REDACTED

Sirote

Sirote & Permutt, PC
2311 Highland Avenue South
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PO Box 55727
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Charles R. Driggars
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Tel: 205-930-5155
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July 26, 2012

VIA FEDERAL EXPRESS

Carolyn McCall
U.S. Environmental Protection Agency
SEIMB 11th Floor
61 Forsyth Street, S. W.
Atlanta, GA 30303

Re: Barry Pattern & Foundry Company, Inc. /
May 21, 2012 CERCLA Section 104 Request for Information

Dear Ms. McCall:

My firm represents Barry Pattern & Foundry Co., Inc. (hereinafter "Barry"). I am writing on behalf of Barry to transmit to you the company's responses to the questions asked in your CERCLA 104 inquiry referenced above. Barry has diligently sought all information in a good faith effort to respond fully and truthfully to your request and to provide you with all requested documentation in a timely fashion.

As you will see from the materials submitted, Barry has occupied its current location at 3333 35th Avenue N., Birmingham, AL 35207 since 1985. It began its smelting operations at this location in 1986, utilizing electric induction furnaces for its operations. Subsequently, it added similar electric induction furnaces for the smelting of aluminum.

As shown by the attached information and documentation, at no time has Barry produced hazardous waste as a result of its operations at this location; nor has Barry violated any air quality regulations set by the Jefferson County Board of Health. Further, according to all available information from Barry and Darrell Brown Trucking, Inc., no waste streams from the facility were ever deposited in the areas denoted in your letter as the "35th Avenue Superfund Site" (hereinafter "the Superfund Site."

Its solid waste material, baghouse dust and foundry sand, have consistently shown extremely low or BDL concentrations of constituents of concerns according to analysis utilizing the Toxic Characteristic Leaching Procedure ("TCLP"). See Attachment D in the enclosed material. Further, all available records, which are enclosed, indicate that this non-hazardous waste material has never been transported off-site for disposal at any of the areas contained in the Superfund Site. See Attachment E.

The enclosed responses and documentation has been primarily gathered by Mr. Robert E. Gurley, Jr., Vice President of Manufacturing, who has been employed in this capacity and at this location throughout the entirety of Barry's operations at this location. Mr. Gurley is therefore the person responding to your inquiries on behalf of Barry. He has been assisted in gathering and organizing this response by Steven K. Osborn, environmental consultant and owner and president of American Environmental Ecology located at 8349 1st Ave., Leeds, AL 35094, and myself.

On behalf of my client, we are pleased to provide the enclosed information and documentation as Barry's full and truthful response to your CERCLA 104 request for information. To the extent any information or documentation is felt by you to be missing, please contact me, and we will do everything possible to supplement this response as needed.

We appreciate the opportunity to work with you to provide you the information about the facility you have requested, and will be more than happy to cooperate and work with you in any manner requested on this matter in the future.

Again, should you have any questions, concerns, or simply wish to discuss this matter further, please do not hesitate to contact me.

Very truly yours,

Charles R. Driggars
FOR THE FIRM

CRD/tv
Enclosures

c: Robert E. Gurley, Jr., Vice President of Manufacturing, Barry Pattern & Foundry Co., Inc.
Steven K. Osborn, Owner and President, American Environmental Ecology

Response of Barry Pattern & Foundry Co., Inc.

Request for Information Pursuant to Section 104 of CERCLA

Volume I

RESPONSE OF BARRY PATTERN AND FOUNDRY COMPANY, INC.
TO REQUEST FOR INFORMATION PURSUANT TO SECTION 104 OF CERCLA
FOR THE 35TH AVENUE SUPERFUND SITE IN AND AROUND
BIRMINGHAM, JEFFERSON COUNTY, ALABAMA

Question # 1. *Identify the person(s) responding to these questions on behalf of the Respondent.*

Answer: Mr. Robert E. Gurley, Jr.
Vice President of Manufacturing
Barry Pattern and Foundry Company
3333 35th Avenue North
Birmingham, AL. 35207

Office Phone: 205-841-8725

Question # 2. *For every question contained herein, identify all persons consulted in the preparation of responses.*

Answer:

1) Mr. Jack S. Barry, Sr. – CEO of Barry Pattern and Foundry Company;

2) Mr. Robert E. Gurley, Jr. – VP of Manufacturing for Barry Pattern and Foundry Company;

3) Mr. Charles R. Driggars – attorney, Sirote Permutt, P.C.;

4) Mr. Steve K. Osborn – American Environmental Ecology – Consultant;

5) Mr. Ronnie B. Lee – Lee Contracting Co. – Waste Handling;

6) Mr. Lonnie Brown – Brown Trucking Company – Transportation and Disposal.

Question # 3. *For every question contained herein, identify all documents consulted, examined, or referred to in the preparation of the response that contain information responsive to the question, and provide true and accurate copies of all such documents.*

Answer: See **Attachment A.**

Question # 4. *Provide the name, title, address, and phone number of the individual to whom any future correspondence regarding this matter should be directed.*

Answer: Mr. Robert E. Gurley, Jr.
Vice President of Manufacturing
Barry Pattern and Foundry Company
3333 35th Avenue North
Birmingham, AL. 35207

Question # 5. *Identify the legal entity that would be responsible for the liabilities, if any, of Respondent arising from or relating to any release or threatened release of hazardous substances at the Site, including, but not limited to, successors and individuals.*

Answer: Barry Pattern and Foundry Company
3333 35th Avenue North
Birmingham, AL. 35207

Question # 6. *Provide the following information about the Facility:*

a) *Dates of operation;*

Answer: Operations started in August of 1986 after the Electric Furnaces were installed.

b) *Describe the manufacturing processes;*

Answer: A "green sand" mold is made in a steel cope and drag flask and compacted using a hand held sand rammer. Sub angular grain F 50 Ottawa raw sand is added to a custom mix of additives to match our sand to metal ratio requirement. S and B Industrial Minerals in Cincinnati, Ohio mix the Bentonite, cellulose, Seacoal and Gilsonite blend we require and ship it in 2000 pound super sacks to our distributor. The blend and sand are mixed in a Simpson 3F Muller for a set amount of time or until the desired compactibility is reached. Water only is added to temper the sand by activating the clays contained in the mix. No chemicals are used.

The mixed sand is dumped onto a conveyor belt running to molding stations where it is "rammed" around a pattern form. The pattern is removed and the flask parts clamped together. The mold is moved down the roller line where a forklift lifts the mold and places it on the floor where it will be poured.

Special broken cast iron scrap plate and structural steel and clean return grates and risers are melted in a 4,000 pound capacity Pillar Electric Induction Melting furnace. When the furnace is molten and full, it is slagged and a quick lab sample is taken to determine the chemistry. Ferrosilicon, Pet Coke carbon or steel may be added to obtain the correct parameters for the class of iron required for the product being made. The iron is elevated to the desired pouring temperatures and poured directly into a pouring ladle.

The pouring ladle is transported to the mold on the pouring floor using an overhead crane hoist. Molds are poured until the ladle is empty. It is returned to the furnace to be filled again.

When the molten iron in the furnace reaches a predetermined level, it will be loaded again and the melting and pouring process will be repeated as needed. The last furnace will be emptied and " cold started" again daily or when required.

The poured molds are allowed to properly cool and are shaken out in place on the floor. Castings are removed and sent to the cleaning room. The sand is loaded into the reclaim system where the shakers reduce lumps of sand and magnets remove "tramp" iron before the sand arrives at the sand storage silo until needed by the sand mixer.

Material Safety Data Sheets for the raw materials used the manufacturing process are presented in **Attachment B**.

The SIC # is 3321, designated for Gray Iron Foundries and the NAIC# is 331511, designated for Iron Foundries. The manufacturing process and raw materials used have not changed since the beginning of operations on site.

c) *Summarize the production volumes; and*

Answer: The production volumes for 2011 are summarized as follows:

Synthetic Minor Operation Permit Jefferson County Facility Number 0040	4-01-0040-02
Electric Industion Furnace Permit Permit Nos. 4-07-40-8601 Emission Unit 004 4-07-40-8602 Emission Unit 002	
GRAY IRON	
Gray Iron Charged	687 Tons
Gray Iron Casting Produced	515 Tons
Hours of Operation	1235 Hours
Process Ratio	.56 Tons
Control Equipment	None
DUCTILE IRON	
Ductile Iron Charged	8.10 Tons
Ductile Iron Castings Produced	5.3 Tons
Hours of Operation	12 Hours
Process Ratio	.68 Tons/Hour
Control Equipment	None
ALUMINUM	
Aluminum Charged	23 Tons
Aluminum Castings Produced	16.1 Tons
Hours of Operation	239 Hours
Process Ratio	.10 Tons/Hour
Control Equipment	None
EMISSION UNIT 003 Cleaning Table (Pangborn) with Fabric Filter System	
Hours of Operation	111 Hours/Year
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005
A Sand Storage Silo, A Sand Elevator, A Shaker Screen, And Foundry Area all connected to a 11,000 SCFM (Aerology) Dust Collector

Average Tons of Sand Used Per Day	21 Tons
Hours of Operation	307 Hours/Year
Control Equipment	11,000 SCFM Aercology Dust Collector

EMISSION UNIT 005
San Muller (Simpson 3F) with a 1137 DSCFM Cartridge type dust collector (Micro-Air)

Average Tons of Sand Mixed Per Day	23 Tons
Hours of Operation	630 Hours / Year
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)
Natural Gas Used	1,446,600 Cu. Ft.
#2 Gas Used (Diesel)	774 Gallons
LPG Gas for Inplant Vehicles	2489 Gallons

Production Volumes, by year, are presented in **Attachment C**.

d) *Describe the use, storage, and disposal of foundry brick or sand.*

Answer: F 50 Ottawa raw sand is supplied in 2000 pound super sacks and is stored on pallets in the foundry. It is transported to the sand mixer on a pallet when needed. Sand is reconditioned and reused until the sand grain is small enough to be drawn into the dust collector as "fines". A small amount of sand is collected for disposal during the cleanup of the molding areas. The waste is non-hazardous (see **Attachment D** for most recent analyses) and transported by Brown Trucking to their landfill.

Question # 7. *Provide all information and records for any entities (public and private) including, but not limited to, industrial/commercial manufacturing plants, municipal properties, or residences that may have received fill dirt, foundry brick, or sand, from the Facility. Include the following for any such transaction:*

a) *State whether this material contained hazardous substances;*

Answer: This wastes generated do not and have not contained hazardous substances; the most recent analysis is presented in **Attachment D**. The manufacturing process and raw materials used have not changed since the beginning of operations on site.

b) *State the location from which any such material originated; and*

Answer: Barry Pattern and Foundry Company
3333 35th Avenue North
Birmingham, AL. 35207

c) *State the location to which any such materials were taken.*

Answer: To Brown landfill, transported by Brown Trucking located at 8669 County Line Road, Dora, AL 35062. See **Attachment E.**

Question # 8. *List all names under which the Facility or the Company has ever operated and has ever been incorporated. For each name, provide the following information:*

Answer: Barry Pattern and Foundry Company (BarryCraft).

a) *Whether the Facility or Company continues to exist, indicating the date and means by which it ceased operations (e.g., dissolution, bankruptcy, sale) if it is no longer in business; management personnel; and*

Answer: The company continues to exist.

b) *Names, addresses, and telephone numbers of all registered agents, officers, and operations management personnel; and*

Answer: Please **Attachment F**.

c) *Names, addresses, and telephone numbers of all subsidiaries, unincorporated divisions or operating units, affiliates, and parent corporations if any, of the Facility and the Company.*

Answer: Please **Attachment F**.

Question # 9. *Identify all 1) Officers of the Facility and the Company; 2) Shareholders; and/or 3) Members of the board of directors.*

Answer: Please **Attachment F**.

Question # 10. *Provide any RCRA Facility Investigation (RFI) Reports, RCRA Facility Assessments (RFA) Reports, Corrective Measures Studies, Interim Measures Reports, Confirmatory Sampling Reports, Notices of Hazardous Waste Activity, Closure Plans, and Post-Closure Plans, if any, that have been prepared for the Facility or the Company.*

Answer: Please **Attachment G.**

Question # 11. *Identify all federal, state and local authorities that regulate(d)the Facility's operations dealing with health and safety and environmental concerns during operations conducted at the Facility.*

Answer:

1) Jefferson County Department of Health, 1400 Sixth Avenue South, Birmingham, Al. 35202;
2) The Alabama Department of Environmental Management (ADEM) – 1400 Coliseum Blvd., Montgomery, Al. 36109;
3) Occupational Safety and Health Administration (OSHA) - 950 22nd Street North, Suite 1050, Birmingham, AL 35203; and
4) U. S. Environmental Protection Agency, Region IV, 61 Forsyth Street S. W., Atlanta, Ga. 30303.

Question # 12. *Provide a list of all local, state, and federal environmental permits ever granted to Facility or the Company or obtained on behalf of the Facility or the Company (e.g. RCRA permits, NPDES permits, Air permits, ect.) on any facility or property located near or within the Site, including but not limited to operations at 3333 35th Avenue N.*

Answer:

1) RCRA Generator ID No. ALN930902002 – Conditionally Exempt Small Quantity Generator;
2) Air Synthetic Minor Operating Permit – 04-07-0040-8601 – Emission Unit 004;
3) Air Synthetic Minor Operating Permit – 04-07-0040-8602 – Emission Unit 002;
4) Air Synthetic Minor Operating Permit – 04-07-0040-9101 – Manual Paint Dip Tank (Inactive since March, 1992).

Question # 13. *Describe all occurrences associated with violations or alleged violations of any environmental laws, citations, and/or malfunctions concerning the Facility or the Company. Provide copies of all documents associated with such occurrences.*

Answer:

1) October 7, 1993, ADEM Warning Letter noted that Barry had not performed waste determinations on each of the solid waste generated by the facility. Barry submitted documentation showing wastes generated were non-hazardous.
2) December 11, 2003, Joint ADEM and EPA RCRA Compliance Assistance Visit. Result: Barry retested its waste materials showing it to be non-hazardous.
3) April 22, 2009, ADEM Compliance Evaluation Inspection. Result: No compliance issues.
4) March 19, 2012, ADEM Compliance Evaluation Inspection. Result: Barry did not keep closed four 55-gallon containers holding used oil. The facility's representative closed the containers at the time of the inspection.

The Environmental Correspondence is presented in **Attachment G**.

Question # 14. *If production wastes, including floor sweepings, have been disposed onsite in landfills, provide a map marked with the location of any or all such sites, list the chemicals or other items landfilled at each site, and give the dates each site was utilized as a landfill by your company or other companies.*

Answer: Production wastes have not been disposed of on site, but have been stored in one (1) principal location pending disposal as marked on the Facility Location Map which is attached.

Question # 15. *If the manufacturing processes used on the Site involve the utilization of rinse water, give*

a description of the equipment and transport mechanisms used to segregate hazardous substances from the water before it is discharged into navigable waters through an outfall permitted by a National Pollution Discharge Elimination System (NPDES) permit. Provide copies of all such permits granted in conjunction with Site operations. Describe the composition of any sludge material recovered from the cleanup processes of such rinse water; give the means used to transport these sludges to disposal points and list any or all such deposition locations.

Answer: Non-applicable – No rinse water is used in the manufacturing process.

Question # 16. *Identify all current and/or past production records kept by the Company and describe the contents of such records. Provide copies of any records still in the Facility or the Company's possession.*

Answer: Please see **Attachment C**.

Question # 17. *Identify any and all furnaces and ovens that are or have been used at the Facility or the Company in its operations, and describe the specific type(s) of furnaces and/or ovens.*

Answer: The facility operates two (2) 1,000 Kilowatt 4,000 pound capacity Pillar Electric Induction Melting Furnaces and two (2) 300 pound capacity Natural Gas Fired Aluminum Crucible Furnaces.

Question # 18. *Identify all substances including, but not limited to Hazardous Substances that were ground, formulated and/or processed by the Facility.*

Answer: The following substances that are ground, formulated and/or processed by the facility, are presented below:

Furnace -

Fiberfrax Insulating paper placed between the furnace coils and drylining material (SVENSRA) when relining the furnace; Also called J paper

Ethylene Glycol Industrial Grade – used as antifreeze and coolant (50/50 aprox 55 gal) in the closed loop cooling system for the furnaces. Totally enclosed.

Ladle Insulation – cover when pouring hot iron or warming ladle for pouring

Cerwol Blanket – 24"x2"Thick

Fibratec

Ladle Upkeep and pouring sput "wash."

- Black Bull
- PL 70 P

Aluminum Melting –

Morganite Crucible (melting pot) – Actual holding vessel in which the aluminum charged becomes liquid for pouring by heating with natural gas and forced air (snail fan)

Non-ferrous flux – for slagging impurities off the liquid before pouring.

Freeze Cores -

Cosby-Carmichael, Inc. supplies "30-120 Robinson" sand that is mixed with sodium silicate and then "frozen" using CO2 in cylinders

Airgas MSDS – Carbon Dioxide: 1-99%; Argon: Balance

These cores remain in the mold while they are poured. They are separated during shakeout and removed as waste. They can be crushed (easily) and mixed with the molding sand.

Grinding –

Resinoid Bonded Grinding Wheels "Cupwheel"

9" and 4 ½ Flat cutting disc Saint-Gobain Abasives

Cut Off Wheel – Everett Abasive Cutting Wheel

(Shot Blast) Pangborn 6LK Cleaning Machine

ERVIN Industries – Amasteel "460" size steel shot

Cutting/Welding [Maintenance]

ESAB .035 steel welding wire

295 Spoolarc .035 steel welding wire

Southern Gas & Supply Co. – Exchange Cylinders

Oxygen O2

Acetylene – C2H2

25% Carbon Dioxide – 75% ARGON Mixture

Argon

Coating -

Occasional coating of bottom of aluminum hosings and coating cast iron hosings when required

Cutback Asphalt #1710

Commercial Propane -

Forklift fuel in 331/2 # Aluminum Cylinders (AMERIGAS)

Off Road No. 2 Diesel Fuel (Veteran's Oil) -

BOBCAT Fuel – Less than 500 Gallons stored outside in a skid tank

Housekeeping -

Zep Sweeping Compound

ZEP D2-7 Neutral CLNR Disinfectant

ZEP Zep-o-Brite

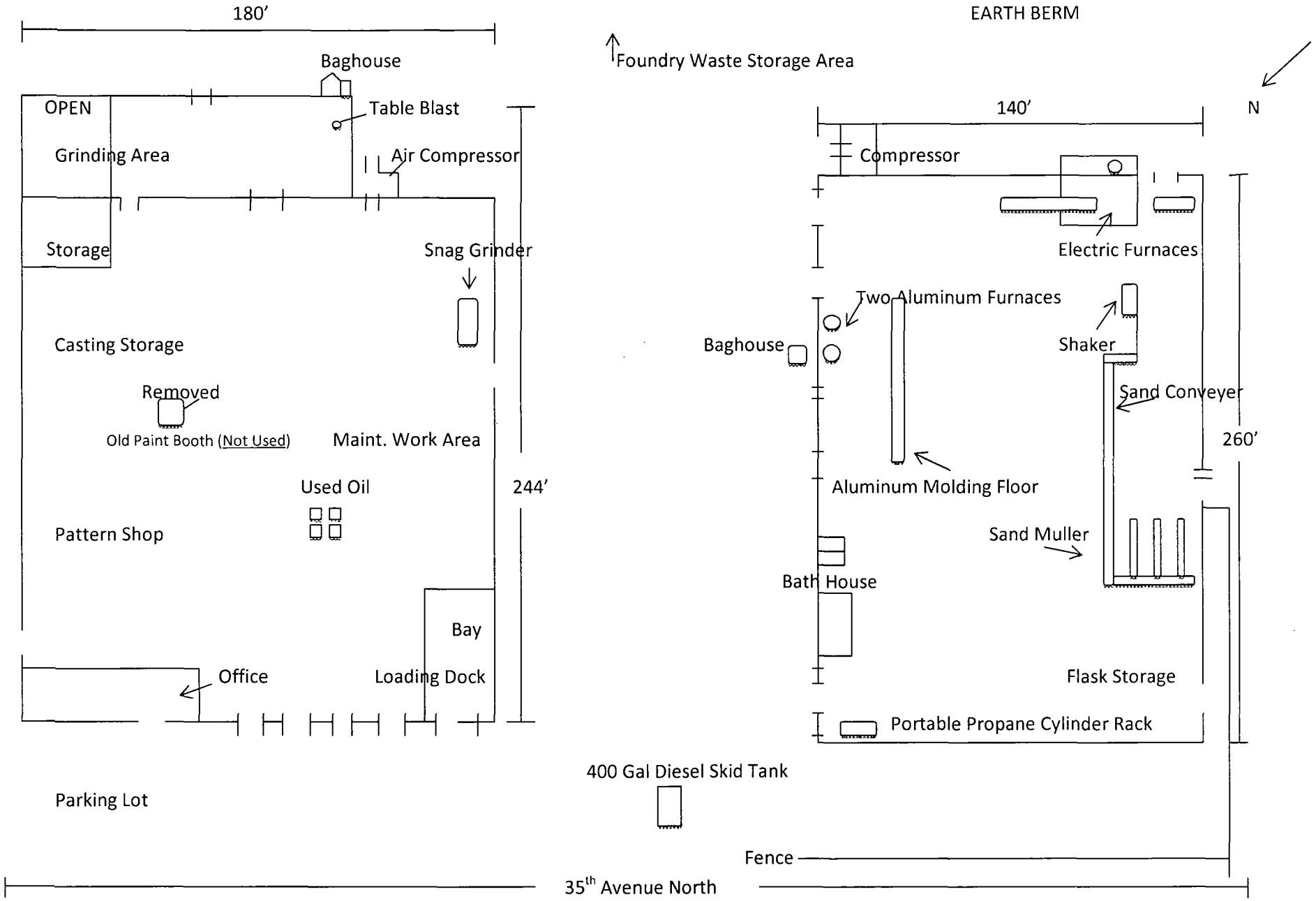
ZEP TKO Hand Cleaner

ZEP Meter Mist Insect Killer

Question # 19. *If you have reason to believe that there may be persons able to provide a more detailed or complete response to any Question contained herein or who may be able to provide additional*

responsive documents, identify such persons and the additional information or documents that they may have.

Answer: Mr. Lonnie Brown, Owner
Darrell Brown Trucking, Inc.
8669 County Line road
Dora, AL 35062
(205) 324-2470
(Transportation and disposal of non-hazardous solid waste material from respondent)



BARRY PATTERN & FOUNDRY CO. INC. 3333 35TH AVENUE NORTH BIRMINGHAM, ALABAMA 35207

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ATTACHMENT A

List of Reference Documents

3333 35th Avenue North
Birmingham, AL. 35207

APPENDIX A- List of All Documents

This Appendix contains a *List of All Documents consulted, examined or referred to in preparation of responses to the questions listed in the May 21, 2012 Request for Information Pursuant to Section 104 of CERCLA for the 35th Avenue Superfund Site*. This list is presented in order of the documents, true and accurate copies of which, are contained in the following Appendices.

APPENDIX B- MSDS Sheets

A list of the Material Safety Data Sheets (MSDSs) is provided in front of copies of the MSDSs provided in **Appendix B**.

APPENDIX C- Production Volumes

Production Data 2011

Production Data 2010

Production Data 2009

Production Data 2008

Production Data 2007

Production Data 2005

Production Data 2004

Production Data 2002

Production Data 2001

Production Data 2000

Production Data 1999

Production Data 1997

Production Data 1996

Production Data 1994

Production Data 1993

Production Data 1992

Production Data 1991

3333 35th Avenue North
Birmingham, AL. 35207

Production Data 1990

APPENDIX D- Analysis

Safety Environmental Laboratories, Inc. Lab Analyses 2003

Analytical Systems, Inc. Laboratory Report 1998

APPENDIX E- WASTE DISPOSAL TICKETS

Check No. 50576 for Jefferson County Department of Health- Annual Compliance Verif – Synthetic Minor Permit 2012

Purchase Order No. 3041 for Safety-Kleen Systems, Inc. – Pick up for used oil for recycling. Approx. 130 gallons. 2012

Check No. 49739 Ronnie Lee- 8 loads of trash 2011

Invoice No. 114232 – Darrell Brown Trucking Inc. – Jul 13, 2011

Time Sheet No. 630785- Darrell Brown Trucking, Inc. 2011

Invoice No. 113703 – Darrell Brown Trucking Inc. – Nov 24, 2010

Time Sheet No. 634843- Darrell Brown Trucking, Inc. - 2010

Invoice No. 113247- Darrell Brown Trucking, Inc.- Apr 6, 2010

Time Sheet No. 631940- Brown Trucking, Inc.- Apr 6, 2010/ Time Sheet No. 632066- Brown Trucking, Inc.- Apr 6, 2010

Invoice No. 112531- Darrell Brown Trucking, Inc.- Mar 5, 2009

Time Sheet 59772- Brown Trucking, Inc.- March 4, 2009

Invoice No. 112735- Darrell Brown Trucking, Inc.- Jun 9, 2009

Time Sheet No. 60344- Brown Trucking, Inc.- Jun 9, 2009

Check No. 1086- Brown Trucking, Inc. – June 30, 2009

Time Sheet No. 60520- Brown Trucking, Inc.- June 30, 2009

Posted Transaction List- Periods 12-04 Through 12-04 as of 03/24/05

Posted Transaction List- Periods 10-00 Through 10-00 as of 12/06/00

Posted Transaction List- December 2001

Posted Transaction List- Periods 12-99 Through 12-99 as of 02/03/00

3333 35th Avenue North
Birmingham, AL. 35207

Posted Transaction List- 1997

Posted Transaction List- 1995

Posted Transaction List- June 1990

Posted Transaction List- 1989

*Between 1986 through 1988, there was not enough production to generate enough waste for disposal.

APPENDIX F- BOD, Shareholders, Officers

List of Barry Pattern and Foundry Co Inc. BOD, Shareholders, and Officers

APPENDIX G- SMOP Environmental Reports

Emissions Calculations Summary- 2007

Emissions Calculations Summary- 2006

Emissions Calculations Summary- 2005

Emissions Calculations Summary- 2004

Emissions Calculations Summary- 2003

Emissions Calculations Summary- 2002

Emissions Calculations Summary- 2001

Emissions Calculations Summary- 2000

Emissions Calculations Summary- 1999

Emissions Calculations Summary- 1998

Emissions Calculations Summary- 1997

Emissions Calculations Summary- 1994

Emissions Calculations Summary- 1992

APPENDIX H- Agency Correspondence

EPA Letter- May 21, 2012

Warning Letter and Correction Adequate EPA Letter- March 19, 2012

2010 Annual Compliance Verif- Synthetic Minor – Invoice No. 110100044

ADEM Preliminary Inspection Report- Apr 14, 2009

3333 35th Avenue North
Birmingham, AL. 35207

ADEM Results of Compliance Evaluation Inspection- Apr 22, 2009

Jefferson County Department of Health- Full Compliance Evaluation Inspection for 2009

Jefferson County Department of Health- Full Compliance Evaluation Inspection for 2004

EPA Letter- RCRA Compliance Assistance Visit- Dec 11, 2003

FY 2001 Synthetic Minor Source Inspection Report- November 2, 2000

Risk Management Plan Applicability- November 24, 1999

FY 1999 Synthetic Minor Source Inspection Report- November 4, 1998

Jefferson County Department of Health- Comprehensive Compliance Inspection- November 5, 1998

Jefferson County Department of Health- Comprehensive Compliance Inspection- November 24, 1997

FY 1998 Synthetic Minor Source Inspection Report- November 19, 1997

Jefferson County Department of Health- Comprehensive Inspection for Air Emissions- December 5, 1994

ADEM- Warning Letter- October 7, 1993

FY 1992 Annual Inspection Report- March 11, 1992

ATTACHMENT B

Material Safety Data Sheets

MSDS- Barry Foundry, Inc.

85 RAM 1
85 RAM 2
90 RAM PC
ALUMINUM SHAPES
AVON NON SILICA DRY PARTING
BARAMIX
BLACK BEAUTY
BLACK BULL
CALCINATED ALUMINA
CALINED PETROLEUM COKE
CARBON STEEL SCRAP
CORN FLOUR
FERROCILICON ALLOYS
GRAFLOK STR
GRAPH- HEX 18
GRAY IRONS
MAGNESIUM FERROSILICON
NON SILICA PARTING
PERILITE ORE
PL 70 P
RAW SILICA 2
RAW SILICA SAND 1
RESIN BONDED ALUMINUM
SEA COAL
SILICA SAND AND GROUND SILICA 1
SILICA SAND AND GROUND SILICA 2
SILICON CARBIDE 2
SILICON CARBIDE
SODIUM SILICATE
SUPER 3000
SUPER CASTABLE 32-1
SUPER CASTABLE 32- 2
SVENSKA SILICA
WESTERN BENTONITE 1
WESTERN BENTONITE 2

FIBERFRAX CONVERTER BULK
ETHYLENE GLYCOL INDUSTRIAL GRADE
CER-WOOL BLANKET LT, RT, HP, HTA
FIBRATEC BULK, CHOPPED, BLANKET & MODULES LT, RT, HP, GT, HTZ
MORGANITE CRUCIBLE LIMITED
NON-FERROUS FLUX
NATURAL SAND & GRAVEL
CARBON DIOXIDE: 1-99%; ARGON: BALANCE
PHENOLIC RESIN BONDED ABRASIVE PRODUCTS
BONDED ABRASIVE PRODUCT
CALENDERED, RESIN/RUBBER, AND RESINOID ABRASIVE CUTTING WHEELS
CAST STEEL
STEEL WIRE, 035: ESAB SPOOLARC 295
OXYGEN O_2
ACETYLENE- C_2H_2
CARBON DIOXIDE- ARGON MIXTURE
ARGON
PIPE COATING CUTBACK ASPHALT #1710
ODORIZED COMMERICAL PROPANE
NO. 2 DIESEL FUEL
SWEEPING COMPOUND
DZ-7 NEUTRAL CLNR DISINFECTANT
ZEP-O-BRITE
ABRASIVE HAND CLEANER
ZEP METER MIST INSECT KILLERS

MATERIAL SAFETY DATA SHEET

Effective Date Sept.1, 1982

SECTION I. IDENTIFICATION

PRODUCT NAME: Fiberfrax Converter Bulk

CHEMICAL FAMILY: Alumino-Silicate Fibers

CHEMICAL NAME: ---

CHEMICAL FORMULA: ---

MANUFACTURER'S NAME AND ADDRESS:

THE CARBORUNDUM COMPANY
INSULATION DIVISION
P. O. BOX 337
NIAGARA FALLS, N.Y. 14302

TELEPHONE NO. (716)-278-2000

SECTION II. PHYSICAL DATA

APPEARANCE & ODOR:	White Fibers; No odor	
SPECIFIC GRAVITY (H_2O=1):	2.73g/cc	BOILING PT.: ---
VOLATILES (% BY WT.):	---	WATER SOLUBILITY: None

OTHER

SECTION III. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV
* We do not have a hazardous number rating but Factory Mutual Research has given the product a 0 rating as per ASTME 84		

SECTION IV. FIRE AND EXPLOSION DATA

FLASH PT.: --- | FLAMMABILITY LIMITS: ---

EXTINGUISHING MEDIA:
Non-flammable

UNUSUAL FIRE & EXPLOSION HAZARDS: ---

SPECIAL FIRE-FIGHTING PROCEDURES: ---

SECTION V. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:

ACGIH (TLV) - Nuisance Dust - 10mg/m^3 total; 5mg/m^3 respirable

OSHA (PEL) - Nuisance Dust - 15mg/m^3 total; 5mg/m^3 respirable

EFFECTS OF OVER EXPOSURE:

Contact with free ceramic fibers may cause temporary skin and upper respiratory irritation.

EMERGENCY FIRST AID PROCEDURES:

Remove from exposure. Wash skin gently with warm water and mild soap. Wash eyes with copious amounts of water. Effects of inhalation decrease upon removal from exposure.

NOTES:

Sensitivity to ceramic fibers vary with individuals. Contact can be decreased by wearing loose fitting long sleeve clothing. Barrier creams can be used to decrease skin irritation of sensitive persons.

SECTION VI. REACTIVITY DATA

STABILITY		HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
STABLE	UNSTABLE	MAY OCCUR	WILL NOT OCCUR	
XX			XX	---

INCOMPATIBILITY: (MATERIALS TO AVOID)	Hydrofluoric acid and concentrted alkali
HAZARDOUS DECOMPOSITON PRODUCTS:	---

SECTION VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:	Wet down area and sweep or vacuum.
WASTE DISPOSAL METHODS:	Dispose of in accordance with Local, State and Federal regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	Use NIOSH approved respirator (such as 3M brand 8710) when appropriate.
VENTILATION:	Adequate ventilation to maintain airborne concentration of fibers below TLV.
PROTECTIVE GLOVES:	Cotton, if desired
EYE PROTECTION:	Safety glasses or goggles, if necessary
OTHER PROTECTIVE EQUIPMENT:	---

SECTION IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: General cleanliness

OTHER PRECAUTIONS:

Some cristobalite may be formed when products are used at elevated temperatures (above approximately 1600°F) for extended periods of time. Care should be taken to minimize dusting and proper respiratory protection is recommended in the handling of Fiberfrax products that have been used in the above conditions.

Carborundum believes that the information contained herein is accurate. It is based on tests and data supplied by technically knowledgeable persons, but is not all-inclusive since the manner and conditions of use, storage and handling may vary. This information is offered solely for your consideration investigation and verification. It is not to be construed as a warranty or representation or authorization for patent infringement for which Carborundum disclaims responsibility.

MATERIAL SAFETY DATA SHEET REGULATORY DATA

INDUSTRIAL CHEMICALS INC. - PO BOX 660688 - BIRMINGHAM, ALABAMA - 35266-0688 - (205) 823-7330

FILE UPDATE: 11/8/2002 **MSDS VERSION DATE:** 7/8/2002

PRODUCT CODE: GLY200 **ORIGINAL ENTRY:** 10/27/1992

PRODUCT NAME: **ETHYLENE GLYCOL INDUSTRIAL GRADE** 108352

CAS Numbers and Names of the Primary Chemical and/or its Components

		MAXIMUM %
107-21-1	1,2-ETHANEDIOL	99.99

TITLE III, SECTION 313 REGULATED CAS REGISTRY NUMBERS AND NAMES

107-21-1	1,2 ETHANEDIOL	99.99

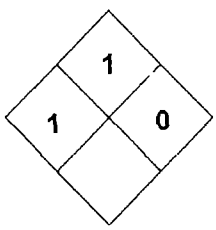
Extremely Hazardous Substance subject to section 302 emergency planning and notification requirements (EHS)	NO
Hazardous chemical and/or components subject to section 311 and 312 MSDS and inventory requirements (OSH)	YES
Toxic chemical and/or components subject to toxic chemical release reporting under Section 313 (TOXIC)	YES
Hazardous contents subject to section 304 spill reporting of Comprehensive Environmental Liability Act (CERCLA)	YES
Subject to the reporting requirements of the EPA Toxicity Characteristic Leaching Process (CFR40 261.24)	NO
This product, or its components, are listed on or are exempt from the Toxic Substance Control Act (TSCA)	YES
Contains a Toxic Air Pollutant listed under the 1990 Clean Air Act Ammendments [42 USC sec 7412(b)(1)].	YES
Subject to the EPA Risk Management Program under Section 112(r) of the Clean Air Act and 40 CFR Part 68	NO

* INFORMATION NOT AVAILABLE

SARA Title III Hazard Categories

	Fire Hazard
	Reactivity Hazard
	Sudden Release of Pressure
	Acute Health Hazard (Immediate)
X	**Chronic Health Hazard (Delayed)**
	Extremely Hazardous Substance

___ NFPA X HMIS



HEALTH	1
FLAMMABILITY	1
REACTIVITY	0

V2.5/ 051398

Department of Transportation Data

D.O.T. Shipping Name (CFR49 172.101(2))

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Hazard Class (CFR49 172.101(3))

9

ID Number (CFR49 172.101(4))

UN3082

ERG Guide #: 171

Packing Group: III

RQ #: 5000

FLASHPOINT ° F / Method: 241 F

Handling & Storage

HUNTSMAN

MATERIAL SAFETY DATA SHEET

READ AND UNDERSTAND MATERIAL SAFETY DATA SHEET BEFORE HANDLING OR DISPOSING OF PRODUCT

PRODUCT CODE AND NAME	:	*EGIND ETHYLENE GLYCOL - INDUSTRIAL*
DATE ISSUED	:	*7/8/2002*
DATE PRINTED	:	*11/1/2002*

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL IDENTITY

PRODUCT CODE AND NAME

EGIND ETHYLENE GLYCOL - INDUSTRIAL

Chemical Name and/or Family or Description:

Glycol

COMPANY INFORMATION

Huntsman Petrochemical Corporation
P.O. Box 27707
Houston, TX 77227-7707

TELEPHONE NUMBERS
Transportation Emergency
Company: (409) 727-0831
CHEMTREC: (800) 424-9300
Medical Emergency: (409) 722-9673 (24 Hour)
General MSDS Assistance: (713) 235-6432
Technical Information: (512) 459-6543

2. COMPOSITION AND INFORMATION ON INGREDIENTS

THE CRITERIA FOR LISTING COMPONENTS IN THE COMPOSITION SECTION ARE AS FOLLOWS: CARCINOGENS ARE LISTED WHEN PRESENT AT 0.1 % OR GREATER; COMPONENTS WHICH ARE OTHERWISE HAZARDOUS ACCORDING TO OSHA ARE LISTED WHEN PRESENT AT 1.0 % OR GREATER; NON-HAZARDOUS COMPONENTS ARE LISTED AT 3.0 % OR GREATER. THIS IS NOT INTENDED TO BE COMPLETE COMPOSITIONAL DISCLOSURE. REFER TO SECTION 14 FOR APPLICABLE STATES' RIGHT TO KNOW AND OTHER REGULATORY INFORMATION.

Product and/or Component(s) Carcinogenic According to:

OSHA IARC NTP OTHER NONE X

Composition:

Chemical Name	CAS Number	Exposure Limits	Range in %
1,2-ethanediol (Common Name-Ethylene glycol)	107-21-1	50 ppm CEILING-OSHA 39.4 ppm CEILING-ACGIH (AEROSOL) (A4)	95.00-99.99

THIS PRODUCT IS CONSIDERED HAZARDOUS ACCORDING TO OSHA (1910.1200).
REFER TO SECTION 16 OF MSDS FOR PROHIBITED PRODUCT APPLICATIONS.

PRODUCT CODE AND NAME	:	***EGIND ETHYLENE GLYCOL - INDUSTRIAL***
DATE ISSUED	:	***7/8/2002***
DATE PRINTED	:	***11/1/2002***
COMPANY	:	***HUNTSMAN***

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Appearance:

Colorless liquid

Odor:

Mild odor

WARNING STATEMENT

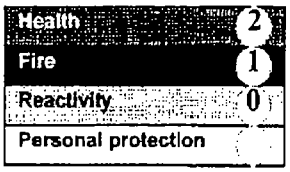
WARNING ! HARMFUL IF SWALLOWED
MAY CAUSE DIZZINESS AND DROWSINESS
MAY CAUSE EYE IRRITATION
ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE
FOR INDUSTRIAL USE ONLY
CAN CAUSE LIVER AND KIDNEY DAMAGE IF SWALLOWED

ATTENTION ! CONTAINS ETHYLENE GLYCOL WHICH MAY CAUSE BIRTH DEFECTS BASED ON ANIMAL DATA

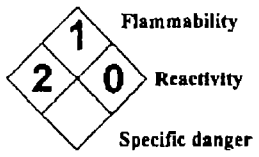
THIS PRODUCT IS NOT TO BE USED IN FOOD, DRUG, COSMETIC OR POTABLE WATER APPLICATIONS

THIS PRODUCT IS NOT TO BE USED TO PRODUCE FOGS OR MISTS IN THEATRICAL, MUSICAL OR OTHER ENTERTAINMENT PERFORMANCES

Hazardous Material Information System (United States)



National Fire Protection Association NFPA (United States)



POTENTIAL HEALTH EFFECTS

Primary Route of Exposure

Eye X Skin X Inhalation X Ingestion

Effects of Overexposure

Acute:

Eyes: May cause irritation, experienced as mild discomfort and seen as slight excess redness of the eye.

Skin: Brief contact may cause slight irritation. Prolonged contact, as with clothing wetted with material, may cause more severe irritation and discomfort, seen as local redness and swelling. Other than the potential skin irritation effects noted above, acute (short term) adverse effects are not expected from brief skin contact; see other effects, below, and Section 11 for information regarding potential long term effects.

PRODUCT CODE AND NAME	:	***EGIND ETHYLENE GLYCOL - INDUSTRIAL***
DATE ISSUED	:	**7/8/2002**
DATE PRINTED	:	**11/1/2002**
COMPANY	:	**HUNTSMAN**

Inhalation: Vapors or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness. Prolonged or repeated overexposure may result in the absorption of potentially harmful amounts of material.

Ingestion: Aspiration may occur during swallowing or vomiting, resulting in lung damage. Contains ethylene glycol and/or diethylene glycol, which are toxic when swallowed. A lethal dose for an adult is 1-2 ml per kilogram, or about 4 ounces (one-half cup). Symptoms include headache, weakness, confusion, dizziness, staggering, slurred speech, loss of coordination, faintness, nausea and vomiting, increased heart rate, decreased blood pressure, difficulty breathing and seeing, pulmonary edema, unconsciousness, convulsions, collapse, and coma. Symptoms may be delayed. Decreased urine output and kidney falure may also occur. Severe poisoning may cause death.

Sensitization Properties: Unknown

Chronic:

Repeated ingestion may cause kidney damage.

Medical Conditions Aggravated by Exposure:

Because of its irritating properties, repeated skin contact may aggravate an existing dermatitis (skin condition). Repeated overexposure may aggravate existing kidney disease.

Other Remarks:

None

4. FIRST AID MEASURES

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Get medical attention.

Skin:

Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

Ingestion:

If person is conscious and can swallow, immediately give two glasses of water (16 oz.) but do not induce vomiting. If vomiting occurs, give fluids again. Have physician determine if condition of person will permit induction of vomiting or evacuation of stomach. Do not give anything by mouth to an unconscious or convulsing person.

Inhalation:

If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Other Instructions:

Ethylene glycol (EG) and diethylene glycol (DEG) intoxication may initially produce behavioral changes, drowsiness, vomiting, diarrhea, thirst, and convulsions. EG and DEG are nephrotoxic. End stages of poisoning may include renal damage or failure with acidosis. Supportive measures, supplemented with hemodialysis if indicated, may limit the progression and severity of toxic effects.

FOR ETHYLENE GLYCOL POISONING intravenous ethanol is a recognized antidotal treatment ; other antidotal treatments also exist for EG poisoning. FOR DIETHYLENE GLYCOL POISONING the role of intravenous ethanol in the treatment is unclear but it may be of benefit in view of structural and toxicological similarities to ethylene glycol. Contact a Poison Center for further treatment information.

PRODUCT CODE AND NAME	: ***EGIND***	***ETHYLENE GLYCOL - INDUSTRIAL***
DATE ISSUED	: **7/8/2002**	
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COMPANY	: **HUNTSMAN**	

Aspiration of this product during induced emesis may result in severe lung injury. If evacuation of stomach is necessary, use method least likely to cause aspiration, such as gastric lavage after endotracheal intubation. Contact a Poison Center for additional treatment information.

5. FIRE-FIGHTING MEASURES

Ignition Temperature - AIT (degrees C):

Not determined.

Flash Point (degrees C):

117.8 (244 F) (PMCC)

Flammable Limits % (Lower-Upper):

Lower: Not Determined
Upper: Not Determined

Recommended Fire Extinguishing Agents And Special Procedures:

Use water spray, dry chemical, foam, or carbon dioxide to extinguish flames. Use water spray to cool fire-exposed containers. Water or foam may cause frothing.

Unusual or Explosive Hazards:

None

Special Protective Equipment for Firefighters:

Wear full protective clothing and positive pressure breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products.

6. ACCIDENTAL RELEASE MEASURES (Transportation Spills: CHEMTREC (800)424-9300)

Procedures in Case of Accidental Release, Breakage or Leakage:

Ventilate area. Avoid breathing vapor. Wear appropriate personal protective equipment, including appropriate respiratory protection. Contain spill if possible. Wipe up or absorb on suitable material and shovel up. Prevent entry into sewers and waterways. Avoid contact with skin, eyes or clothing.

7. HANDLING AND STORAGE

Precautions to be Taken in

Handling:

Minimum feasible handling temperatures should be maintained.

Storage:

Periods of exposure to high temperatures should be minimized. Water contamination should be avoided.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective Equipment (Type)

Eye/Face Protection:

Safety glasses, chemical type goggles, or face shield recommended to prevent eye contact.

Skin Protection:

Workers should wash exposed skin several times daily with soap and water. Soiled work clothing should be laundered or dry-cleaned.

PRODUCT CODE AND NAME	: ***EGIND***	***ETHYLENE GLYCOL - INDUSTRIAL***
DATE ISSUED	: **7/8/2002**	
DATE PRINTED	: **11/1/2002**	
COMPANY	: **HUNTSMAN**	

Respiratory Protection:

Airborne concentrations should be kept to lowest levels possible. If vapor, mist or dust is generated and the occupational exposure limit of the product, or any component of the product, is exceeded, use appropriate NIOSH or MSHA approved air purifying or air supplied respirator after determining the airborne concentration of the contaminant. Air supplied respirators should always be worn when airborne concentration of the contaminant or oxygen content is unknown.

Ventilation:

Adequate to meet occupational exposure limits (see below).

Exposure Limit for the Total Product:

Ethylene glycol: OSHA CEILING 50 ppm; ACGIH CEILING 39.4 ppm (aerosol)

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Colorless liquid

Odor:

Mild odor

Boiling Point (degrees C):

197.8 (388 F)

Melting/Freezing Point (degrees C):

-13.3 (8 F)

Specific Gravity (water=1):

1.12

pH:

6.5

Vapor Pressure:

.1 mmHg at 20 C (68 F)

Viscosity:

18.7 cSt at 20 C (68 F)

VOC Content:

<1% by ASTM D 2369

Vapor Density (Air=1):

2.1

Solubility in Water (%):

>10

Other:

None

PRODUCT CODE AND NAME	: *EGIND*	*ETHYLENE GLYCOL - INDUSTRIAL*
DATE ISSUED	: *7/8/2002*	
DATE PRINTED	: *11/1/2002*	
COMPANY	: *HUNTSMAN*	

10. STABILITY AND REACTIVITY

This Material Reacts Violently With:

Air Water Heat Strong Oxidizers Others None of these X

Comments:

None

Products Evolved When Subjected to Heat or Combustion:

Toxic levels of carbon monoxide, carbon dioxide, irritating aldehydes and ketones may be formed on burning. Heating in air may produce irritating aldehydes, acids, and ketones.

Hazardous Polymerizations:

DO NOT OCCUR

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION (ANIMAL TOXICITY DATA)

Oral:
Animal data does not reflect human toxicity; see Sections 3 & 11
Inhalation:
Not determined.
Dermal:
LD50 Believed to be > 1.00 - 2.00 g/kg (rabbit) slightly toxic

IRRITATION INDEX, ESTIMATION OF IRRITATION (SPECIES)

Skin:
(Draize) Believed to be > .50 - 1.00 /8.0 (rabbit) slightly irritating
Eyes:
(Draize) Believed to be 15.00 - 25.00 /110 (rabbit) slightly irritating
Sensitization:
Not determined.

Other:

Oral administration of ethylene glycol to pregnant experimental animals has been shown to cause birth defects in the offspring. These effects were not seen when ethylene glycol was administered by dermal application or by inhalation. Continuous ingestion of a diet contaning 1% or 2% ethylene glycol for two years produced liver and kidney damage, and bladder stones in rats.

12. DISPOSAL CONSIDERATIONS:

Waste Disposal Methods:

This product has been evaluated for RCRA characteristics and does not meet the criteria of a hazardous waste if discarded in its purchased form. Under RCRA, it is the responsibility of the user of the product to determine at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc. may render the resulting materials hazardous.

Remarks:

This product is potentially biodegradable.

PRODUCT CODE AND NAME	: *EGIND*	*ETHYLENE GLYCOL - INDUSTRIAL*
DATE ISSUED	: 7/8/2002	
DATE PRINTED	: 11/1/2002	
COMPANY	: HUNTSMAN	

13. TRANSPORT INFORMATION

Transportation

DOT:

Proper Shipping Name:
Not regulated in drums

Hazard Class:
Not regulated in drums

Identification Number:
Not regulated in drums

Packing Group:
Not regulated in drums

Label Required:
Not regulated in drums

Depending on container size, spills of this product may require reporting under SARA 304 and/or CERCLA 102(A) regulations. Please refer to Sections 2 and 14 of MSDS for composition and component RQ information.

IMDG

Proper Shipping Name:
Not regulated for drums

Hazard Class
Not regulated for drums

Identification Number
Not regulated for drums

Packing Group
Not regulated for drums

Label Required
Not regulated for drums

ICAO

Proper Shipping Name:
Not regulated for drums

Hazard Class
Not regulated for drums

Identification Number
Not regulated for drums

Packing Group
Not regulated for drums

Label Required
Not regulated for drums

TDG

Proper Shipping Name:
Not regulated

Hazard Class:
Not regulated

Identification Number:
Not regulated

PRODUCT CODE AND NAME	:	***EGIND ETHYLENE GLYCOL - INDUSTRIAL***
DATE ISSUED	:	**7/8/2002**
DATE PRINTED	:	**11/1/2002**
COMPANY	:	**HUNTSMAN**

Label Required:
Not regulated

14. REGULATORY INFORMATION

Federal Regulations:

SARA Title III:

Section 302/304 Extremely Hazardous Substances

Chemical Name	CAS Number	Range in %	TPQ	RQ
None.				

Section 311 Hazardous Categorization:
Acute X Chronic X Fire Pressure Reactive N/A

Section 313 Toxic Chemical

Chemical Name	CAS Number	Concentration
1,2-ethanediol (Common Name-Ethylene glycol)	107-21-1	95.00-99.99

CERCLA 102(a)/DOT Hazardous Substances:

Chemical Name	CAS Number	Range in %	RQ
1,2-ethanediol (Common Name-Ethylene glycol)	107-21-1	95.00-99.99	5000

States Right-to-Know Regulations:

Chemical Name	State Right-to-know
1,2-ethanediol	FL, IL, MA, NJ, PA, RI

State list: CT (Connecticut), FL (Florida), IL (Illinois), MI (Michigan), LA (Louisiana), MA (Massachusetts), NJ (New Jersey), PA (Pennsylvania), RI (Rhode Island)

California Prop. 65:
The following detectable components of this product are substances, or belong to classes of substances, known to the State of California to cause cancer and/or reproductive toxicity.

Chemical Name	CAS Number
None.	

INTERNATIONAL REGULATIONS:

TSCA Inventory Status:
This product, or its components, are listed on or are exempt from the Toxic Substance Control Act (TSCA) Chemical Substance Inventory.

WHMIS Classification:
Class D, Div 1, Subdiv B: Toxic Class D, Div 2, Subdiv A: Teratogenic

Canadian Inventory Status:
This product, or its components, are listed on or are exempt from the Canadian Domestic Substance List (DSL).

EINECS Inventory Status:
This product, or its components, are listed on or are exempt from the European Inventory of Existing Chemical Substances (EINECS) or the European List of Notified Chemical Substances (ELINCS).

Australian Inventory Status:
This product, or its components, are listed on or are exempt from the Australian Inventory of Chemical Substances (AICS).

Japan Inventory Status:

PRODUCT CODE AND NAME	**:**	***EGIND ETHYLENE GLYCOL - INDUSTRIAL***
DATE ISSUED	**:**	**7/8/2002**
DATE PRINTED	**:**	**11/1/2002**
COMPANY	**:**	**HUNTSMAN**

This product, or its components, are listed on or are exempt from the Japan Ministry of International Trade and Industry (MITI) inventory.

15. ENVIRONMENTAL INFORMATION

Aquatic Toxicity:

Aquatic toxicity rating is believed to be > 100.00 mg/liter practically nontoxic to aquatic organisms.

Mobility:

Not determined.

Persistence and Biodegradability:

This product is considered to be readily biodegradable and is not expected to persist in the environment.

Potential to Bioaccumulate:

This product is not expected to bioaccumulate.

Remarks:

None

16. OTHER INFORMATION 7/8/2002

Acute or chronic oral consumption of products containing ethylene glycol can produce significant adverse health effects, including death, in humans and animals. Keep out of reach of children and pets.

Due to toxicity considerations with ethylene glycol, the following applications are considered to be prohibited applications: Potable Water Applications; Food, Drug and Cosmetic Formulations; Antifreeze for potable water systems in recreational vehicles and seasonal homes; Antifreeze for fire sprinkler systems.

This product is not to be used to produce fogs or mists in theatrical, musical or other entertainment performances.

Huntsman recommends that all exposures to this product be minimized by strictly adhering to recommended occupational controls procedures to avoid any potential adverse health effects.

THE INFORMATION CONTAINED HEREIN IS BELIEVED TO BE ACCURATE. IT IS PROVIDED INDEPENDENTLY OF ANY SALE OF THE PRODUCT FOR PURPOSE OF HAZARD COMMUNICATION AS PART OF HUNTSMAN'S PRODUCT SAFETY PROGRAM. IT IS NOT INTENDED TO CONSTITUTE PERFORMANCE INFORMATION CONCERNING THE PRODUCT. NO EXPRESS WARRANTY, OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE IS MADE WITH RESPECT TO THE PRODUCT OR THE INFORMATION CONTAINED HEREIN. DATA SHEETS ARE AVAILABLE FOR ALL HUNTSMAN PRODUCTS. YOU ARE URGED TO OBTAIN DATA SHEEETS FOR ALL HUNTSMAN PRODUCTS YOU BUY, PROCESS, USE OR DISTRIBUTE AND YOU ARE ENCOURAGED AND REQUESTED TO ADVISE THOSE WHO MAY COME IN CONTACT WITH SUCH PRODUCTS OF THE INFORMATION CONTAINED HEREIN.

TO DETERMINE APPLICABILITY OR EFFECTS OF ANY LAW OR REGULATION WITH RESPECT TO THE PRODUCT, USER SHOULD CONSULT HIS LEGAL ADVISOR OR THE APPROPRIATE GOVERNMENT AGENCY. HUNTSMAN DOES NOT UNDERTAKE TO FURNISH ADVICE ON SUCH MATTERS.

Supercedes: 1/5/2001 **The following sections have been revised: 3, 16**

Date Issued: 7/8/2002.

Inquiries regarding MSDS should be directed to:

HUNTSMAN
Coordinator, Product Safety
P.O. Box 27707
Houston, TX 77227-7707

EMERGENCY RESPONSE GUIDE SHEET

Guide No.: 171

GUIDE 171 - ORANGE PAGE 290 - SUBSTANCES (LOW TO MODERATE HAZARD)

GLY200

POTENTIAL HAZARDS

FIRE OR EXPLOSION
Some may burn but none ignite readily.
Some may polymerize (P) explosively when heated or involved in a fire.
Containers may explode when heated.
Some may be transported hot.

HEALTH
Inhalation of material may be harmful.
Contact may cause burns to skin and eyes.
Inhalation of Asbestos dust may have a damaging effect on the lungs.
Fire may produce irritating, corrosive and/or toxic gases.
Runoff from fire control may cause pollution.

PUBLIC SAFETY
CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
Isolate spill or leak area immediately for at least 10 to 25 meters (30 to 80 feet) in all directions.
Keep unauthorized personnel away. Stay upwind.

PROTECTIVE CLOTHING
Wear positive pressure self-contained breathing apparatus (SCBA).
Structural firefighters' protective clothing will only provide limited protection.

EVACUATION
Fire: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE
FIRE
Small Fires: Dry chemical, CO2, water spray or regular foam.
Large Fires: Water spray, fog or regular foam.
Move containers from fire area if you can do it without risk.
Do not scatter spilled material with high pressure water streams.
Dike fire-control water for later disposal.
Fire involving Tanks
Cool containers with flooding quantities of water until well after fire is out.
Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
ALWAYS stay away from the ends of tanks.

SPILL OR LEAK
Do not touch or walk through spilled material.
Stop leak if you can do it without risk.
Prevent dust cloud.
Avoid inhalation of asbestos dust.
Small Dry Spills: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
Small Spills: Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Large Spills: Dike far ahead of liquid spill for later disposal.
Cover powder spill with plastic sheet or tarp to minimize spreading.
Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID
Move victim to fresh air.
Call emergency medical care.
Apply artificial respiration if victim is not breathing.
Administer oxygen if breathing is difficult.
Remove and isolate contaminated clothing and shoes.
In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: *CER-WOOL® BLANKET LT, RT, HP, HTA*

Internal ID: F009

MSDS No: F009
Revision of: 6/89
Date: November, 1991

National Paint and Coatings Association

Hazardous Material Identification System

HEALTH HAZARD	2 - See Sections VI and IX for more information.
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	E - Glasses, gloves and dust respirator.

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: CER-WOOL® BLANKET LT, RT, HP, HTA

Description: CER-WOOL® BLANKET is an inorganic, amorphous, glass fiber blanket used for reducing heat transmission through furnace, kiln and vessel structures; an aluminosilicate high temperature insulating material.

CAS# Inorganic Glass, None assigned

Manufacture: Premier Refractories and Chemicals, Inc. **Phone:** 215/337-1100

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	CAS Number:	Percent:	Exposure Limits:
Refractory Ceramic Fiber (RCF)	Non-assigned	100	Respirable Dust: 5 mg/m^3 (NIOSH); Total Dust: 10 mg/m^3 (ACGIH TLV-TWA).

Premier Refractories and Chemicals, Inc. recommends an exposure limit of one (1) fiber per cubic centimeter for respirable fiber as an 8-hour time weighted exposure. After-service ceramic fiber may contain crystalline silica in the form of cristobalite. Refer to Section VI for further information. Fiber concentration is determined by time weighted air samples collected and analyzed using NIOSH Method 7400 ("B" counting rules).

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: CER-WOOL® BLANKET LT, RT, HP, HTA

Internal ID: F009

MSDS No: F009
Revision: 6/89
Date: November, 1991

SECTION III. PHYSICAL DATA

Appearance and Odor: White to off-white, wool type fiber mat, no odor.

Boiling Point: Not Applicable
Vapor Pressure: Not Applicable
Water Solubility (%): 0
Vapor density (air=1): Not Applicable
Evaporation rate: Not Applicable
Specific Gravity: 4-8 lbs/ft^3
Melting Point: >2900°F (1590°C)
% volatile by volume: 0

SECTION IV. FIRE AND EXPLOSION DATA

Extinguishing Media: This refractory insulation product is non-combustible. Use extinguishing media appropriate to the surrounding fire.

Unusual fire or explosion hazards: None

Special fire-fighting procedures: None

SECTION V. REACTIVITY DATA

This refractory ceramic fiber product is stable under all normal conditions of storage. Hazardous polymerization will not occur.

Chemical incompatibilities: Hydrofluoric Acid

Hazardous decomposition Products: None

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: Ceramic fiber can cause eye and skin irritation. Dust from this product contains a respirable fiber and may also contain crystalline silica. A respirator must be worn when exposure limits are exceeded.

Medical conditions which may be aggravated by contact: Dust from the product may aggravate existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Target organs: Eyes, skin, and respiratory system.

Primary entry route: Inhalation

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety, MSDS Info 215/337-1100

Product: CER-WOOL® BLANKET LT, RT, HP, HTA

Internal ID: F009

MSDS No. / F009
Revision: 6/89
Date: November, 1991

HEALTH HAZARD INFORMATION continued from page 2

Acute effects:
Transitory upper respiratory physical irritation. Irritation and inflammation to the eyes on contact and to the skin on prolonged contact.

Chronic effects:
The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including RCF) in 1987. IARC classified RCF as possibly carcinogenic to humans (Group 2B). IARC's classification of RCF was based on sufficient evidence of carcinogenicity in experimental animals in the absence of data on the carcinogenicity of RCF to humans. Additionally, IARC classified crystalline silica, which may be found in after-service RCF, as probably carcinogenic to humans (Group 2A).

Signs & symptoms of overexposure:

Eye contact: Physical irritation

Skin contact: Physical irritation

Inhalation: Upper respiratory irritation

First aid:
Eye contact: Flush eyes, including under the eyelids, with large amounts of water. If irritation persists, seek medical attention.

Skin contact: Wash with mild soap and water.

Inhalation: Remove to fresh air.

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Spill / Leak procedures:

Carefully clean-up material into a suitable container, being careful to avoid creating any dust. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

Waste management / Disposal:

This product does not exhibit any characteristics of a hazardous waste. Follow all local, state and federal regulations for proper disposal.

MSDS F009 continues on page 4

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: CER-WOOL® BLANKET LT, RT, HP, HTA

Internal ID: F009

MSDS No. F009
Revision: 6/89
Date: November, 1991

SECTION VIII. SPECIAL PROTECTION INFORMATION

Personal protective equipment: Goggles, gloves, respirators, long sleeve clothing and head covering.

Respiration Protection: Premier Refractories currently recommends an exposure limit of one fiber per cubic centimeter (1 f/cc) for respirable airborne ceramic fiber as an 8-hour time weighted average exposure. Provide workers with NIOSH/MSHA-approved respirators in accordance with requirements of 29 CFR 1910.134 when airborne concentrations of respirable fiber and/or cristobalite exceed the recommended limits.

The following are recommended respirator types for the varying respirable airborne concentrations of ceramic fiber and/or cristobalite.

Fiber	Cristobalite	Respirator Type
< 1 f/cc	< 0.05 mg/m^3	Optional disposable respirator (example: 3M 9900)
1-5 f/cc	0.05-0.5 mg/m^3	Half-mask air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges (example: 3M 6340).
5-25 f/cc	0.5-2.5 mg/m^3	Full-facepiece air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges (example: 3M 7800 with 7255 filters) or powered air-purifying respirator (PAPR) with HEPA filter cartridges.
>25 f/cc	>2.5 mg/m^3	Any supplied-air respirator operated in positive pressure mode (example: 3M 7800 with W9435 hose and W3196 regulator connected to clean air supply).

Airborne fiber and cristobalite concentrations are determined by time-weighted air samples collected and analyzed using NIOSH Method 7400 ("B" counting rules) and 7500, respectively. Exposures are expressed as 8-hour time weighted averages.

Pending results of long-term health effects studies, engineering controls (i.e. ventilation) and work practices should be established to control levels of airborne fiber to the lowest level attainable.

SAFE HANDLING PROCEDURES FOR WORKING WITH REFRACTORY CERAMIC FIBER PRODUCTS

1. Provide engineering controls where feasible to reduce airborne fiber concentrations to the lowest attainable level.
2. Use NIOSH/MSHA-approved respirators per the above exposure guidelines.
3. Wash exposed clothing to prevent it from becoming laden with dust. Use of disposable work clothing is preferred.
4 Wash exposed skin surfaces with mild soap and water after handling.
5. Refrain from smoking, eating or drinking in refractory ceramic fiber work areas.
6 Minimize accumulation of debris by cleaning up materials which fall to ground as soon as possible.
7. Refrain from dry sweeping and use of compressed air for cleaning. HEPA-filtered vacuuming is the preferred method for waste removal. When HEPA equipment is not available, wet sweeping methods should be used.

MSDS continues on page 5

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: CER-WOOL® BLANKET LT, RT, HP, HTA

Internal ID: F009

MSDS No. / F009
Revision: 6/89
Date: October, 1991

SECTION IX. SPECIAL PRECAUTIONS

Further Precautions:
Product which has been in service above 1650°F (900°C) may undergo partial conversion to cristobalite, a form of crystalline silica which presents a health hazard if inhaled over long periods of time. Cristobalite is classified as a probable human carcinogen by IARC, Group 2A.

AFTER-SERVICE RCF REMOVAL PRECAUTIONS:

1. EMPLOYEES SHOULD BE APPRISED OF THE HAZARDS AND PROPER CONDITIONS AND PRECAUTIONS FOR SAFE USE OR EXPOSURE.
2. NIOSH-approved respirators, in accordance with requirements of 29CFR 1910.134 should be used according to the above guidelines for dust levels above the OSHA PEL (8-hour TWA) of 0.05 mg/m^3 for cristobalite.
3. Dust generation should be minimized by the use of dust control equipment or water spray when feasible.
4. Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA - AVOID BREATHING DUST - DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

SARA TITLE III INFORMATION:
This product does not contain any substances reportable under SARA TITLE III Sections 302, 304, and 313.

TSCA INVENTORY:
All substances contained in this product are listed in the Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

DOT Class: Not Regulated

Data Source Code(s): 1,7,31,55,85,86,87,89

SECTION X. ACRONYMS/DEFINITIONS USED IN THIS MSDS

ACGIH:	American Conference of Governmental Industrial Hygienists
CAS#:	CAS Registration Number is an assigned number to identify a material. CAS stands for Chemical Abstracts Service.
f/cc:	Fibers per cubic centimeter
HMIS™:	Hazardous Materials Identification System (National Paint & Coatings Association)
IARC:	International Agency for Research on Cancer
MSHA:	Mine Safety and Health Administration
mg/m^3:	Milligrams per cubic meter
NIOSH:	National Institute for Occupational Safety and Health
NFPA:	National Fire Protection Association
OSHA:	Occupational Safety and Health Administration
PEL:	Permissible Exposure Limit (OSHA)
RCF:	Refractory Ceramic Fiber
REL:	Recommended Exposure Limit (NIOSH)

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: CER-WOOL® BLANKET LT, RT, HP, HTA

Internal ID: F009

MSDS No. / F009
Revision:
Date: November, 1991

ACRONYMS/DEFINITIONS continued from page 5

SARA:	Superfund Amendments and Reauthorization Act
TITLE III:	Emergency Planning and Community Right To Know Act
Section 302:	Extremely Hazardous Substances
Section 304:	Emergency Release
Section 313:	Toxic Chemicals
TLV:	Threshold Limit Values (ACGIH)
TWA:	Time Weighted Average
29CFR1910.134:	OSHA Respiratory Protection Standard

Prepared/revised by: A.G.Nighswander
November 6, 1991

Although reasonable care has been taken in the preparation of the information contained herein, Premier Refractories and Chemicals, Inc. extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

NUTEC FIBRATEC

MATERIAL SAFETY DATA SHEET

I CHEMICAL PRODUCT AND IDENTIFICATION

Material/ Product Name(s): Fibratec* Bulk, Chopped, Blanket & Modules LT, RT, HP, HT,HTZ

CAS#: 142844-00-6

Chemical family: Inorganic amorphous glass fiber RCF (Refractory Ceramic Fiber)

General use: A high-temperature insulating material.

Manufacturer/Supplier:

Nutec Fibratec, S.A. de C.V.
Carretera Saltillo-Monterrey No. 100 (km 62.5)
66359 Santa Catarina, N.L., México.
Phone (MX): +52 (81) 8151-4646
www.nutecfibratec.com

II INGREDIENTS / COMPOSITION

Material or Component	CAS No.†	%	Hazard Data
Refractory Ceramic Fiber (RCF) Refractory Ceramic Fiber (RCF) (with zirconia) (Contains no asbestos)	142844-00-6 142844-00-6	98- 100	Respirable dust: 5 mg/m³ (NIOSH); Total Dust: 10 mg/m³ (ACGIH TLV-TWA)

Chemical Abstract Service Number

Nutec Fibratec, S.A. de C.V. recommends an exposure limit of 0.5 fiber per cubic centimeter for respirable fiber as an 8-hour time weighted exposure. After service ceramic fiber may contain crystalline silica in the form of cristobalite; refer to Section 16. Fiber concentration is determined by time weighted air samples collected and analyzed using NIOSH Method 7400 ("B" counting rules).

III HAZARDS IDENTIFICATION

HMIS

HEALTH HAZARD	2- MODERATE
FLAMMABILITY HAZARD	0 – MINIMAL
REACTIVITY HAZARD	0 – MINIMAL
PERSONAL PROTECTION	E – Glasses, Gloves, Dust Respirator

EMERGENCY OVERVIEW:

The fiber is a physical eye, skin and upper respiratory irritant. Dust generated from this product contains respirable fiber. Product is not a fire or spill hazard.

Medical conditions which may be aggravated by contact:

Dust from the product may aggravate existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Target organs:

Lungs, Eyes, Skin.

Primary route(s) of entry:

Inhalation.

Acute effects:

Upper respiratory irritation, including irritation of throat. Irritation and inflammation to eyes on contact and to the skin on prolonged contact.

Chronic effects:

The international agency for research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including RCF) in 1987. IARC classified RCF as "possibly carcinogenic to humans" Group 2B. IARC's classification of RCF was based on sufficient evidence of carcinogenicity in experimental animals in the absence of data on the carcinogenicity of RCF to humans. Additionally, IARC classified cristobalite, which may be found in after-service RCF, and quartz, which may be found at low levels in some of the raw materials as "Known Human Carcinogens – Group 1. NTP lists the respirable polymorphs of crystalline silica (cristobalite and quartz) amongst substances which may "reasonably be anticipated to be carcinogens". The long-term, excessive inhalation of respirable RCF and/or dust particulate containing crystalline silica in the respirable size range, may contribute to the development of industrial bronchitis reduced breathing capacity, and lead to increased susceptibility to other lung disease.

Signs & symptoms of overexposure:

Eye contact:

Fiber and/or particulate may contribute to the development of moderate eye irritation.

Skin Contact:

Abrasiveness of fiber may contribute to the development of skin irritation.

Inhalation:

Inhalation of airborne particulate can irritate upper respiratory system as well as the throat.

Ingestion:

An unlikely route of exposure. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms will include irritation and may include nausea, vomiting and abdominal pain.

IV FIRST AID MEASURES

Eye contact:

Flush eyes, including under the eyelids, with large amounts of water. If irritation persists, seek medical attention.

Skin contact:

Wash affected areas with mild soap and water.

Inhalation:

Remove victims from adverse environment to fresh air.

Ingestion:

Ingestion is an unlikely route of exposure. If ingested in sufficient quantity and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspired into the lungs. Seek immediate medical attention.

V FIRE FIGHTING MEASURES

NFPA Code: Flammability: 0 Health: 0 Reactivity : 0 Special : 0

Flash point:

Product is not combustible.

Extinguishing Media:

Use extinguishing media appropriate to combustibles in area of fire.

Fire fighting instructions:

Firefighters should wear NIOSH-approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

VI ACCIDENTAL RELEASE MEASURES

Spill procedures:

Carefully, cleanup and place material into a suitable covered container, being careful to avoid creating any airborne dust; Use EPA filtered vacuum equipment if available, if not, use a dust suppressant with sweeping; do not use compressed air. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

VII HANDLING AND STORAGE

These products are stable under all conditions of storage. Store in original container in a dry area. Keep container closed when not in use. Avoid creating dust.

VIII EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering controls:

Pending results of long-term health effects studies, engineering controls (i.e. ventilation) and work practices to control levels of airborne fibers to the lowest level attainable. Provide sufficient ventilation, in both volume and airflow patterns, to control the fiber/dust concentrations below allowable exposure limits.

Personal protective equipment:

Goggles, gloves, respirators, long sleeve clothing and head covering.

Respiration protection:

Nutec Fibratec currently recommends an exposure limit of 0.5 fibers per cubic centimeter (0.5 f/cc) for respirable airborne ceramic fiber as an 8-hour time weighted average

exposure. Provide workers with NIOSH/MSHA-approved respirators in accordance with requirements of 29

CFR 1910.134 when airborne concentrations of respirable fiber and/or cristobalite exceed the recommended limits.

The following are recommended respirator types for varying respirable airborne concentrations of ceramic fiber and/or cristobalite.

Fiber	Cristobalite	Respirator Type
< 1 f/cc	< 0.05 mg/m^3	Optional disposable respirator (example: 3M 9900)
1 – 5 f/cc	0.05 – 0.5 mg/m^3	Half-mask air-purifying respirator equipped with high-efficiency particulate air (HEPA) filtered cartridges (example: 3M 6340)
5 – 25 f/cc	0.5 – 2.5 mg/m^3	Full-facepiece air-purifying respirator equipped with high-efficiency particulate air (HEPA) filtered cartridges (example: 3M 7800 with 7255 filters) or powered air-purifying respirator (PAPR) with HEPA filtered cartridge.
> 25 f/cc	> 2.5 mg/m^3	Any supplied-air respirator operated in positive pressure mode (example: 3M 7800 with W9435 hose and W3196 regulator connected to clean air supply).

Airborne fiber and cristobalite concentrations are determined by time-weighted air samples collected and analyzed using NIOSH method 7400 ("B" counting rules) and 7500, respectively. Exposures are expressed as 8-hour time weighted averages.

IX PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point N/A	Melting Point >3200°F (1760°C)
Specific Gravity (g/cc) 2.5 – 2.7	Freezing Point N/A
Evaporation Rate N/A	Vapor Pressure N/A
% Volatile by Vol. 0	Solubility in H_2O 0
Appearance and Odor White, odorless, fibrous material	Bulk Weight (lbs/ft^3) 4-16
PH N/A	

X STABILITY AND REACTIVITY

Hazardous Polymerization: Will not occur.

Chemical Incompatibilities: Hydrofluoric acid, strong acid and alkali vapors.

Hazardous Decomposition Products: None

NUTEC FIBRATEC

MATERIAL SAFETY DATA SHEET

XI TOXICOLOGICAL INFORMATION

Epidemiology:

Industry epidemiologic investigations of RCF production workers and surveillance of customer's employees using RCF is ongoing. Preliminary interim results[1], obtained from employees in RCF manufacturing facilities, is as follows:

1. - There is no evidence of any fibrotic lung disease (interstitial fibrosis) on x-ray.
2. - There is no evidence of any lung disease among those employees exposed to RCF that have never smoked.
3. - A statistical trend was observed in exposed population between the duration of exposure to RCF and a decrease in some measures of pulmonary function. These observations are clinically insignificant. In other words, if these observations were made on an individual employee, the results would be interrupted as being with in the normal range.
4. – Pleural plaques (thickening along the chest wall) have been observed in a small number of employees who had a long duration of employment. There are several occupational and non-occupational causes for pleural plaque. It should be noted that plaques are not pre-cancer nor are they associated with any measurable effects on lung function.

Toxicology:

The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including ceramic fiber, glasswool, rockwool, and slagwool) and classified MMVF as a possible human carcinogen (Group 2B). IARC's 2B classification was based on sufficient evidence of carcinogenicity in the experimental animals and inadequate evidence (no data) of the carcinogenicity in the experimental of ceramic fiber to the humans.

A number of studies on the health effects of inhalation exposure of rats and hamster have recently been completed. In a lifetime nose-only inhalation study[2,3], rats exposed the Maximum Tolerated Dose of 30 mg/m^3 (approximately 200 fibers /cc) developed progressive lung damage and cancers of the lung and of the pleura (lining of the chest wall and lung). In contrast, hamsters similarly exposed developed interstitial fibrosis and pleural cancer, but no lung cancer. Cancer of the pleura is called mesothelioma.

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[1] Lockey, J.E., Lemasters, G.K., Rice, C.M., McKay, R.T., et al, (1994) Epidemiological Study Assessing Respiratory Effects of workers exposed to Ceramics Fibers, Department of Environmental Health, University of Cincinnati, College of Medicine.

[2] Mast, R.W., McConnell, E.E., Anderson, R., et al, (1993) Studies on the Chronic Toxicity (Inhalation) of four types of Refractory ceramic Fiber in Male Fisher 344 Rats. Submitted for publication.

[3] Glass, L. E., Mast, R. W., Hesterberg, T. H., et al. Inhalation Oncogenicity of Refractory Ceramic Fiber (RCF) in Rats Final Results. (1992) The Toxicologist.

In another lifetime nose-only inhalation study [4,5], rats were exposed to three different concentrations of RCF (3,9, and 16 mg/m^3 , approximately 25 , 75 and 115 fibers per cc respectively). The data from this study demonstrated a dose-response relationship in the

biological affects of RCF in rats. There is no RCF related increase in lung tumors at 3, 9, or 16 mg/m^3 . A pleural fibrosis and mesothelioma were seen in single rat in the mid-dose (9 mg/m^3) group. In addition, no consistently diagnosed fibrosis was seen below 9 mg/m^3. Pulmonary fibrosis was observed at 9 and 16 mg/m^3.

Toxicological information on other components contained in the product: The balances of the components contained in the product have no LD_{50} or LC_{50} found for oral, dermal, or inhalation routes of administration.

XII ECOLOGICAL INFORMATION.

No data available on any adverse ecological effects from this material.

XIII DISPOSAL INFORMATION.

Waste Management/ Disposal: This product does not exhibit any characteristics of a hazardous waste. It is a recommended that the product should be contained is bags or suitable closed containers to prevent creating any airborne dust during disposal. The product is suitable for landfill disposal. However, debris generated during installation, maintenance or tear-out procedures may be contaminated whit other hazardous materials. Therefore, appropriate waste analysis may be necessary to determine proper disposal. Waste characterization and disposal/treatment methods should be determined by a qualified environmental professional in accordance whit applicable federal, state and local regulations.

XIV TRANSPORT INFORMATION.

US Department of transportation:

Not regulated by DOT as a hazardous material. No hazard class, no label or placard required, no UN or NA number assigned.

Canadian TDG hazard Class & PIN: Not regulated.

XV REGULATORY INFORMATION.

SARA TITLE III:

These products do not contain any substances reportable under SARA Selections 302, 304, and 313. Sections 311 and 312 do apply. (Routine reporting and Chemical Inventories).

TSCA:

All substances in this product are listed in the chemical substance inventory [(sections 8(b)]. Refractory, fiber aluminosilicate (RCF) CAS# 142844-00-6 is substance to the TSCA Export Notification Requirements [Section 12(b)] or TSCA.

OSHA:

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[4] Mast, R.W., McConnell, Hesterberg, T. H., et al, (1993) A Multiple Dose Chronic Inhalation Toxicity of Size Selected Kaolin Refractory Ceramic Fiber (RCF) in Male Fisher 344 Rats. Submitted for publication.

[5] Mast, R.W., McConnell, E.E., Glass, L. R., al. A Multiple Dose Chronic Inhalation Toxicity Study of Kaoline in Refractory Ceramic Fiber (RCF) in Male Fisher 344 Rats. (1993). The Toxicologist.

NUTEC FIBRATEC

MATERIAL SAFETY DATA SHEET

Comply whit Hazard Communication Standard 29 CFR 1910.134 and 29 CFR 1926.103.

CALIFORNIA:

Listed as "Ceramic Fibers (airborne particles of respirable size)" Proposition 65 and the Safe Drinking Water and Toxic Enforcement Act of 1986.

XVI OTHER INFORMATION.

Special Precautions:

Product which has been in service above 1800°F (982°C) may undergo partial conversion to cristobalite, a form of crystalline silica which presents a health hazard if inhaled over long periods of time. Cristobalite is classified by IARC as a "Known Human Carcinogen – Group A". NTP lists cristobalite amongst substances which may "reasonably be anticipated to be carcinogens"

AFTER-SERVICE RCF REMOVAL PRECAUTIONS:

1. -Employees should be apprised of the hazards and proper conditions and precautions for safe use or exposure.
2. – NIOSH -approved respirators, in accordance with requirements of 29 CFR 1910.134 Should be used according to the above guideline for dust levels above the OSHA PEL (8-hours TWA) of 0.05 mg/m^3 for cristobalite.
3. - Dust generations should be minimized by the use of dust control equipment or water spray when feasible.
4. - Wear protective clothing and vacuum clean prior to removing clothing
5. - Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA - AVOID BREATHING DUST – DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

Acronyms and References Used in Preparation of MSDS:

ACGIH:	American Conference of Governmental Industrial Hygienists
CAS#:	CAS Re Number is assigned number to identify a material. CAS stands for Chemical Abstracts Service.
F/cc:	Fibers per cubic centimeter.
HMIS:	Hazardous Materials Identification system (National Paint & Coatings Association).
IARC:	International Agency for Research on Cancer.
MSHA:	Mine Safety and Health Administration.
Mg/m^3 :	Milligrams per cubic meter.
NIOSH:	National Institute for Occupational Safety a
NFPA:	National Fire Protection Association.
NTP:	National toxicology program.
OSHA:	Occupational Safety and Health Administration.
PEL:	Permissible Exposure Limit (OSHA).
RCF:	Refractory Ceramic Fiber.
REL:	Recommended Exposure Limit (NIOSH).
RTECS:	Registry of Toxic Effects of Chemical Substances.
SARA:	Superfund Amendments and Reauthorization Act.
TITLE III:	Emergency Planning and Community Right To Know Act
Section 302.	Extremely Hazardous Substance.
Section 304.	Emergency Release.

NUTEC FIBRATEC

MATERIAL SAFETY DATA SHEET

Section 311 & 312 Community right-to-know, MSDSs, Chemical Inventory.
Section 313: Toxic Chemical.
TLV: Threshold Limit Values (ACGIH):
TWA: Time weighted Average.
29CFR1910.134: OSHA Respiratory Protection Standard.

References:

Sax, N. Irving: Dangerous Properties Of Industrial Materials, Seventh Edition, Van Nostrand Reinhold Co., Inc., 1989.
Kirk, R. and Othmer, D., Encyclopedia of Chemical Technology, Third Edition, Wiley-Interscience, New York, NY 1980.
Clansky, K.B., Suspect Chemical Sourcebook, 1992-2 Edition, Roytech Publications, Bethesda, Maryland.
Sax N, Irving and Lewis, R. J. Hawley's Condensed Chemical Directory, Eleventh Ed., Van Nostand Reinhold Co, Inc., NY.
Manufacturers / Suppliers, Material Safety Data Sheets on Raw Materials Used.

Prepared / revised by: F. Miranda
May, 2007.

Although reasonable care has been taken in the preparation of the information contained herein, Nutec Fibratec, S.A de C.V. extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

MATERIAL SAFETY DATA SHEET
BULLETIN DE SECURITE DU MATERIEL

SECTION I - NAME AND PRODUCT - NOM ET PRODUIT

anufacturer's name - Nom du fabricant	Address - adresse
MORGANITE CRUCIBLE LIMITED	WOODBURY LANE, NORTON, WORCESTER.

Téléphone/regular/d'affaires	Téléphone/emergency/en cas d'urgence

Trade name - Nom du produit	Synonyms - Synonymes
SALAMANDER EXCEL	SILICON CARBIDE

SECTION II - HAZARDOUS INGREDIENTS AND PHYSICAL PROPERTIES - COMPOSES DANGEREUX ET PROPRIETES PHYSIQUES

INGREDIENTS-HAZARDOUS -DANGEREUX	%	TLV. LD_{50} (units)
NONE		

Boiling Point:
Point d'ébullition: NOT KNOWN

Melting point:
Point de fusion: > 1600°C

Specific gravity (H_2O=1) 1.8 - 1.9
Poids specifique

% volatile by volume:
% volatil par volume: N/A

Vapor pressure: (760 mm de Hg) N/A
Tension de vapeur:

Solubility in H_2O (%)
Solubilité dans l'eau: NONE

Evaporation rate (_____=1) N/A
Evaporation (taux de):

Vapor density (air=1) N/A
Densité de vapeur:

Remarks - Remarques	Appearance and odor - Apparence et odeur

SECTION III - FIRE AND EXPLOSION DATA - FEU ET EXPLOSION

Flash Point Point éclair	(method - méthode)	Flammable limits - Limite d'inflammation
	N/A	Lower - Inférieure Higher - Supérieure

Autoignition Température	Extinguishing media - Matériel extincteur
	N/A

Special fire fighting procedures - Techniques spéciales pour combattre le feu

N/A

Explosive Hazard - Risques d'explosion

IN THE PRESENCE OF ABSORBED WATER MOLTEN METAL IN THE CRUCIBLE WILL GENERATE STEAM WHICH CAN BLOW OFF SECTIONS OF CRUCIBLE.

Conditions to avoid - Etats à éviter

CRUCIBLES MUST NOT BE WET WHEN MELTING METAL IN THEM.

Incompatibility - Incompatibilité (materials to avoid - matériaux à éviter)

☐ H_2O ☐ Acid-Acide ☐ Base-Base ☐ Corrosive-Corrosif
☐ Oxydant material-Matériel oxydant ☐ Other-Autres ☐

Dangerous decomposition of products - Produites à décomposition dangereuse

N/A

Dangerous polymerization Polymérisation dangereuse	May occur Peut se produire		Conditions to avoid-Etats à évi
	Will not occur Ne se produira pas	✓	CRUCIBLES MUST NOT BE WE

SECTION V - PRECAUTIONS - REQUIREMENTS

Stockage:
Storage: STORED UNDER COVER

Handling: PROTECTIVE GLOVES SHOULD
Manutention: BE WORN

Specific personnal protective equipment - Matériel de protection individuelle

Clothings:
Vêtements: N/A

Respiration devices:
Système de respiration: N/A

Ventilation requirements-Ventilation

N/A

Step to be taken if material is released or spilled
Marche à suivre en cas de fuite ou de renversement

N/A

Waste disposal-Elimination des déchets

SECTION VI - HEALTH HAZARD INFORMATION - DOMMAGES OCCASIONNES A LA SANTE

Route of exposure - Voies d'exposition

Inhalation-Inhalation:
Skin Contact-Contact épidermique:
Skin absorption-Absorption cutanée:
Eye contact-Contact oculaire:
Ingestion-Ingestion:

N/A

Effects of over exposure-Effets de la surexposition

Emergency and first aid - Cas d'urgence et premiers soins

Eyes-Yeux:
Skin-Peau: WHEN BREAKING UP CRUCIBLES THE BROKEN EDGES ARE EXTREMELY SHARP AND CAN EASILY CUT THE HANDS. PROTECTIVE GLOVES SHOULD BE WORN.

ATT: BOB Fax #841-1972 1/2/06

Section 1: PRODUCT AND COMPANY IDENTIFICATION

American Metal Chemical Company
835 West Smith Road
Medina, Ohio 44256-2424
Company Phone Number: (330) 725-4501 (24 hours)
Company Fax Number: (330) 723-0487

3546 South Morgan Street
Chicago, Illinois 60609-1524
Company Phone Number: (773) 254-1818
Company Fax Number: (773) 254-4722

Product Name: NS-511 **Synonym Name:** N/A
Recommended Use: Non-ferrous flux.
Issue Date: ~~01/02/2006~~
Supersedes Date: 01/31/2003

Section 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

May cause eye irritation.
Contains fluoride.
Irritating to eyes, skin and mucous membranes.
Ingestion may cause vomiting, abdominal cramps and diarrhea.

OSHA regulatory status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential acute health effects:

Inhalation: Inhalation may cause irritation or minor burning of mucous membranes.
Skin: Contact with product and/or by-product could cause irritation on the skin.
Eyes: Contact with the product and/or by-product could cause irritation, pain, tearing, reddening, swelling and itching of the eyes.
Ingestion: Contact could cause mild to violent stomach disorders such as diarrhea, upset stomach, burning sensations and digestive tract bleeding. If elimination is blocked by another disorder, ingestion may affect central nervous system.

Potential chronic health effects:

Carcinogenic Effects: Not classified or listed by IARC, NTP, OSHA, EU or ACGIH.
Mutagenic Effects: Not known to be mutagenic.
Other: Chronic exposure to fluorides well above the PEL or TLV may cause bone fluorosis. Prolonged exposure of skin to the product may cause dermatitis.

Target organs: Eyes, lungs, kidneys, bones and skin. See Section 11 for Toxicological Information.

Potential environmental effects: Fluorides can be highly toxic, especially to fish and aquatic plants. Cleanup spills promptly to avoid product entering the environment. See Section 12 for Ecological Information.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	EC No.	% by Wt.
a. Sodium Nitrate	7631-99-4	231-554-3	5 to 15%
b. Sodium Fluorosilicate	16893-85-9	240-934-8	5 to 15%
c. Non-hazardous salts			Balance

Section 4: FIRST AID MEASURES

Probable Routes of Exposure: Inhalation / Skin / Eyes
Skin Contact: Wash with soap and water. If pain or irritation persists, refer to physician.
Eye Contact: Flush with running water for at least 15 minutes. Refer to physician.
Ingestion: Call Poison Control Center. Never give anything by mouth to someone who is unconscious or convulsing. Induce vomiting only on the advice of a medical professional.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing difficult, give oxygen. Refer to physician.
Signs/Symptoms/Effects of Overexposure: Irritation of eyes, skin, nausea.

Section 5: FIRE FIGHTING MEASURES

Flammable properties: Product is non-flammable, but contains a small amount of oxidizer. Avoid mixing material with reducing agents or flammable liquids.
Extinguishing Media: Media used to extinguish surrounding area fire.
Unsuitable Extinguishing Media: N/A
Special Fire Fighting Procedure: Remove containers from fire area if safe to do so. Cool containers exposed to fire with water. Heat from surrounding fire may release toxic chlorine, fluorine or nitric oxide gas or acids from product.
Special Protective Equipment for Fire Fighters: Firefighters should wear approved self-contained breathing apparatus (SCBA) and full firefighting turnout gear. Use caution around sealed drums of any kind since pressure buildup from the surrounding fire may cause them to rupture.

Section 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Environmental Precautions: This product is a water pollutant. Keep out of drains, sewers, ditches and waterways. Do not leave product exposed outdoors. Minimize the use of water in cleaning up spills to minimize water pollution.
Methods for Containment: This product is a granular solid. Protect from exposure to water, high winds or vehicular traffic that could disperse it. Clean up spills promptly. Avoid mixing product with reducing agents or flammable materials.
Methods for Cleaning: Ventilate area of leak or spill. Shovel or sweep up material and place in a suitable container for reclamation or disposal, using a method that does not generate excessive dust.

Section 7: HANDLING AND STORAGE

Handling: Avoid breathing dust from this material. Wear safety glasses with side shields or chemical goggles to prevent eye injury. Provide adequate ventilation. In areas where the permissible exposure limit may be exceeded, wear appropriate respiratory protection. Wear PVC, Neoprene or similar polymeric gloves

when handling the material. Avoid prolonged contact with the skin. Wash hands and face thoroughly before eating, drinking or smoking.

Storage: Store in dry place below 150° F. Keep container closed when not in use. Observe shelf life for storage. Avoid storing near flammable materials or reducing agents.

Section 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Exposure Guidelines:

Component	OSHA (PEL)		ACGIH (TLV)		Units
	TWA	STEL	TWA	STEL	
Sodium Nitrate (1)	15 (T)	N.E. (2)	10 (T)	N.E.	mg/m^3
	5 (R)	N.E.	3 (R)	N.E.	mg/m^3
Sodium Fluorosilicate	2.5 (as F-)	N.E.	2.5 (as F-)	N.E.	mg/m^3

(1) No specific limits have been established for this component. As a guideline, OSHA has established limits for inert or nuisance dusts. Particulates not Otherwise Regulated (PNOR) have a total (T) dust TWA (8 hour) of 15 mg/m^3 and a respirable (R) dust TWA (8 hour) of 5 mg/m^3. ACGIH has also established a TLV for inert, insoluble particulates total (T) dust TWA (8 hour) of 10mg/m^3 and a respirable (R) dust TWA (8 hour) of 3 mg/m^3.

(2) N.E. = Not Established

Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below the recommended exposure limits.

Personal Protective Equipment (PPE): During normal use and operation, wear chemical goggles and impermeable gloves to minimize exposure. If airborne levels are at or above the recommended exposure limit or in the event the product is spilled, wear NIOSH-approved respiratory protection. Additional PPE may be necessary, depending on user operations to avoid prolonged contact of the product with skin.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Crystalline particles
Odor: Odorless
pH: N/A
Boiling Point: N/A
Melting Point: N/A
Flashpoint: N/A
Explosive Properties: N/A
Vapor Pressure: N/A
Relative Density: S.G./Apparent Density: 1.8 to 2.0 (Water = 1.0)
Vapor Density (Air=1): N/A
Solubility: High in Water
Flash Point: N/A
Flammable Limits: LEL: N/A UEL: N/A
Hazardous Polymerization: No
Corrosive: No
Stable: Yes **Unstable:** No
Incompatibility: Strong Acids, Strong Oxidizers, Reducing Agents.
Thermal Decomposition Products: Hydrogen chloride, hydrogen fluoride, fluorine gas or chlorine gas.

Section 10: STABILITY AND REACTIVITY

Stability: Stable under ordinary conditions of use and storage.
Hazardous Polymerization: Will not occur.
Incompatibilities: Strong acids, Oxidizers, Reducing Agents.
Hazardous Decomposition Products: Hydrogen chloride and/or hydrogen fluoride in presence of heat and oxidizer. Chlorine and/or fluorine gas may be released in a fire.

Section 11: TOXICOLOGICAL INFORMATION

Acute Toxicity:	LD50: Sodium Fluorosilicate	125 mg/kg	Oral Rat
	LD50: Sodium Nitrate	4300 mg/kg	Oral Rat

Excessive Exposure May Affect Human Health as Follows:
Skin Contact: Irritation. Prolonged exposure may cause dermatitis.
Eye Contact: Mechanical Irritation
Inhalation: Irritation.
Reproductive Toxicity: No
Carcinogen: No
Other: Chronic exposure of fluorides well above the TLV or PEL may cause bone fluorosis.

Section 12: ECOLOGICAL INFORMATION

Environmental Fate: No information found.
Environmental Toxicity:

Fluorides:
Fluorides can be highly toxic to aquatic and terrestrial flora and fauna. Care should be taken to prevent the product from entering the environment.

Section 13: DISPOSAL CONSIDERATIONS

Not an RCRA hazardous waste. Dispose of in accordance with local, state and Federal regulations. Empty containers must be handled with care due to product residue. Do not heat or cut empty containers with electric or gas torch.

Section 14: TRANSPORT INFORMATION

Classification Data:

DOT Information:		Proper Shipping Name: Not Regulated	
Hazard Class:	N/A	UN Number:	N/A
Reportable Quantity (lbs):	N/A	Packing Group:	N/A
Placard Requirement:	N/A		

Section 15: REGULATORY INFORMATION

Global Inventory Status:

Inventory	Status
United States (TSCA)	All components are listed.
Canada (DSL)	All components are listed.
Mexico	No components are listed.
European Union (EC)	All components are listed.
Japan (METI)	All components are listed or exempt from listing.
Philippines (PICCS)	All components are listed or exempt from listing.
South Korea (KECL)	All components are listed or exempt from listing.
Australia (AICS)	All components are listed or exempt from listing.
China	All components are listed or exempt from listing.

SARA TITLE III

Section 302 Extremely Hazardous Substances	None
Section 311/312 Hazard Categories	
Acute Health	Yes - Irritation
Chronic Health	Yes- Fluorosis
Fire	No
Reactive	No
Sudden Release of Pressure	No
Section 313 Toxic Chemicals	None

RCRA STATUS: If discarded in its purchased form, this product would not be hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

CANADIAN STATUS: All components of this material are listed on the Canadian Domestic Substances List.
EUROPEAN UNION: All components of this material are listed in the EC.

STATE REGULATORY INFORMATION:

(Letters in parenthesis refer to components listed in Section 3 of this MSDS.)

California Prop 65 – No components listed
Connecticut – No component subject to reporting in quantities less than 10,000 pounds.
Florida - No component subject to reporting in quantities less than 10,000 pounds.
New Jersey – Component (b) listed RTK Substance # 1701
New York - No components listed in 6 NYCRR Part 597 – Hazardous Substances List
Pennsylvania - No component subject to reporting in quantities less than 10,000 pounds.
Rhode Island – Component (a) is on the Hazardous Substances List

Section 16: OTHER INFORMATION

Key/legend:

ACGIH	American Council of Governmental Industrial Hygienists
CAS	Chemical Abstracts Service
CFR	Code of Federal Regulations
DSL	Domestic Substances List - Canada
EC	Existing Chemical Registered with EU
EU	European Union
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration in water to 50% of aquatic test population
LD50	Lethal Dose to 50% of test population
N/A	Not applicable
NDSL	Non-Domestic Substances List -Canada
NTP	U.S. National Toxicology Program
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit
SG	Specific Gravity
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TSCA	U.S. Toxic Substances Control Act

Reason For Issue: Update To New Format
Prepared By: American Metal Chemical Company
Approved By: Erin Fauber

MSDS Number: NS-511

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of American Metal Chemical Company. The data on this sheet related only the specific material designated herein. American Metal Chemical Company assumes no legal responsibility for use or reliance upon these data.

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30-120 ROBINSON

OFFICE PHONE (334) 874-7411 FAX (334) 875-3028

Cosby-Carmichael, Inc.

FOR
SAND AND GRAVEL
P. O. BOX 100
SELMA, ALABAMA 36702

MATERIAL SAFETY DATA SHEET

I. IDENTIFICATION

CHEMICAL NAME	CHEMICAL FORMULA	MOLECULAR WEIGHT
Natural Sand & Gravel	Not Applicable	Not Applicable

TRADE NAME	DOT IDENTIFICATION NO.
Sand or Gravel	None

II. PRODUCT AND COMPONENT DATA

Component(s) Chemical Name: Natural Sand or Gravel
CAS Registry No.: None
% (Approx): 100
** Quartz (crystalline silica) content typically greater than 1%

III. PHYSICAL DATA

Appearance and Odor: Angular or round multicolored particals. No Odor
Specific Gravity: 2.55-2.80
Boiling Point: Not Applicable
Vapor Density in Air: Not Applicable
Vapor Pressure: 0 Evaporation Rate: 0
% Volatile By Volume: 0%
Solubility in Water: Negligible

IV. REACTIVITY DATA

Stability: Stable Conditions to avoid: None Known
Incompatibility:(materials to avoid) None Known
Hazardous Decomposition Products: None Known
Hazardous Polymerization: Will not occur

V. FIRE AND EXPLOSION HAZARD DATA

Flash Point: (method used) Not flammable
Flammable Limits in Air: Not flammable
Extinguishing Agents: None Required
Unusual Fire and Explosion Hazards: None Known

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Crystalline Silica, a component of this product, is listed by IARC and NTP but not by OSHA. IARC has determined that there is sufficient evidence for carcinogenicity to experimental animals exposed to crystalline silica and limited evidence for carcinogenicity to humans. "Limited evidence" means that a causal relationship is possible; however, other explanations such as chance, bias or confounding factors cannot adequately be excluded. Based on the IARC determination, NTP has listed respirable crystalline silica as a substance reasonably anticipated to be a carcinogen.

VII - PERSONAL PROTECTION AND CONTROLS

RESPIRATORY PROTECTION

NIOSH-MSHA approved dust respirators for conditions where dust levels exceed or are likely to exceed appropriate TLVs. Respirator use must comply with applicable standards, which include provisions for a user training program, respirator repair and cleaning, respirator fit testing, and other requirements. NIOSH-MSHA approved air-supplied hood must be used when sandblasting.

VENTILATION

Local exhaust or general ventilation adequate to maintain exposures below appropriate TLVs.

SKIN PROTECTION

See "Hygiene" section below.

EYE PROTECTION

Safety glasses with side shields should be worn as minimum protection. Dust goggles should be worn when excessively (visible) dusty conditions are present or are anticipated.

HYGIENE

Wash dust-exposed skin with soap and water. Wash work clothes after each use.

OTHER CONTROL MEASURES

Respirable dust levels should be monitored regularly. Dust levels in excess of appropriate TLVs should be reduced by all feasible engineering controls, including (but not limited to) wet suppression, ventilation, process enclosure, and enclosed employee work stations.

VIII - STORAGE AND HANDLING PRECAUTIONS

Respirable dust may be generated during processing, handling, and storage. The controls identified in Section VII of this MSDS should be applied as appropraite.

This product is not recommended and should not be used for sandblasting, nor foundry operations (or other operations during which dust is generated in excess of appropriate TLVs) unless and until fully adequate measures have been taken to reduce dust exposure levels below appropriate TLVs. The controls identified in Section VII of this MSDS should be applied as appropriate.

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VI - TOXICITY AND FIRST AID

EXPOSURE LIMITS (WHEN EXPOSURE TO THIS PRODUCT AND OTHER CHEMICALS IS CONCURRENT, THE TLV MUST BE DERIVED IN THE WORKPLACE).

Exposure limits vary with the % Quartz in dust. All limits are for 8-hr. TWA exposures. Total Dust (AOGIH & MSHA) = 30 mg/M - (% Quartz + 3); Total Dust (OSHA) = 30 mg/M - (% Quartz + 2) Respirable Dust (AOGIH, MSHA & OSHA) = 10 mg/M - (% Quartz +2)

Effects described in this section are believed not to occur if exposures are maintained at or below appropriate TLVs. Because of the wide variation in individual susceptibility, TLVs may not be applicable to all persons and those with medical conditions listed below.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Inhaling respirable dust may aggravate existing respiratory system disease(s) and/or dysfunctions. Exposure to dust may aggravate existing skin and/or [illegible] conditions.

ACUTE TOXICITY PRIMARY ROUTE(S) OF EXPOSURE: /X/ INHALATION // SKIN ABSORPTION // INGESTION

Exposure to dust may irritate respiratory system, eyes, and skin.

Use of natural sand and gravel for construction purposes is believed not to have caused acute toxic effects. Exposure to quartz-containing dust in excess of appropriate TLVs during sandblasting and foundry operations has caused acute silicosis. Symptoms of acute silicosis may include (but are not limited to) shortness of breath, coughing, fever, and weight loss. Acute silicosis can occur in less than one year and can be fatal.

FIRST AID

Dust in eyes: Flush eyes with running water for 15 minutes. Contact a physician if irritation persists.

Dust on previously irritated skin: Wash with soap and water. Contact a physician if irritation is aggravated.

Dust inhalation: Remove to fresh air

Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists.

CHRONIC TOXICITY

Chronic exposure to respirable quartz-containing dust in excess of appropriate TLVs has caused silicosis, a progressive pneumoconiosis.

[illegible]toms of Silicosis: Not all individuals with silicosis will exhibit symptoms (signs) of the disease. However, silicosis is progressive, and symptoms can appear at any time, even years after exposures have ceased. Symptoms of silicosis may include (but are not limited to): Shortness of breath; difficulty breathing with or without exertion; coughing; diminished work capacity; diminished chest expansion; reduction of lung volume; right heart enlargement and/or failure. Persons with silicosis have an increased risk of pulmonary tuberculosis infection.

Sand and gravel are not listed as carcinogens on the NTP, IARC, or OSHA lists of carcinogens.

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IX - SPILL, LEAK AND DISPOSAL PRACTICES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

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Spilled materials, where dust can be generated, may overexpose cleanup personnel to respirable dust. Wetting of spilled material and/or use of respiratory protective equipment may be necessary.

WASTE DISPOSAL METHOD

Pickup and reuse clean materials. Dispose of waste materials only in accordance with applicable federal, state, and local laws and regulations.

X - TRANSPORTATION

DOT HAZARD CLASSIFICATION

None

PLACARD REQUIRED

None

LABEL REQUIRED

Label as required by applicable state and local regulations.

NOTICE: **Cosby--Carmichael, Inc.** believes that the information contained on this Material Safety Data Sheet is accurate. The suggested procedures are based on experience as of the date of publication. They are not necessarily all-inclusive nor fully adequate in every circumstance. Also, the suggestions should not be confused with nor followed in violation of applicable laws, regulations, rules or insurance requirements. NO WARRENTY, EXPRESS OR IMPLIED, OR MERCHANTABILITY, FITNESS OR OTHERWISE IS MADE.

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CHEMICAL PROPERTIES

of

Cosby-Carmichael, Inc. GRAVEL

Iron	0.15%	
Calcium	0.01%	
Aluminum	0.27%	
Calcium Carbonate	1.06%	
Silica Content	+98.0%	
Neutral ph value		
HCL Solubility Test	98.9%	non-solvent
Specific Gravity	2.61%	

MATERIAL SAFETY DATA SHEET

section I

Manufacturers Name	Emergency Telephone No.
Hudson Abrasives Co.	713-977-0037
address 8606 Windswept, Houston, TX 77063	
Chemical Name & Synonyms Phenolic Resin Bonded Abrasive Products	Trade Name & Synonyms Resinoid bonded grinding wheels
Chemical Family oxides, carbides, polymers	Formula dependent on wheel specification

section II - Hazardous Ingredients

ingredient	cas#	wt%	TLV_3	Carcin. (y/n)
Aluminum Oxide	1344-28-1	45+	10 mg/m	n
Zirconium Oxide	409-21-2	45+	5 mg/m	n
Silicon Carbide	7440-67-21	45+	10 mg/m	n
Cured Resin	na	4+	10 mg/m	n
cryolite	15096-52-3	1+	2.5 mg/m	n
Pyrite	na	1+	2 mg/m	n
Lime	1305-78-8	1+	2 mg/m	n
Glass mesh	na	1+	10 mg/m	n
Flourspar	1344-95-2	1+	10 mg/m	n
Carbon Black	1333-86-4	1+	3.5 mg/m	n
Furfural	98-00-1	1+	5 ppm	n

section III - Physical Data

Boiling Point (°F)	na	Specific Gravity	Varies
Vapor Pressure (mm hg.	NA	Volatile (% by volume)	NA
Vapor Density	NA	Evaporation Rate	NA
Solubility in Water	Slight		
Appearance and Color	Brownish color, rough surface, no appreciable odor		

section IV - Fire & Explosion Hazard Data

Flash Point	NA	Flammable Limits	Lel NA	Uel
Extinguishing Media	Normal extinguishing may be used			
Special Fire Fighting Procedures	Normal fire fighting procedures may be used			
Unusual Fire and Explosion Hazards	none			

section V - Health Hazard Data

Threshold limit value	To be treated as a nuisance dust 10 mg/m
Effects of overexposure	normal to over exposure to nuisance dust
Emergency and first aid procedures	Remove to fresh air and call Physician if necessary

section VI - Reactivity Data

Stability	unstable		Conditions to avoid	Avoid strong alkali Store in dry area
	stable	X		
Incompatability(materials to avoid)			strong alkali	
Hazardous decomposition products			none known	
Hazardous polymerization	may occur		Conditions to avoid	
	will not occur	X		

section VII - Spill or Leak Procedures

Steps to be taken in case material is released or spilled Ventilate the area and collect the material as normal non-hazardous material.
Waste disposal method Landfill - according to local, state, and federal regulations.

section VIII - Special Protection Information

Respiratory protection	MSHA or NOISH approved dust respirator may be required	
Ventilation	local exhaust recommended	special
	mechanical recommended	other
Protective gloves recommended		eye protection should be worn
Other protective equipment	if deemed necessary	

section IX - Special Precautions

Precautions to be taken in handling and storing Store in dry , near normal room temp. conditions
Other precautions avoid dropping or bumping wheels

MSDS Format : ANSI

PDF for Print | Print | E-mail

SAINT-GOBAIN ABRASIVES

View (M)SDS Section : 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

NFPA

0
0 1

Product Name:	Bonded Abrasive Product
MSDS Manufacturer Number:	BA_B_Resin
Manufacturer Name:	Saint-Gobain Abrasives, Inc.
Address:	1 New Bond Street Worcester, MA 01615
General Phone Number:	508-795-5000
Emergency Phone Number:	508-795-5000
Website:	www.Nortonabrasives.com
MSDS Creation Date:	August 15, 2009
MSDS Revision Date:	April 01, 2011

HMIS

Health Hazard	1
Fire Hazard	0
Reactivity	1
Personal Protection	X

* Chronic Health Effects

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
Kyanite	1302-76-7	10 - 30 by weight	215-106-4
Zirconium dioxide	1314-23-4	5 - 10 by weight	215-227-2
Phenol-formaldehyde polymer	9003-35-4	5 - 10 by weight	
Crystalline Silica, Quartz	14808-60-7	1 - 5 by weight	238-878-4
Fiberglass	65997-17-3	1 - 5 by weight	266-046-0
Sulfates/Sulfides	No data	5 - 10 by weight	
Aluminum Oxide, Non-fibrous	1344-28-1	30 - 60 by weight	215-691-6
Titanium dioxide	13463-67-7	0 - 1 by weight	236-675-5

Notes : Actual grinding tests with wheels known to contain Crystalline Silica did not produce any detectable amount of respirable free Crystalline Silica.

SECTION 3 - HAZARDS IDENTIFICATION

Potential Health Effects:

Eye:	Dust may cause slight irritation.
Skin:	Dust from this product may cause temporary mechanical irritation.
Inhalation:	Dusts from this product may cause mechanical irritation of the nose, throat and respiratory tract.
Ingestion:	Ingestion of this product is unlikely. However, ingestion of product may produce gastrointestinal irritation and disturbances.
Chronic Health Effects:	Chronic health effects are not expected as long as good hygiene and proper safety precautions are practiced.

Phenol-formaldehyde polymer

Chronic Health Effects:	Dust generated from intended use may contain trace amounts of phenol and formaldehyde which under excessive exposure may cause skin sensitization and airway obstruction.

Fiberglass

Inhalation:	Fiberglass contained in wheels have fiber diameters greater than 10 um, therefore considered non-respirable.

SECTION 4 - FIRST AID MEASURES

Eye Contact:	Immediately flush eyes with plenty of water for at least 15 to 20 minutes. Ensure adequate flushing of the eyes by separating the eyelids with fingers. Get medical attention, if irritation or symptoms of overexposure persists.
Skin Contact:	Immediately wash skin with soap and plenty of water. Get medical attention if irritation develops or persists.
Inhalation:	If dust from cutting or drilling is inhaled, remove the affected person to fresh air. If symptoms persist, get medical attention.
Ingestion:	Accidental ingestion of this material is unlikely. If this does occur, watch person for several days to make sure intestinal blockage does not occur. If symptoms persist, call a physician.
Note to Physicians:	No information available.

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:	Non Flammable.
Flash Point:	Does not apply.
Auto Ignition Temperature:	Not determined.
Lower Flammable/Explosive Limit:	Not available.
Upper Flammable/Explosive Limit:	Not available.
Extinguishing Media:	Use any extinguishing media appropriate for the surrounding fires.
Unsuitable Media:	None.
Protective Equipment:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA Ratings:

NFPA Health:	0

NFPA Flammability:	0
NFPA Reactivity:	1
NFPA Other:	

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Methods for containment:	Containment of this material should not be necessary.
Methods for cleanup:	Shovel or sweep up for re-use or disposal. Avoid creating dusty conditions. Evaluate residue to determine if it is a hazardous waste by characteristic. Dispose of in accordance with Local, State, Federal and Provincial regulations.

SECTION 7 - HANDLING and STORAGE

Handling:	Always HANDLE AND STORE wheels in a CAREFUL manner. Always VISUALLY INSPECT all wheels before mounting. Always CHECK MACHINE SPEED against the established maximum safe operating speed MARKED ON THE WHEEL. Always CHECK MOUNTING FLANGES for equal and correct diameter. Always USE MOUNTING BLOTTERS. Always be sure WORK REST is properly adjusted. Always USE A SAFETY GUARD covering at least one-half of the grinding wheel. Always allow NEWLY MOUNTED WHEELS to run at operating speed, with guard in place, for at least one minute before grinding. Always TURN OFF COOLANT before stopping wheel to avoid creating an out-of-balance wheel.
Storage:	No special storage conditions required.
Hygiene Practices:	Wear suitable gloves and eye/face protection.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	General dilution ventilation and/or local exhaust ventilation should be provided as necessary to maintain exposures below occupational exposure limits.
Eye/Face Protection:	Always WEAR SAFETY GLASSES or some type of eye protection when grinding.
Skin Protection Description:	Protective gloves. Long sleeved shirt and long pants.
Respiratory Protection:	When workers are facing airborne particulate/dust concentrations above the exposure limit they must use appropriate certified respirators. A properly fitted NIOSH approved disposable N 95 type dust respirator or better is recommended.
Other Protective:	Use of this product may create elevated sound levels. Hearing protection should be worn where required (see OSHA 29 CFR 1910.134 and other applicable regulations).
General Hygiene Considerations:	Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Avoid getting dust into boots and gloves through wrist bands and pant tucks.

EXPOSURE GUIDELINES

Ingredient	Guideline OSHA	Guideline ACGIH	Quebec Canada	Ontario Canada	Alberta Canada
Zirconium dioxide		TLV-TWA: 10 mg/m3 as zirconium compounds			
Crystalline Silica, Quartz		TLV-TWA: 0.025 mg/m3 Respirable fraction (R)	VEMP-TWA: 0.1 mg/m3 Respirable fraction (R)	OEL-TWAEV: 0.05 mg/m3 Respirable fraction (R)	OEL-TWA: 0.1 mg/m3 Respirable fraction (R)
Fiberglass	PEL-TWA: 1 f/cc as Continuous filament glass	TLV-TWA: 1 f/cc as Continuous filament glass TLV-TWA: 5 mg/m3 as			

		Continuous filament glass			
Aluminum Oxide, Non-fibrous	PEL-TWA: 5 mg/m3 Respirable fraction (R) PEL-TWA: 15 mg/m3 Total particulate/dust (T)	TLV-TWA: 10 mg/m3	VEMP-TWA: 10 mg/m3 Total particulate/dust (T)	OEL-TWAEV: 10 mg/m3 Total particulate/dust (T)	OEL-TWA: 10 mg/m3
Titanium dioxide		TLV-TWA: 10 mg/m3	VEMP-TWA: 10 mg/m3 Total particulate/dust (T)	OEL-TWAEV: 10 mg/m3 Total particulate/dust (T)	OEL-TWA: 10 mg/m3 Total particulate/dust (T)

Ingredient	Mexico	British Columbia Canada
Crystalline Silica, Quartz	LMPE-PPT: 0.1 mg/m3 Respirable fraction (R)	OEL-TWA: 0.025 mg/m3 Respirable fraction (R)
Aluminum Oxide, Non-fibrous	MPE-PPT: 0.1 mg/m3 Respirable fraction (R)	OEL-TWA: 3 mg/m3 Respirable fraction (R) OEL-TWA: 10 mg/m3 OEL-TWA: 10 mg/m3 Total particulate/dust (T) OEL-STEL: 20 mg/m3 Total particulate/dust (T)
Titanium dioxide	MPE-PPT: 0.1 mg/m3 Respirable fraction (R)	OEL-TWA: 10 mg/m3 Total particulate/dust (T) OEL-TWA: 3 mg/m3 Respirable fraction (R)

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Physical State Appearance:	Solid article.
Odor:	Odorless
Flash Point:	Does not apply.
Auto Ignition Temperature:	Not determined.

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability:	Stable under normal conditions.
Hazardous Polymerization:	Hazardous polymerization does not occur.
Special Decomposition Products:	In use, dust and decomposing odors may be generated. In most cases, the material removed from the workplace will be significantly greater than the grinding wheel components. Coolants may produce other decomposition products.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity:	This product has not been tested for its toxicity.

Carcinogens:							
	ACGIH	NIOSH	OSHA	IARC	NTP		
Aluminum Oxide, Non-fibrous	A4 Not Classifiable as a Human Carcinogen	No Data	No Data	No Data	No Data		

Titanium dioxide	No Data	No Data	No Data	No Data	No Data		

Kyanite :

RTECS Number: BD1450000

Zirconium dioxide :

RTECS Number: ZH8800000

Phenol-formaldehyde polymer :

RTECS Number: SM8542500

Skin: Administration onto the skin - Rat LD50 : >2 gm/kg [Details of toxic effects not reported other than lethal dose value] (RTECS)

Ingestion: Oral - Rat LD50 : >5 gm/kg [Details of toxic effects not reported other than lethal dose value] (RTECS)

Crystalline Silica, Quartz :

RTECS Number: VV7330000

Fiberglass :

RTECS Number: LK3651000

Aluminum Oxide, Non-fibrous :

RTECS Number: BD1200000

Inhalation: Inhalation - Rat TCLo: 200 mg/m3/5H/28W (Intermittent) [Lungs, Thorax, or Respiration - Structural or functional change in trachea or bronchi; Lungs, Thorax, or Respiration - Chronic pulmonary edema; Related to Chronic Data - death] (RTECS)

Titanium dioxide :

RTECS Number: XR2275000

Skin: Skin - Human Standard Draize test : 300 ug/3D-I - [mild] (RTECS)

Inhalation: Inhalation - Rat TCLo - Lowest published toxic concentration: 1 mg/kg - [Lungs, Thorax, or Respiration - Other changes Biochemical - Metabolism (Intermediary) - Effect on inflammation or mediation of inflammation] (RTECS)

Ingestion: Oral - Rodent rat TDLo - Lowest published toxic dose: 60 gm/kg - [Gastrointestinal - Hypermotility, diarrhea Gastrointestinal - Other changes] (RTECS)

SECTION 12 - ECOLOGICAL INFORMATION

Biodegradation: Resin bonded materials demonstrate similar degradation rates as Phenolic plastics.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal: Use standard landfill methods consistent with applicable Federal, State, Provincial and local laws.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name: Not regulated as hazardous material for transportation.

DOT UN Number: Not regulated as hazardous material for transportation.

IATA Shipping Name: Not regulated as hazardous material for transportation.

Canadian Shipping Name: This product is Not Regulated under the Transportation of Dangerous Goods Act. (CAN)

SECTION 15 - REGULATORY INFORMATION

Kyanite:

Canada DSL:	Listed
EC Number:	215-106-4

Zirconium dioxide:

TSCA Inventory Status:	Listed
Massachusetts:	Listed
Canada DSL:	Listed
EC Number:	215-227-2

Phenol-formaldehyde polymer:

TSCA Inventory Status:	Listed
Canada DSL:	Listed

Crystalline Silica, Quartz:

TSCA Inventory Status:	Listed
Massachusetts:	Listed
Pennsylvania:	Listed
Canada DSL:	Listed
EC Number:	238-878-4

Fiberglass:

TSCA Inventory Status:	Listed
Canada DSL:	Listed
EC Number:	266-046-0

Aluminum Oxide, Non-fibrous:

TSCA Inventory Status:	Listed
EINECS Number:	262-373-8
New Jersey:	Listed: NJ Hazardous List; Substance Number: 2891
Massachusetts:	Listed
Pennsylvania:	Listed
Minnesota:	Listed
Illinois:	No Data
Rhode Island:	Listed
Canada DSL:	Listed
EC Number:	215-691-6

Titanium dioxide:

TSCA Inventory Status:	Listed
New Jersey:	No Data
Massachusetts:	Listed
Pennsylvania:	Listed
Minnesota:	Listed
Illinois:	No Data
Rhode Island:	Listed

Stewart Supply Company Inc.
2068 VALLEYDALE TERRACE
BIRMINGHAM, AL 35244
PHONE 205-982-3000
FAX 205-982-3042

FAX COVER

FROM MARY WHITE

TO: Bob DATE: 7-23

COMPANY: Barry PAGE: 1 OF 8

FAX: 841-1972

SUBJECT: MSDS on Calvo 63988

Canada DSL:	Listed
EC Number:	236-675-5

SECTION 16 - ADDITIONAL INFORMATION

HMIS Health Hazard:	1
HMIS Fire Hazard:	0
HMIS Reactivity:	1
HMIS Personal Protection:	X
MSDS Creation Date:	August 15, 2009
MSDS Revision Date:	April 01, 2011

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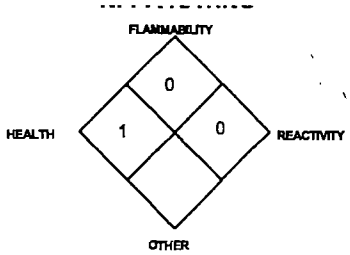
UPC Number = 05539563988

MATERIAL SAFETY DATA SHEET



Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: **CARBON DIOXIDE: 1 - 99%; ARGON: Balance**

TRADE NAMES/SYNONYMS: **Gold Gas™ Shielding Gases**
STEELMIX™: Carbon Dioxide 16%; Argon: Balance
STAINLESS MIX: Carbon Dioxide 3%; Argon: Balance
GOLD GAS™ C 2: Carbon Dioxide 2%; Argon: Balance
GOLD GAS™ C 10: Carbon Dioxide: 10%; Argon: Balance
GOLD GAS™ C 25 :Carbon Dioxide: 25%; Argon: Balance
Document Number: 002004

PRODUCT USE: Analytical/synthetic chemical use.

SUPPLIER/MANUFACTURER'S NAME: AIRGAS INC.

ADDRESS: 259 N. Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283

BUSINESS PHONE: 1-610-687-5253

EMERGENCY PHONE: 1-800-949-7937
International: 423-479-0293

DATE OF PREPARATION: September 5, 1996

REVISION DATE: January 19, 2001

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		–	
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	OTHER
Carbon Dioxide	124-38-9	1.0-99.0%	5000	30,000	5000 10,000 (Vacated 1989 PEL)	30,000 (Vacated 1989 PEL)	40,000	DFG-MAK: 5000 NIOSH REL: TWA =10000 STEL = 30000
Argon	7440-37-1	Balance	There are no specific exposure limits for Argon. Argon is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established C = Ceiling Limit See Section 16 for Definitions of Terms Used

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless, non-flammable gas. The main health hazard associated with releases of this gas is the effect of Carbon Dioxide. At concentrations between 2-10%, Carbon Dioxide (a component of this gas mixture) can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. If the concentration of Carbon Dioxide reaches 10% or more, suffocation can occur within minutes. Moisture in the air could lead to the formation of carbonic acid, which can be irritating to the eyes. Asphyxiation by displacement of oxygen may also occur. Emergency responders must wear proper personal protective equipment, including Self-Contained Breathing Apparatus, when responding to releases of this material.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant route of overexposure for this gas mixture is by inhalation. The following paragraphs describe symptoms of exposure by route of exposure.

INHALATION: Carbon Dioxide is an asphyxiant and a powerful cerebral vasodilator. If the concentration of Carbon Dioxide reaches 10% or more, suffocation can occur rapidly. Inhalation of concentrations between 2 and 10% can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. Carbon Dioxide initially stimulates respiration and then causes respiratory depression. Inhalation of low concentrations (3-5%) have no known permanent harmful effects. Symptoms in humans at various levels of concentration are as follows:

CONCENTRATION	SYMPTOMS OF EXPOSURE
1%:	Slight increase in breathing rate.
2%:	Breathing rate increases to 50% above normal; exposure causes headache, tiredness.
3%:	Breathing increases to twice normal rate and becomes labored. Weak narcotic effect. Impaired hearing, headache, increase in blood pressure and pulse rate.
4-5%:	Breathing increases to approximately four times normal rate, symptoms of intoxication become evident and slight choking may be felt.
5-10%:	Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment and ringing in the ears. Judgment may be impaired, followed by loss of consciousness.
> 10%	Unconsciousness occurs more rapidly above 10% level.

High concentrations of this gas can also cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. The skin of a victim of overexposure may have a blue color. Under some circumstances of overexposure, death may occur.

OTHER POTENTIAL HEALTH EFFECTS: Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside. Moisture in the air could lead to the formation of carbonic acid (from the Carbon Dioxide gas present in this product), which can be irritating to the eyes.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Overexposure to this gas mixture may cause the following health effects:

ACUTE: Inhaling high concentrations of this gas mixture can lead to coma or death. At low concentrations of this gas mixture, inhalation can cause nausea, dizziness, visual disturbances, shaking, headache, mental confusion, sweating, increased heartbeat, and elevated blood pressure and respiratory rate, due to the effects of Carbon Dioxide or oxygen deficiency. High concentrations of the gas mixture may cause eye irritation or damage. Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite.

CHRONIC: Reversible effects on the acid-base balance in the blood, blood pressure, and circulatory system may occur after prolonged exposure to elevated Carbon Dioxide levels. See Section 11 (Toxicological Information) for additional information.

TARGET ORGANS: Respiratory system, cardiovascular system, eyes.

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	1
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		B

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications

See Section 16 for Definition of Ratings

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

ESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus Personal Protective equipment should be worn.

Remove victim(s) to fresh air, as quickly as possible. In case of eye contact which leads to irritation, immediately flush eyes with copious amounts of water for at least 15 minutes. If not breathing, give artificial respiration If breathing is difficult, give oxygen. Only trained personnel should administer supplemental oxygen.
In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

5. FIRE-FIGHTING MEASURES

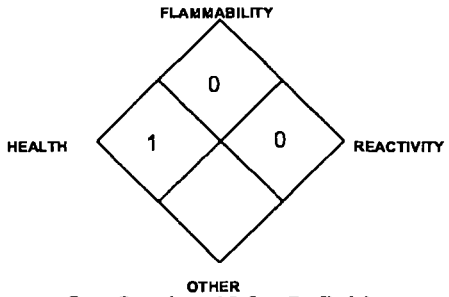
FLASH POINT: Not applicable.
AUTOIGNITION TEMPERATURE: Not applicable.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: Non-flammable, inert gas. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Although the mixture is non-flammable, it can present minor health hazards to firefighters. This gas mixture does not burn; however, containers, when involved in fire, may rupture in the heat of the fire.

xplosion Sensitivity to Mechanical Impact: Not sensitive.
Explosion Sensitivity to Static Discharge: Not sensitive.

NFPA RATING



See Section 16 for Definition of Ratings

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed cylinders from area, if it can be done without risk to fire-fighters. Withdraw immediately in case of rising sounds from venting safety devices or any discoloration of tanks or cylinders due to a fire.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel.

Minimum Personal Protective Equipment should be **Level B: protective clothing, mechanically-resistant gloves and Self-Contained Breathing Apparatus**. Locate and seal the source of the leaking gas. Allow the gas, which is heavier than air, to dissipate. Monitor the surrounding area for Carbon Dioxide and oxygen levels. Colorimetric tubes are available for Carbon Dioxide. The levels of Carbon Dioxide must be below those listed in Section 2 (Composition and Information on Ingredients) and the atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product IN YOU. Do not eat or drink while handling chemicals Be aware of any signs of effects of exposure indicated in Section 3 (Hazard Identification); exposures to fatal concentrations of the components of this gas mixture could occur rapidly.

7. HANDLING and STORAGE (Continued)

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks.

Do not allow area where cylinders are stored to exceed 52°C (125°F). Avoid storing products by incompatible chemicals. Do not store containers where they can come into contact with moisture. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. The following rules are applicable to situations in which cylinders are being used:

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap in-place until cylinder is ready for use.

During Use Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Replace valve protection cap. Mark empty cylinders "EMPTY".

NOTE: Use only DOT or ASME Code containers. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 *"Oxygen Deficient Atmospheres"*.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents dispersion of this gas mixture into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

RESPIRATORY PROTECTION: Maintain Carbon Dioxide levels below those listed in Section 2 (Composition and Information on Ingredients) and oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if Carbon Dioxide levels are above the IDLH (40,000 ppm) or during emergency response to a release of this product. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards. Respiratory selection guidelines from NIOSH for Carbon Dioxide are provided below for further information on respiratory protection.

CONCENTRATION	**RESPIRATORY EQUIPMENT**
UP TO 40,000 ppm:	Supplied Air Respirator (SAR); or full-facepiece Self-Contained Breathing Apparatus (SCBA).
EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:	Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
ESCAPE:	Escape-type SCBA.
NOTE:	The IDLH concentration for Carbon Dioxide is 40,000 ppm.

EYE PROTECTION: Splash goggles, face-shields or safety glasses.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of this product.

BODY PROTECTION: Use body protection appropriate for task.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is pertinent for Argon, the main component of this gas mixture.

VAPOR DENSITY: 1.650 kg/m^3 (0.103 lb/ft^3)
SPECIFIC GRAVITY (air = 1): 1.380
SOLUBILITY IN WATER v/v @ 20°C (68°F): 3.37%
VAPOR PRESSURE: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Log P = 0.94
SPECIFIC VOLUME (ft^3/lb): 9.7

EVAPORATION RATE (nBuAc = 1): Not applicable.
FREEZING POINT: -189.2°C (-308.9°F)
BOILING POINT (@ 1 atm.): -185.9°C (-302.6°F)
ODOR THRESHOLD: Not applicable.
pH: Not applicable.
EXPANSION RATIO: Not applicable

9. PHYSICAL and CHEMICAL PROPERTIES (Continued)

The following information is pertinent to this gas mixture.

APPEARANCE AND COLOR: This product is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this product.

10. STABILITY and REACTIVITY

STABILITY: Normally stable, inert gas.

DECOMPOSITION PRODUCTS: Carbon Dioxide gas (a component of this product) in an electrical discharge, yields carbon monoxide and oxygen. In the presence of moisture, Carbon Dioxide will form carbonic acid.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Carbon Dioxide (a component of this product) will ignite and explode when heated with powdered aluminum, beryllium, cerium alloys, chromium, magnesium-aluminum alloys, manganese, thorium, titanium, and zirconium. In the presence of moisture, Carbon Dioxide will ignite with cesium oxide. Metal acetylides will also ignite and explode on contact with Carbon Dioxide. The remaining component gas, Argon, is inert.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid exposing cylinders to extremely high temperatures, which could cause the cylinders to rupture. Avoiding exposing this product to incompatible chemicals.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following data are for the components of this gas mixture.

Carbon Dioxide: This gas is an asphyxiant gas with physiological effects at high concentrations.

LCL_o (inhalation, human) = 9 pph/5 minutes. LCL_o (inhalation, mammal) = 90000 ppm/5 minutes. TCL_o (inhalation, rat) = 6 pph/24 hours; reproductive and teratogenic effects.

Argon: Standard animal toxicity values are not available. Male rats were exposed for 6 days to 20% oxygen and 80% Argon at 1 atmosphere ambient pressure. No significant changes in blood cell counts or bone marrow were observed. Other animal studies concern the deficiency of (hypoxia) or the narcotic effects of various pressures of Argon, the effects of increased Argon pressures on the central nervous system and decompression sickness.

Eyes: Argon gas injected into the anterior (front) chamber of the eyes of rabbits caused no injury and was reabsorbed at about the same rate as air.

SUSPECTED CANCER AGENT: The components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and therefore are not considered to be, nor suspected to be cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes. Moisture in the air could lead to the formation of carbonic acid (due to the Carbon Dioxide in the mixture), and irritate the eyes.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not known to be sensitizers upon prolonged or repeated exposure.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not expected to cause mutagenic effects in humans.
Embryotoxicity: This product is not expected to cause embryotoxic effects.
Teratogenicity: This product is not expected to cause teratogenic effects in humans. Clinical studies involving test animals exposed to high concentrations of Carbon Dioxide (a component of this product) indicate teratogenic effects (i.e., cardiac and skeletal malformations, stillbirths).
Reproductive Toxicity: This product is not expected to cause adverse reproductive effects in humans. Clinical studies involving test animals exposed to high concentrations of Carbon Dioxide (a component of this product) indicate reproductive effects (i.e., changes in testes).

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

11. TOXICOLOGICAL INFORMATION (Continued)

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Disorders involving the "Target Organs" (see Section 3, Hazard Information) may be aggravated by overexposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

BIOLOGICAL EXPOSURE INDICES: Currently there are no Biological Exposure Indices (BEIs) associated with the components of this product.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this product.

CARBON DIOXIDE: Food chain concentration potential: None. Biological Oxygen Demand: None

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Any adverse effect on animals would be related to oxygen-deficient environments. No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: The following aquatic toxicity data are available for the components of this product.

CARBON DIOXIDE:
Aquatic toxicity: 100-200 mg/l/no time specified/various organisms/fresh water.
Waterfowl toxicity: Inhalation 5-8%, no effect.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, and local regulations. Return cylinders with residual product to Airgas. Do not dispose locally.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:	Compressed gases, n.o.s. (Argon, Carbon Dioxide)
HAZARD CLASS NUMBER and DESCRIPTION:	2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER:	UN 1956
PACKING GROUP:	Not Applicable
DOT LABEL(S) REQUIRED:	Non-Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this gas mixture are listed on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: The components of this gas mixture are on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

15. REGULATORY INFORMATION (Continued)

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

Alaska - Designated Toxic and Hazardous Substances: Argon, Carbon Dioxide.
California - Permissible Exposure Limits for Chemical Contaminants: Argon, Carbon Dioxide.
Florida - Substance List: Argon, Carbon Dioxide.
Illinois - Toxic Substance List: Argon, Carbon Dioxide.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Argon, Carbon Dioxide.
Michigan - Critical Material Register: No.
Minnesota - List of Hazardous Substances: Argon, Carbon Dioxide.
Missouri - Employer Information/Toxic Substance List: Argon, Carbon Dioxide.
New Jersey - Right to Know Hazardous Substance List: Argon, Carbon Dioxide.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Argon, Carbon Dioxide.
Rhode Island - Hazardous Substance List: Argon, Carbon Dioxide.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: Carbon Dioxide.
Wisconsin - Toxic and Hazardous Substances: Carbon Dioxide.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The components of this gas mixture are not on the California Proposition 65 lists.

LABELING (Precautionary Statements):

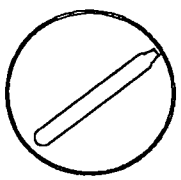
CAUTION:
HIGH PRESSURE GAS.
CAN CAUSE RAPID SUFFOCATION.
CAN INCREASE RESPIRATION AND HEART RATE.
MAY CAUSE FROSTBITE.
Avoid breathing gas.
Store and use with adequate ventilation.
Cylinder temperature should not exceed 52°C (125°F)
Use equipment rated for cylinder pressure.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

NOTE:
Suck-back into cylinder may cause rupture.
Always use a back flow preventative device in piping.

FIRST-AID:
IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

IN CASE OF FROSTBITE, obtain immediate medical attention.
DO NOT REMOVE THIS PRODUCT LABEL.

CANADIAN WHMIS SYMBOLS: **Class A:** Compressed Gas



16. OTHER INFORMATION

PREPARED BY: Airgas - SAFECOR

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AIRGAS, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AIRGAS, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration. **PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure causes death or major residual injury).

NATIONAL FIRE PROTECTION ASSOCIATION (Continued): Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations.

SECTION I: MATERIAL IDENTIFICATION

EVERETT

Trade/Material Name: Calendered, resin/rubber, and resinoid abrasive cutting wheels.

Date Prepared: October 27, 2000

SECTION II: HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Products may contain any of the following ingredients:

CHEMICAL IDENTITY	CAS NO.	PERCENT	ACGIH TLV	CARCINOGENIC
Aluminum Oxide	1344-28-1	<95%	10 mg/m3	N
Silicon Carbide	409-21-2	<95%	10 mg/m3	N
Zirconium Oxide	7440-67-2	<90%	5 mg/m3	N
Cured Phenolic Resin		<20%	10 mg/m3	N
Calcium Oxide	1305-78-8	<10%	2 mg/m3	N
Fibrous Glass		<20%	10 mg/m3	N
Iron Disulphide	12068-85-8	<20%	2 mg/m3	N
Depolymerized Rubber	78-79-5	<15%	none	N
Sulphur	7704-34-9	<15%	10 mg/m3	N
Potassium Fluoborate	14075-53-7	<10%	2.5 mg/m3	N
Iron Oxide	1309-38-2	<20%	5 mg/m3	N
Kryolith	15096-52-3	<20%	2.5 mg/m3	N
Dixie Clay	1332-58-7	<35%	none	N
Calcium Sulphate	7778-18-9	<15%	10 mg/m3	N
Red Iron Oxide	1309-37-1	<20%	5 mg/m3	N
Natural Rubber		<35%	none	N
Synthetic Rubber		<35%	none	N

National Paint and Coatings Association

Health Hazard - O - Minimal
Flammability Hazard - O - Minimal
Reactivity - O - Minimal
Personal Protection - E - Safety Glasses, Gloves, Dust Respirator

Hazardous Material Identification System

SECTION III: PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point:	none
Vapor Pressure:	none
Vapor Density:	none
Specific Gravity:	2.0 - 5.0
Melting Point:	none
Evaporation Rate:	none
Solubility in Water:	none
Appearance and Odor:	Gray, brown, reddish brown, black. May give off rubber odor in use.

SECTION IV: FIRE AND EXPLOSION DATA

Flash Point:	none
Extinguishing Media:	will not burn
Special Fire Fighting Procedures:	none
Unusual Fire and Explosion Hazards:	none

SECTION V: REACTIVITY DATA

Stability:	Stable
Conditions to Avoid:	Overspeed and unsafe use practices
Hazardous Polymerization:	Does not occur
Hazardous Decomposition:	Dusts are generated by use. Use of coolants may produce other decomposition products

SECTION VI: HEALTH HAZARD DATA

Inhalation: Prolonged exposure to grinding dust may cause respiratory problems or aggravate existing conditions.

Ingestion: No known adverse effects.

Skin: Excessive contact with dust may cause skin irritation. Wash affected areas with soap and water and obtain medical assistance.

Eyes: Dusts generated during grinding may irritate eyes. Flush with large quantities of water and obtain medical assistance.

Other: Cutting operations may generate high noise levels. Sufficient ear protection should be sought if this condition exists.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

Spills: Use normal cleanup procedures. No special precautions required.

Waste Disposal: Landfill in accordance with local, state and federal regulations.

Handling & Storage: Refer to ANSI Code B7.1.

SECTION VIII: SPECIAL PRECAUTIONS

Respirator Protection: Approved dust respirators recommended if TLV is exceeded.

Ventilation: Local exhaust ventilation as necessary to keep dust levels below TLV.

Protective Gloves: As desired.

Eye Protection: Goggles or safety glasses with side shields are recommended.

Hearing Protection: As needed.

Other Precautions: Maintain good hygienic practices.

MATERIAL SAFETY DATA SHEET

I - PRODUCT IDENTIFICATION:

Manufacturer's Name: Ervin Industries, Inc. Amasteel Division

Address: 3893 Research Park Drive, Ann Arbor, MI 48108-2217

Telephone: (313) 769-4600

FAX: (313) 663-0136

D-U-N-S NO.: 00-533-7738, 00-504-3708, 07-499-7677

PRODUCT NAMES: Amasteel Shot, Amabrasive, Amasteel Grit, Amasteel

Common Name: Cast Steel

Chemical Family: Ferrous

II - HAZARDOUS COMPONENTS:

CAS REGISTRY NO.	% WEIGHT	CHEMICAL NAME	ACGIH TLV (mg/m^3)	OSHA PEL (mg/m^3)
7439-89-6	>96	Iron		
		Oxide fume, as Fe	5	10
7440-44-0	0.8-1.3	Carbon	none estab.	none estab.
7439-96-5	0.5-1.3	Manganese		
		Elemental and Inorganic compounds, as Mn	0.2	5 (ceiling)
		Fume - as Mn	none estab.	5 (ceiling)
7440-21-3	0.3-1.2	Silicon		
		as total dust	10	15
		Respirable fraction	none estab.	5
7440-47-3	<0.25	Chromium		
		Elemental metal and Inorganic compounds as Cr metal	0.5	1
		Cr II compounds - as Cr	none estab.	0.5
		Cr III compounds - as Cr	0.5	0.5
		Cr VI compounds - water Soluble	0.05	none estab.
		Cr VI compounds - insoluble	0.01	none estab.
		Chromic Acid and Chromates as CrO_3	none estab.	0.1 (ceiling)
		Chromium salts - Insoluble - as Cr	none estab.	1
7440-02-0	<0.2	Nickel		
		elemental metal, insoluble compounds as Ni	0.05	1
		soluble compounds as Ni	0.05	1

III - PHYSICAL DATA:

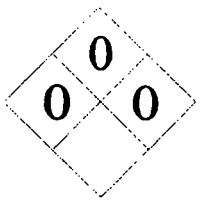
Cast steel shot and grit are non-hazardous as received. Fine metallic dust is generated as the abrasive breaks down from impact and wear during normal use. Since the ferrous content is >96%, dust or fumes will consist mainly of iron or iron oxide. In addition, the fine steel dust created can be a mild explosion hazard (see IV).

Boiling Point - 2850-3150 Degrees C
Specific Gravity(at 60 degrees F)->7.6
% Volatile by volume-Not Applicable
Evaporation Rate-Not Applicable
Solubility in Water-Not Applicable
Melting Point-1371-1483 Degree C
Vapor Pressure-Not Applicable
pH - Not Applicable
Vapor Density-Not Applicable
Percent Solid by Weight-100%
Appearance and Odor - Near spherical or angular steel particles with no odor

IV - FIRE AND EXPLOSION HAZARD DATA:

Flash Point - Not Applicable
Flammability Limits-Not Applicable
Autoignition Temperature (solid iron exposed to oxygen) -930 Degrees C
Cast steel shot and grit will not burn or explode.
A mild fire or explosion hazard situation may be created due to the fine dust that may result from use.
Fire Extinguishing method for dust created due to use - use Class D extinguishing agents or dry sand to exclude air. Do not use water or other liquids, or foam.

NFPA49



NFPA Hazard Rating

4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

Health (blue)	0
Flamability (red)	0
Reactivity (yellow)	0
Special (colorless)	

SECTION V-HEALTH HAZARD DATA:

Threshold Limit Values - Permissible Exposure Limits - see Section II

Carcinogenicity - OSHA, not listed. IARC, chromium [VI] - carcinogenic to humans (Group 1), metallic chromium and chromium [III] compounds - not classifiable as to their carcinogenicity to humans (Group 3); nickel compounds are carcinogenic to humans, metallic nickel is possibly carcinogenic to humans (Group 2B).
Fumes can be generated by welding or flame cutting a surface containing new or used abrasive or the dust created by use of the abrasive. Welding or flame cutting may convert a small portion of the chromium to hexavalent chromium [VI]. IARC reports that welding fumes are possibly carcinogenic to humans.
Over exposure to dust and fumes may cause mouth, eye, and nose irritation. Prolonged overexposure to manganese dust or fume affects the central nervous system. Chronic overexposure can cause manganese poisoning, and attendant apathy, loss of appetite, uncontrolled laughter, insomnia followed by sleepiness, headache, difficulty in walking, frequent falling, tremors, salivation sweating and mental detachment. Prolonged overexposure to iron oxide fume can cause siderosis, or "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability.

SECTION V-HEALTH HAZARD DATA: (continued)

Target Organs - Lung for chromium and lung and nasal for Nickel.
Primary Routes of entry - inhalation of dust formed during use, or shot, grit or dust particles in eyes.

Emergency and First Aid Procedure - If inhaled, move out of area into fresh air. Flush eyes with running water, have any remaining particles removed from eyes by qualified medical person.

SECTION VI - REACTIVITY DATA:

Stability - stable Hazardous Polymerization - will not occur
Hazardous decomposition products - None. Shot and grit will break down into progressively smaller particles and dust during normal use.

SECTION VII - SPILL OR LEAK PROCEDURES:

Shot spilled or leaked onto floors can create hazardous walking conditions. No special precautions need to be followed when cleaning up spills or leaks of shot or grit. When cleaning up large quantities of dust, a NIOSH approved respirator should be used. Spilled shot and grit can be reclaimed for reuse, or disposed of as a non-hazardous solid waste. Collected dust from blast cleaning or shot peening operations always contains contaminants from the surfaces of the parts being processed, and therefore the dust may be classed as a hazardous waste and, as such, must be disposed of according to appropriate local, State or Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION:

Ventilation - General ventilation and local exhaust should be provided to keep the dust levels below the TLV's shown in Section II.

Respiratory protection - If the dust created by use exceeds the ACGIH TLV's and OSHA PEL's indicated in Section II, a NIOSH approved respirator should be worn.

Eye protection - Approved safety glasses with eye shields should be worn.
Other protective equipment - none required.

SECTION IX - SPECIAL PRECAUTIONS:

Precautions to be taken in handling and storing - Keep dry to reduce rusting. Observe maximum floor loading limitations.
Other precautions - The company has no control over this product or its use after it leaves our facility. The company assumes no liability for loss or damage incurred from the proper or improper use of this product.

The information presented here has been compiled from sources considered to be reliable and accurate to the best of our knowledge and belief, but is not guaranteed to be so.

Prepared by: David A. Hale Manager, Technical Services

MATERIAL SAFETY DATA SHEET

I - PRODUCT IDENTIFICATION

Manufacturer's Name: Ervin Industries, Inc. Amasteel Division

Address: 3893 Research Park Drive
P.O. Box 1168
Ann Arbor, MI 48108-2217

Telephone: (313) 769-4600

D-U-N-S NO. 00-533-7738

Product Names: Amasteel Shot, Amabrasive, Amasteel Grit, Amasteel

Common Name: Cast Steel

Chemical Family: Ferrous

II - HAZARDOUS INGREDIENtS

CAS REGISTRY NO.	% WEIGHT	Chemical NAME	ACGIH TWA	OSHA TWA	OSHA STEL (15 MIN)
7439-89-6	>96	Iron	5 mg/cu. m as oxide fume	10 mg/cu. m as oxide fume	none estab.
7440-44-0	0.8 - 1.3	Carbon	none estab.	none estab.	none estab.
7439-96-5	0.5 - 1.3	Manganese	5 mg/cu. m as dust 1 mg/cu. m as fume	1 mg/cu.m as fume	3 mg/cu. m as fume
7440-21-3	0.3 - 1.2	Silicon	10 mg/cu. m	10mg/cu. m (as nuisance dust) 5 mg/cu. m (as respirable fraction)	none estab.

III - PHYSICAL DATA

Boiling Point - 2850 - 3150 Degrees C

Melting Point - 1371 - 1483 Degrees C

Specific Gravity (at 60 degrees F) - >7.6

Vapor Pressure - Not Applicable

Percent Volatile by volume - Not Applicable

pH - Not Applicable

Evaporation Rate - Not Applicable

Vapor Density - Not Applicable

Solubility in Water - Not Applicable

Percent Solid by Weight - 100%

Appearance and Odor - Near spherical or angular particles with no odor

IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point - Not Applicable

Flammability Limits - Not Applicable

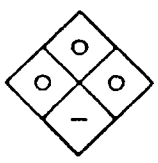
Autoignition Temperature (solid iron exposed to oxygen) - 930 Degrees C.

Cast Steel shot and grit will not burn or explode.

A mild fire or explosion hazard situation may be created due to the fine dust that may result from use.

Fire Extinguishing method - use dry chemicals or sand to exclude air.

NFPA49



Revision Date 2-10-89

Revision E

SECTION V - HEALTH HAZARD DATA

Threshold Limit Value - see Section II Carcinogenicity - not listed
Carcinogenicity - none of ingredients listed in NTP, IARC or OSHA
Permissible Exposure Limit - see Section II
Primary Routes of entry - inhalation of dust formed during use, or shot, grit or dust particles in eyes.
Prolonged overexposure to manganese dust or fume can cause metal fume fever.
Chronic overexposure can cause manganese poisoning.
Over exposure to dust and fumes may cause mouth, eye, and nose irritation.
Emergency and First Aid Procedure - If inhaled, move out of area into fresh air. Flush eyes with running water, have any remaining particles removed from eyes by qualified medical person.
Medical Conditions Aggravated by Exposure - None

SECTION VI - REACTIVITY DATA

Stability - stable Hazardous Polymerization - will not occur
Hazardous decomposition products - None. Shot and grit will break down into progressively smaller particles during normal use.

SECTION VII - SPILL OR LEAK PROCEDURES

Shot spilled or leaked onto floors can create hazardous walking conditions.
No special precautions need to be followed when cleaning up spills or leaks of shot or grit. When cleaning up large quantities of dust, a NIOSH approved respirator should be used. Spilled shot and grit can be reclaimed for reuse, or disposed of as a non-hazardous solid waste. Collected dust from blast cleaning or shot peening operations always contains contaminants from the surfaces of the parts being processed, and therefore the dust may be classed as a hazardous waste and, as such, must be disposed of according to appropriate local, State or Federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

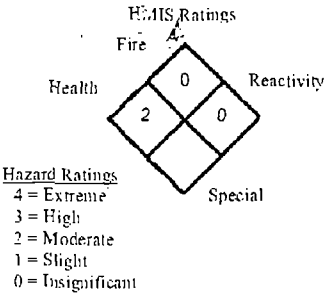
Respiratory protection - If the dust created by use exceeds the TLV's indicated in Section II, a NIOSH approved respirator should be worn.
Ventilation - General ventilation and local exhaust should be provided to keep the dust levels below the TLV's shown in Section II.
Eye protection - Approved safety glasses with eye shields should be worn.
Other protective equipment - none required.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storing - Keep dry to reduce rusting.
Observe maximum floor loading limitations.
Other precautions - The company has no control over this product or its use after it leaves our facility. The company assumes no liability for loss of damage incurred from the proper or improper use of this product.
The information presented here has been compiled from sources considered to be reliable and accurate to the best of our knowledge and belief, but is not guaranteed to be so.

Prepared by: David A. Hale
Manager, Technical Services
Date: 2-10-89

STEEL WIRE, .035
ESAB SPOOLARC 29S



FORM NO. 7965-L
DATE REVISED: 05/06/2002

Material Safety Data Sheet

(Essentially Similar to U.S. Department of Labor Suggested Form For Hazard Communication Compliance)

I. Product Identification

Product Type - SPOOLARC, OXWELD, & ESAB SOLID STEEL WELDING ELECTRODES AND RODS

Manufacturer - THE ESAB GROUP, INC.

Telephone No. - 1-717-637-8911
1-800-933-7070

Address - 801 Wilson Avenue, P. O. Box 517
Hanover, PA 17331

Emergency No. - 1-717-637-8911
(CHEMTREC) 1-800-424-9300

APPROXIMATE COMPOSITION OF STEEL WIRES AND RODS

Product Trade Name	C	Mn	Si	Cu	Mo	Cr	Ni	Ti	Al	Zr	V	Fe	AWS Classification
1HT ❶	<0.5	1-2	<0.5	–	–	–	–	–	–	–	–	Bal.	A5.2, R60
7 ❶	<0.5	<0.5	<0.1	<0.5	–	–	–	–	–	–	–	Bal.	A5.2, R45
29S ❶	<0.5	1-2	0.5	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EM13K; A5.18, ER70S-3
32CMS ❸	<0.5	1-2	0.5	–	–	<0.5	–	–	–	–	–	Bal.	A5.2, R65
36 ❶	<0.5	2	<0.1	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EH14; A5.25, EH14-EW
40 ❶	<0.5	2	<0.1	<0.5	0.5	–	–	–	–	–	–	Bal.	A5.23, EA3
40A ❶	<0.5	<1	<0.1	<0.5	0.5	–	–	–	–	–	–	Bal.	A5.23, EA1
40B ❶	<0.5	1-2	<0.1	<0.5	0.5	–	–	–	–	–	–	Bal.	A5.23, EA2
44 ❸	<0.5	2	<0.1	<0.5	0.5	–	<1	–	–	–	–	Bal.	A5.23, EF2
53 ❶	<0.5	1-2	<0.5	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EH12K
65 ❶	<0.5	1-2	0.5	<0.5	–	–	–	<0.1	<0.1	<0.1	–	Bal.	A5.18, ER70S-2
66 ❶	<0.5	1-2	0.5	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EM13K; A5.18, ER70S-3
71 ❶	<0.5	<1.5	<1	<0.5	–	–	–	<0.2	–	–	–	Bal.	A5.23, EM14K
75 ❶	<0.5	<1.5	<1	<0.5	–	–	<1.2	–	–	–	–	Bal.	A5.23, ENi1K; A5.28, E80S-Ni1
80 ❶	<0.5	0.5	<0.1	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EL12; A5.23, EL12
81 ❶	<0.5	1	<0.5	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EM12K; A5.23, EM12K
82 ❶	<0.5	1-2	0.5	<0.5	–	–	–	–	–	–	–	Bal.	A5.17, EM13K; A5.18, ER70S-3
83 ❶	<0.5	1-2	<1	<0.5	0.5	–	–	–	–	–	–	Bal.	A5.23, EA3K; A5.28, ER80S-D2
85 ❶	<0.5	1-2	<1	<0.5	–	–	–	–	–	–	–	Bal.	A5.18, ER70S-4
86 ❶	<0.5	1-2	<1	<0.5	–	–	–	–	–	–	–	Bal.	A5.18, ER70S-6
87HP ❶	<0.5	1-2	<1	<0.5	–	–	–	–	–	–	–	Bal.	A5.18, ER70S-7
95 ❸	<0.5	1-2	<0.5	<0.5	<0.5	0.1	1-2	<0.1	–	–	–	Bal.	A5.23, EM2; A5.28, ER100S-1
100 ❸	<0.5	2	0.1	<0.5	0.5	<0.5	2-3	–	–	–	–	Bal.	A5.23, EF5
120 ❸	<0.5	1-2	<0.5	<0.5	0.5	<0.5	2-3	<0.1	–	–	–	Bal.	A5.23, EM4; A5.28, ER120S-1
140 ❸	<0.5	1-2	<0.5	<0.5	<1	<1	2-3	<0.1	–	–	–	Bal.	NONE
551 ❸	<0.5	<1	0.5	<0.5	1	<1	–	–	–	–	–	Bal.	A5.23, EB5
ARC 100 ❸	<0.5	1-2	<0.5	<0.5	<1	–	2-3	<0.1	–	–	–	Bal.	NONE
EG ❶	<0.5	1-2	0.5	<0.5	–	–	–	–	–	–	–	Bal.	NONE
ENi4 ❸	<0.5	<1	<0.5	<0.5	<0.5	–	1-2	–	–	–	–	Bal.	A5.23, ENi4
HI-84 ❶	<0.5	1-2	<1	<0.5	0.5	–	–	<0.1	–	–	–	Bal.	A5.28, ER80S-D2
MIG-3 ❶	<0.5	<1.5	<1	<0.5	–	–	–	–	–	–	–	Bal.	A5.18, ER70S-3
MIG-6 ❶	<0.5	1-2	<1.2	<0.5	–	–	–	–	–	–	–	Bal.	A5.18, ER70S-6
MW ❸	<0.5	1-2	<1	–	0.1	<1	–	–	–	–	<0.1	Bal.	NONE
U515 ❸	<0.5	<1	<0.5	<0.5	<1	1-2	–	–	–	–	–	Bal.	A5.23, EB2
U521 ❸	<0.5	<1	<0.5	<0.5	1	2-3	–	–	–	–	–	Bal.	A5.23, EB3
WS ❸	<0.5	0.5	<0.5	<1	–	<1	<1	–	–	–	–	Bal.	A5.23, EW; A5.28, ER80S-G
XTi ❶	<0.5	1-2	<1	<0.5	–	–	–	<0.1	–	–	–	Bal.	A5.18, ER70S-G
Arcaloy B9 ❸	<0.5	<1.5	<0.5	–	1	8-10	<1	–	–	–	<0.5	Bal	A5.23, EB9; A5.28, ER90S-B9

❶ See Note in Section VI ❸ See Note in Section VI

THE ESAB GROUP requests the users of these products to study this Material Safety Data Sheet (MSDS) and become aware of the product hazards and safety information. To promote the safe use of these products a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for these products, and (3)

Product Identity: SPOOLARC AND OXWELD SOLID STEEL WELDING ELECTRODES AND RODS

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IV. Fire & Explosion Hazard

Flammable/Explosive: NO (X) YES ( )

Under what conditions: Only the packaging for this product will burn.

Extinguishing Media: This product will not burn; however, welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. See ANSI Z49.1 "Safety in Welding and Cutting" and "Safe Practices" Code: SP, published by the American Welding Society, P. O. Box 351040, Miami, FL 33135, and NFPA 51B "Cutting and Welding Processes," published by the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269 for additional fire prevention and protection information.

V. Reactivity Data

Stability: Stable (X) Unstable ( ) Polymerization will not occur

Incompatible products: None currently known

Hazardous decomposition products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the material being worked, the process, procedures and consumables used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the material being worked (such as paint, plating or galvanizing), the number of welding operations and the volume of the work area, the quality and amount of ventilation, the position of the worker's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning or painting activities). When the materials are consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section II. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the ingredients, plus those from the material being worked and the coatings etc. noted above.

Reasonably expected decomposition products from normal use of these products include a complex of the oxides of the materials listed in Section II, as well as carbon monoxide, carbon dioxide, ozone and nitrogen oxides (refer to "Characterization of Arc Welding Fume" available from the American Welding Society). THE TLV FOR MANGANESE (0.2 mg/m^3) WILL BE REACHED BEFORE THE GENERAL LIMIT FOR WELDING FUMES OF 5 mg/m^3 IS REACHED. The only way to determine the true identity of the decomposition products is by sampling and analysis. The composition and quantity of the fumes and gases to which a worker may be overexposed can be determined from a sample obtained from inside the welder's helmet, if worn, or in the workers breathing zone. See ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes," available from the American Welding Society.

VI. Physical and Health Hazard Data

Electric arc working may create one or more of the following health or physical hazards. Fumes and gases can be dangerous to your health. Electric shock can kill you. Arc rays can injure eyes and burn skin. Noise can damage hearing. An additional detailed description of the Health and Physical Hazards and their consequences may be found in ESAB's publications F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating." You may obtain copies from your local supplier or by writing to the address in Section I.

Route of overexposure: The primary route of entry of the decomposition products is by inhalation. Skin contact, eye contact, and ingestion are possible. Absorption by skin contact is unlikely. When these products are used as recommended by **THE ESAB GROUP**, and ventilation maintains exposure to the decomposition products below the limits recommended in this section, overexposure is unlikely.

Effects of acute (short-term) overexposure *to the gases, fumes, and dusts may include irritation of the eyes, lungs, nose and* throat. Some toxic gases associated with welding may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty in breathing, frequent coughing, or chest pain. The presence of chromium/chromate in fume can cause irritation of nasal membranes and skin. The presence of nickel compounds in fume can cause metallic taste, nausea, tightness of chest, fever, and allergic reaction.

Pre-existing Medical Conditions Aggravated by Overexposure: Individuals with allergies or impaired respiratory function may have symptoms worsened by exposure to welding fumes; however, such reaction cannot be predicted due to the variation in composition and quantity of the decomposition products.

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Effects of chronic (long-term) overexposure to air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest X-rays. The severity of the change is proportional to the length of the exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on X-rays may be caused by non-work factors such as smoking, etc. Nickel and chromium (in some products) are considered carcinogenic. Long term overexposure to nickel fumes may also cause pulmonary fibrosis and edema. Overexposure to manganese compounds may affect the central nervous system, symptoms of which are languor, sleepiness, muscular weakness, emotional disturbances and spastic gait.

Exposure limits for the ingredients are listed in Section II. The 1989 OSHA TWA for welding fume is 5 mg/m^3. TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and excessive concentrations. When these products are used as recommended by **THE ESAB GROUP**, and the preventive measures taught in this MSDS are followed, overexposure to hazardous substances will not occur.

Emergency First Aid Measures: In case of emergency, call for medical aid. Employ first aid technique recommended by the Red Cross. **IF BREATHING IS DIFFICULT,** give oxygen and call for a physician. **FOR ELECTRIC SHOCK**, disconnect and turn off the power. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician. **FOR ARC BURN**, apply cold, clean compresses and call a physician.

Carcinogenic Assessment (NTP Annual Report, IARC Monographs, Other): Nickel and Chromium must be considered possible carcinogens under OSHA (29CFR1910.1200). IARC has indicated Nickel, Chromium and certain of their compounds are probably carcinogenic for humans, but the compounds cannot be specified precisely. Their conclusions were drawn from operations different from welding. Regardless, exposure level must be kept below those levels specified in Section II.

❶ **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code §25249.5 et seq.)

❷ **WARNING:** This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). *(California Health & Safety Code §25249.5 et seq.)*

VII. Precautions for Safe Handling and Use/Applicable Control Measures

Read and understand the manufacturer's instructions and the precautionary label on this product. See American National Standard Z-49.1, "Safety in Welding and Cutting," published by the American Welding Society, P. O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 for more detail on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both, to keep the fumes and gases below the TLVs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens. As a rule of thumb, start with a shade which is too dark to see the weld zone. Then go to the next lighter shade which gives sufficient view of the weld zone. Provide protective screens and flash goggles, if necessary, to shield others.

Protective Clothing: Wear head, hand, and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z-49.1. At a minimum, this includes welder's gloves and a protective face shield and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

Procedure for Cleanup of Spills or Leaks: NOT APPLICABLE

Waste Disposal Method: Prevent waste from contaminating surrounding environment. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with Federal, State and Local regulations.

The opinions expressed in this MSDS are those of qualified experts within **THE ESAB GROUP**. We believe that the information contained herein is current as of the date of this MSDS. Since the use of this information and these opinions and the conditions of use of these products are not within the control of **THE ESAB GROUP**, it is the user's obligation to determine the conditions of safe use of these products.

ESAB Welding & Cutting Products
411 South Ebenezer Road, Florence, SC 29501-0545

FAX

No. of pages including this: 5

To

Name: Bob
Company : **BARRY PATTERN & FDRY**
Fax Number : **$1(205)8411972**
Phone Number :

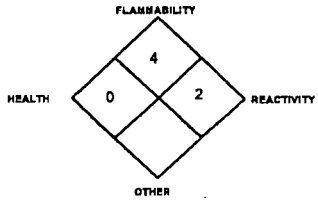
From

Name: Elaine Ardis
Fax Number : **800-634-7548**
Phone Number : **800-362-7080**

Subject :

GAS DISSOLVED IN ACETONE

NFPA RATING



MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS:	**ACETYLENE - C_2H_2**
	Document Number: 001001
PRODUCT USE:	For welding, cutting, and general analytical/synthetic chemical uses.
SUPPLIER/MANUFACTURER'S NAME:	AIRGAS INC.
ADDRESS:	259 N. Radnor-Chester Road Suite 100 Radnor, PA 19087-5283
BUSINESS PHONE:	1-610-687-5253
EMERGENCY PHONE:	1-800-949-7937 International: 423-479-0293 (Call Collect)
DATE OF PREPARATION:	May 20, 1996
REVISION DATE:	September 25, 2000

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV *ppm*	STEL *ppm*	PEL *ppm*	STEL *ppm*	IDLH *ppm*	
Acetylene	74-86-2	>99	Simple Asphyxiant		NE	NE	NE	NIOSH REL: 2500 ppm, ceiling Matheson maximum recommended limit for exposure: 5000 ppm
Maximum Impurities		< 1	None of the trace impurities in this mixture contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalent standards.					

NE = Not Established C = Ceiling Limit See Section 16 for Definitions of Terms Used.

NOTE: all WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Acetylene is a colorless, flammable gas, with a garlic-like odor, that is dissolved in acetone. The main health hazard associated with a release of this gas is asphyxiation by displacement of oxygen. Acetylene gas poses an extreme fire hazard when accidentally released. The gas is lighter than air, and may spread long distances. Distant ignition and flashback are possible. Flame or high temperature impinging on a localized area of the cylinder of this product can cause the cylinder to explode without activating the cylinder's relief devices. Acetylene gas may decompose explosively at elevated temperatures and pressures. Acetylene can form very explosive metallic salts (such as with copper, mercury, and silver). Provide adequate fire protection during emergency response situations.

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant route of overexposure for this gas is by inhalation. The following paragraphs describe symptoms of exposure by route of exposure.

INHALATION: At concentration below the LEL of 2.5% (25000 ppm) this gas is essentially non-toxic. At higher concentrations, Acetylene has anesthetic effects. Symptoms of overexposure to such high concentrations may include drowsiness, dizziness, and a general feeling of weakness. High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. The skin of a victim of overexposure may have a blue color. Under some circumstances of overexposure, death may occur. The following effects associated with various levels of oxygen are as follows:

CONCENTRATION	SYMPTOMS OF EXPOSURE
12-16% Oxygen:	Breathing and pulse rate increased, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea and vomiting, collapse or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

When administered with oxygen at concentrations of 10% or greater, Acetylene produces varying degrees of temporary narcosis.

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	1
FLAMMABILITY	(RED)	4
REACTIVITY	(YELLOW)	2
PROTECTIVE EQUIPMENT		B

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications

See Section 16 for Definition of Ratings

OTHER POTENTIAL HEALTH EFFECTS: The gas is generally non-irritating to the skin and eyes. Acetylene is dissolved in acetone. Any skin or eye contact with the acetone component of this product may be slightly irritating to contaminated skin or eyes.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Overexposure to Acetylene may cause the following health effects:

ACUTE: The most significant hazard associated with Acetylene is inhalation of oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, and nausea. At high concentrations, unconsciousness or death may occur.

CHRONIC: *There are currently no known adverse health effects associated with chronic exposure to the components of* this compressed gas.

TARGET ORGANS: Respiratory system, central nervous system.

Product Identity: SPOOLARC AND OXWELD SOLID STEEL WELDING ELECTRODES AND RODS

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II. Hazardous Ingredients

IMPORTANT: This section covers the materials from which this product is manufactured. The fumes and gases produced during normal use of these products are covered in Section V. The term **HAZARDOUS** should be interpreted as a term required and defined by Laws, Statutes, or Regulations, and does not necessarily imply the existence of any hazard when the products are used as directed by **THE ESAB GROUP**.

Material	(CAS No.)	SARA	ACGIH TLV (1998) TWA (mg/m^3)	OSHA - PEL (1993) TWA (mg/m^3)	STEL (mg/m^3)
Aluminum	(7429-90-5)	*	5 (Welding Fume)	5 (Welding Fume)	–
Carbon	(7440-44-0)		3.5 (Carbon Black)	3.5 (Carbon Black)	–
Chromium	(7440-47-3)	*	0.5 (Metal) 0.05 (Water Soluble Cr(VI)) 0.01 (Insoluble Cr(VI))	1 (Metal) C 0.1 (as Chromate)	–
Copper	(7440-50-8)	*	0.2 (Fume)	0.1 (Fume)	–
Iron	(7439-89-6)		5 (Oxide Fume)	10 (Total Particulate)	–
Manganese	(7439-96-5)	*	0.2 (Fume) C 5 (STEL)	1 (Fume)	3
Molybdenum	(7439-98-7)		5 (Soluble)	5 (Soluble)	–
Nickel	(7440-02-0)	*	0.1 (Soluble)	0.1 (Soluble)	–
S	(7440-21-3)		10 (Dust)	5 (Respirable)	–
Titanium	(7440-32-6)		10 (TiO_2)	5 (TiO_2 - Respirable)	–
Vanadium	(7440-62-2)	*	0.05 (V_2O_5, Fume)	0.05 (V_2O_5, Fume)	C 0.1
Zirconium	(7440-67-7)		5 (as Zr) 10 (STEL)	5 (as Zr)	10

NOTE: In the ingredients table, an asterisk (*) after the CAS number indicates a toxic chemical subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (SARA) and 40 CFR Part 372.

Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLE in Section I.
In the table above, "C" indicates "Ceiling Limit."

III. Physical Data

As shipped, these products are nonflammable, non-explosive, non-reactive, and non-hazardous

Physical State: GAS ( ) LIQUID ( ) SOLID (X)

Odor and Appearance: Copper coated or bare, solid steel wire or rod, odorless.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO ACETYLENE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus and Fire-Retardant Personal Protective equipment should be worn. Adequate fire protection must be provided during rescue situations.

Remove victim(s) to fresh air, as quickly as possible. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

SKIN EXPOSURE: If the liquid portion of this product (acetone) is spilled on skin, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention if redness or irritation develops.

EYE EXPOSURE: If the liquid portion of this product (acetone) splashes into eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s).

5. FIRE-FIGHTING MEASURES

GAS DISSOLVED IN ACETONE

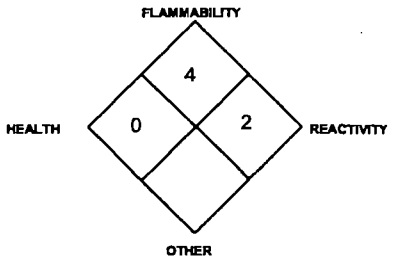
FLASH POINT (Closed Cup): 0°C (32°F)

AUTOIGNITION TEMPERATURE: 305°C (581°F)

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): 2.5%
Upper (UEL): 82%
100% with substantial energy source and under certain conditions of pressure, container size and shape.

NFPA RATING



See Section 16 for Definition of Ratings

FIRE EXTINGUISHING MATERIALS: Extinguish fires of this gas by shutting-off the source of the gas. Use water spray to cool fire-exposed structures and equipment.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material ignites to produce toxic gases including carbon monoxide and carbon dioxide. Acetylene gas is extremely flammable and can readily form explosive mixtures with air over a very wide range. An explosion hazard exists in confined spaces when the gas is released. Pure Acetylene can explode under certain conditions of elevated pressure, temperature and container size. Acetylene reacts with active metals to form explosive acetylide compounds.

DANGER! Fires impinging (direct flame) on the outside surface of unprotected pressure storage vessels of Acetylene can be very dangerous. Direct flame exposure on the cylinder wall can cause an explosion either by BLEVE (Boiling Liquid Expanding Vapor Explosion), or by exothermic decomposition. This could cause a catastrophic failure of the vessel releasing the contents into a massive fireball and explosion. The resulting fire and explosion can result in severe equipment damage and personnel injury or death over a large area around the vessel. For massive fires in large areas, use unmanned hose holder or monitor nozzles; if this is not possible, withdraw from area and allow fire to burn.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Static discharge may cause this gas to ignite explosively, if released.

SPECIAL FIRE-FIGHTING PROCEDURES: The best fire-fighting technique may be simply to let the burning gas escape from the pressurized cylinder, tank car, or pipeline. Stop the leak before extinguishing fire. If the fire is extinguished before the leak is sealed, the still-leaking gas could explosively re-ignite without warning and cause extensive damage, injury, or fatality. In this case, increase ventilation (in enclosed areas) to prevent flammable or explosive mixture formation. Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Because of the potential for a BLEVE, evacuation of non-emergency personnel is essential. If water is not available for cooling or protection of vessel exposures, evacuate the area. Refer to the North American Emergency Response Guidebook (Guide #116).

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area and protect people. Adequate fire protection must be provided.

Minimum Personal Protective Equipment should be **Level B: fire-retardant protective clothing, mechanically-resistant gloves and Self-Contained Breathing Apparatus.** Use only non-sparking tools and equipment. Locate and seal the source of the leaking gas. Protect personnel attempting the shut-off with water-spray. Allow the gas to dissipate. Monitor the surrounding area for oxygen and combustible gas levels. Combustible gas concentration must be below 10% of the LEL (LEL = 2.5%) prior to entry of any response personnel. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus.

Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.

THIS IS AN EXTREMELY FLAMMABLE GAS. Protection of all personnel and the area must be maintained.

PART III *How can I prevent hazardous situation from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting Acetylene IN YOU. Do not eat or drink while handling chemicals. Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of Acetylene could occur without any significant warning symptoms.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas. Avoid storage for over six months and keep the smallest amount necessary on-site at any one-time. In the United States, from NFPA 51, cylinders of Acetylene stored inside buildings at the locations of use, must be limited to a total capacity of 2500 ft^3 (70m^3). In Canada, the limit is for a total capacity of 2160 ft^3 (60 m^3) in non-sprinklered buildings and 6130 ft^3 (170 m^3) in building with sprinkler systems. After these quantities are exceeded, a special room must be built for the storage of Acetylene. Consider installation of leak detection and alarm for storage area. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. This will prevent acetone from being released from the cylinder. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting.

Use non-sparking ventilation systems, approved explosion-proof equipment, and appropriate electrical systems. Keep the quantity stored as small as possible. Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits. Keep storage area clear of materials which can burn. Have appropriate extinguishing equipment in the storage area (e.g., sprinkler system, portable fire extinguishers).

It is important to note that Acetylene, in its free state, under pressure, may decompose violently. The higher the pressure, the smaller the initial force necessary to cause a reaction. Therefore, **never use the free gas outside the cylinder at pressures in excess of 15 psig.** If pressures exceeding this limit are utilized, special explosion and fire safety precautions must be implemented.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated area, away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52°C (125°F). Isolate from halogens and oxidizers such as oxygen, chlorine, or fluorine. Use a check valve or trap in the discharge line to prevent hazardous backflow. Never tamper with pressure relief devices in valves and cylinders. Electrical equipment should be non-sparking or explosion proof. The following rules are applicable to work situations in which cylinders are being used:

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap (where provided) in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Valves should be closed tightly, to prevent evaporation of acetone. Replace valve protection cap. Mark empty cylinders "EMPTY".

7. HANDLING and STORAGE (Continued)

NOTE: Use only DOT or ASME code containers designed for acetylene storage. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet -1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 "*Oxygen Deficient Atmospheres*" and NFPA Bulletin 58.

For welding and brazing operations, refer to ANSI Z-49.1 "*Safety in Welding and Cutting*" and OSHA safety regulations for welding, cutting, and brazing (29 CFR 1910.252).

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (e.g., nitrogen) before attempting repairs.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure oxygen levels are above 19.5% in the work area. Local exhaust ventilation is preferred, because it prevents Acetylene dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen and the presence of potentially explosive air-gas mixtures.

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to a release of Acetylene. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards.

EYE PROTECTION: Splash goggles or safety glasses, for protection from rapidly expanding gases and splashes of the acetone.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of Acetylene. Wear Solvex or neoprene gloves if operations could lead to a potential exposure to acetone.

BODY PROTECTION: Use body protection appropriate for task. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from splashes of liquefied product, as well as fire retardant items.

9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY (@ 0°C): 1.1716 kg/m^3 (0.073 lb/ft^3)
SPECIFIC GRAVITY (air = 1): 0.906
SOLUBILITY IN WATER @0°C (32°F) 1 atm: 1.7 vol/vol
EVAPORATION RATE (nBuAc = 1): Not applicable.
ODOR THRESHOLD (Detection): 226 ppm
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.
pH: Not applicable.
FREEZING POINT (@ 10 psig): -84°C (-119°F)
BOILING POINT: -75°C (-103°F)
EXPANSION RATIO: Not applicable.
VAPOR PRESSURE (psia): 649.6
SPECIFIC VOLUME (ft^3/lb): 14.7

APPEARANCE AND COLOR: Colorless gas with a garlic-like, odor dissolved in acetone.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no distinct warning properties. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Acetylene is stable at standard temperatures and pressures. Gaseous acetylene may decompose violently at elevated temperatures and pressures. Acetylene must not be used at pressures greater than 15 psig. The higher the pressure, the more likely it is for a reaction to occur.

DECOMPOSITION PRODUCTS: Carbon and hydrogen. When ignited in the presence of oxygen, carbon monoxide and carbon dioxide are formed.

10. STABILITY and REACTIVITY (Continued)

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Acetylene is not compatible with the following materials. Strong oxidizers (e.g. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride), brass (with a copper content exceeding 65%), calcium hypochlorite, various heavy metals (copper, silver, mercury) and the salts of these metals, halogens (bromine, chlorine, iodine, fluorine), hydrides (e.g. sodium hydride, cesium hydride), ozone, perchloric acid; potassium.

HAZARDOUS POLYMERIZATION: Can occur when heated or under pressure.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to heat, sparks and other sources of ignition. Cylinders exposed to high temperatures or direct flame can rupture or burst. Liquid nitrogen should not be used as a trap, as it may cause acetylene to condense to its liquid or solid state, both of which are explosive.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following information is for Acetylene.

TCLo (inhalation, human) = 20 pph; central nervous system, respiratory system effects.
LCLo (inhalation, human) = 50 pph/5 minutes
LCLo (inhalation, human) = 500,000 ppm/5 minutes

Other data pertaining to the effects of Acetylene inhalation on humans are as follows:

Concentration	Symptom
100,000 ppm	Intoxication (drowsiness, dizziness, giddiness).
200,000 ppm	Severe intoxication.
300,000 ppm	Loss of coordination.
350,000 ppm	Unconsciousness after 5 minutes of exposure.

Effects on Short-Term Inhalation: Animals have shown tolerance to 10% Acetylene. In studies with dogs, cats, and rabbits, Acetylene acts as an anesthetic at 20% exposure. Recovery occurs if the oxygen level is maintained. In an oxygen-deficient environment, death may occur after 5-10 minutes. Rodents exposed to 25, 50, and 80 percent Acetylene in oxygen for 1-2 hours daily (93 hours total exposure), evidenced no weight change or cellular damage. Mixtures of 80% Acetylene/20% oxygen caused a rise in blood pressure in an exposed cat.

SUSPECTED CANCER AGENT: Acetylene is not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA, and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Acetylene is not irritating; however, contact with the acetone component of Acetylene can be slightly irritating to contaminated skin or eyes.

SENSITIZATION TO THE PRODUCT: Acetylene is not known to cause sensitization in humans.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects Acetylene on the human reproductive system.

Mutagenicity: No mutagenicity effects have been described for Acetylene.
Embryotoxcity: No embryotoxic effects have been described for Acetylene.
Teratogenicity: No teratogenicity effects have been described for Acetylene.
Reproductive Toxicity: No reproductive toxicity effects have been described for Acetylene.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by overexposure to the components of Acetylene.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for this gas.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary. Treat symptoms and eliminate exposure.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas. The following environmental data are available for this gas.

ACETYLENE: Water Solubility = 100 vol./100 vol. at 18 EC. Acetylene is not expected to be harmful to aquatic life. Only moderately toxic to fish. Volatility and low solubility suggest it would be rare for water to become critically polluted from accidental releases. Acetylene is biodegraded through various plant and bacterial systems by inactivating atmospheric acetylene through their nitrogen- fixing mechanisms.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Any adverse effect on animals would be related to oxygen deficient environments and the anesthetic properties of Acetylene at high concentrations of exposure. The following data are available for effects on plant-life:

Sweet pea: declination in seedling: 250 ppm, 3 days
Tomato: Epinasty in petiole: 50 ppm, 2 days.

EFFECT OF CHEMICAL ON AQUATIC LIFE: The following aquatic toxicity data are available for Acetylene.

LC50 (river trout): 33 hours, 200 mg/L

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, and local regulations. Return cylinders with residual product to Airgas. Do not dispose of locally.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:	Acetylene, dissolved
HAZARD CLASS NUMBER and DESCRIPTION:	2.1 (Flammable Gas)
UN IDENTIFICATION NUMBER:	UN 1001
PACKING GROUP:	Not Applicable
LOT LABEL(S) REQUIRED:	Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 116

MARINE POLLUTANT: Acetylene is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: Acetylene is not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

CANADIAN DSL/NDSL INVENTORY STATUS: Acetylene is on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: Acetylene is on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Acetylene is subject to the reporting requirements of Section 112(r) of the Clean Air Act, unless used as a fuel. The Threshold Quantity for this gas is 10,000 lb. Depending on specific operations involving the use of Acetylene, the regulations of the Process Safety Management of Highly Hazardous Chemicals may be applicable (29 CFR 1910.119). Under this regulation Acetylene is not listed in Appendix A, however, any process that involves a flammable gas on-site, in one location, in quantities of 10,000 lb (4,553 kg) or greater is covered under this regulation unless it is used as a fuel.

15. REGULATORY INFORMATION (Continued)

U.S. STATE REGULATORY INFORMATION: Acetylene is covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: Acetylene.
California - Permissible Exposure Limits for Chemical Contaminants: Acetylene.
Florida - Substance List: Acetylene.
Illinois - Toxic Substance List: Acetylene.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Acetylene.
Michigan - Critical Materials Register: No.
Minnesota - List of Hazardous Substances: Acetylene.
Missouri - Employer Information/Toxic Substance List: Acetylene.
New Jersey - Right to Know Hazardous Substance List: Acetylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Acetylene.
Rhode Island - Hazardous Substance List: Acetylene.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Acetylene is not on the California Proposition 65 lists.

LABELING:

DANGER: FLAMMABLE GAS UNDER PRESSURE.
CAN FORM EXPLOSIVE MIXTURES WITH AIR.
FUSIBLE PLUGS ON TOP, BOTTOM, OR VALVE MELT AT 208 °F (98-104 °C).
DO NOT DISCHARGE AT PRESSURES ABOVE 15 PSIG (103 kPa)

ODOR: Garlic-like.

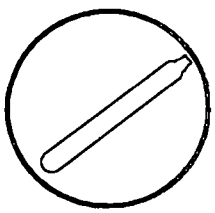
Keep away from heat, flames, and sparks.
Store and use width adequate ventilation.
Use equipment rated for cylinder pressure.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

NOTE: Cylinder contains acetone solvent, which may cause irritation.

DO NOT REMOVE THIS PRODUCT LABEL

CANADIAN WHMIS SYMBOLS:

Class A: Compressed Gases
Class B1: Flammable Gas



16. OTHER INFORMATION

PREPARED BY: **Airgas - SAFECOR**

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AIRGAS, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AIRGAS, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

TLV - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

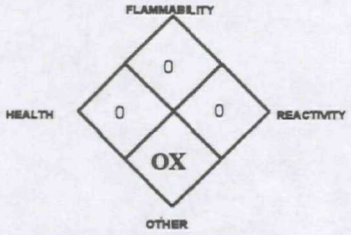
REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations.

MATERIAL SAFETY DATA SHEET

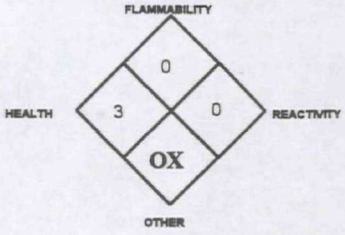
OXYGEN GAS

NFPA RATING



OXYGEN- REFRIGERATED LIQUID

NFPA RATING



Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: **OXYGEN O_2**
OXYGEN O_2
REFRIGERATED LIQUID
Document Number: 1043

PRODUCT USE: For general analytical/synthetic chemical uses.

SUPPLIER/MANUFACTURER'S NAME: AIRGAS INC.
ADDRESS: 259 Radnor-Chester Road
Suite 100
Radnor, PA 19087-5240

BUSINESS PHONE: 1-610-687-5253
EMERGENCY PHONE: CHEMTREC: 1-800-424-9300
International: 202-483-7616

DATE OF PREPARATION: May 20, 1996
SECOND REVISION: December 8, 1997

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
Oxygen	7782-44-7	99.8%	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5% and below 23.5%					
Maximum Impurities		<0.2% (2000 ppm)	None of the trace impurities in this mixture contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalent standards.					

NE = Not Established C = Ceiling Limit. See Section 16 for Definitions of Terms Used.

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: Oxygen is a colorless, odorless, oxidizing gas, or a colorless, odorless, cryogenic liquid. The chief health hazard presented by this gas at atmospheric pressures is respiratory system irritation after overexposure to high oxygen concentrations. The main physical hazard associated with releases of this gas is related to its oxidizing power. In high oxygen content atmospheres, common combustible materials can become highly flammable. The cryogenic liquid will rapidly boil to the gas at standard temperatures and pressures. The liquefied gas can cause frostbite to any contaminated tissue. Emergency responders must practice extreme caution when approaching oxygen releases because of the extreme fire potential.

OXYGEN GAS

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	0
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		B

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications

LIQUID OXYGEN

HAZARDOUS MATERIAL INFORMATION SYSTEM

HEALTH	(BLUE)	3
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		X

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications

See Section 16 for Definition of Ratings

SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant route of overexposure for this gas or cryogenic liquid by inhalation. Skin and eye contact is also possible for the cryogenic liquid. The following paragraphs describe symptoms of exposure by route of exposure.

INHALATION: Normally, air contains 21% oxygen. No health effects have been observed in people exposed to 50% Oxygen at 1 atm. for 24 hours or longer. High concentrations of this gas create an oxygen-rich environment. Individuals breathing such an atmosphere containing 51-100% Oxygen may experience nausea, dizziness, coughing, and bronchial irritation. Exposures to high Oxygen concentrations, especially at elevated pressures, can cause, hypothermia, increased depth of respiration, bradycardia, pulmonary discomfort, central nervous system effects (e.g., mood changes, dizziness), peripheral vasoconstriction, amblyopia (loss of vision), seizures, or death. Exposure levels to pure oxygen which have produced the adverse symptoms described above are summarized below.

DURATION OF EXPOSURE	***PRESSURE OF OXYGEN***
5 hours	Sea level
3 hours	3 atmospheres
30 minutes	4 atmospheres
5 minutes	7 atmospheres

NOTE: Pure oxygen at 1/3 atmospheric pressure can be inhaled for weeks without symptoms. Inhalation of pure oxygen for up to 16 hours per day for many days and 65% oxygen in air for extended periods does not cause symptoms of oxygen toxicity.

OTHER POTENTIAL HEALTH EFFECTS: Contact of the skin or eyes with cryogenic liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside. Ingestion and absorption through the skin are not considered significant routes of entry of oxygen into the body.

3. HAZARD IDENTIFICATION (Continued)

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Overexposure to Oxygen may cause the following health effects:

ACUTE: The most significant hazard associated with this gas is inhalation of oxygen-rich atmospheres. Symptoms of overexposure to Oxygen include nausea, dizziness, respiratory problems, lowering of body temperature, loss of vision, seizures, or death. Contact with cryogenic liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite.

CHRONIC: Long-term exposure to high atmospheric concentrations of oxygen at normal pressure or elevated pressure may produce severe thickening and scarring of lung tissues. Blood hemoglobin concentration decreases (thus reducing oxygen-carrying capacity) with prolonged exposure to high concentrations). See Section 11 (Toxicological Information) for additional information.

TARGET ORGANS: Hyperbaric Oxygen: Respiratory system and Central Nervous System. Cryogenic Liquid: Skin.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO OXYGEN WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus Personal Protective equipment (and fire retardant clothing, if appropriate) should be worn to protect against high oxygen content or super-heated gases in the event of fire.

Remove victim(s) to fresh air, as quickly as possible. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Supplemental oxygen is not normally appropriate. Victims tend to recover rapidly, when removed from the hypoxic exposure.

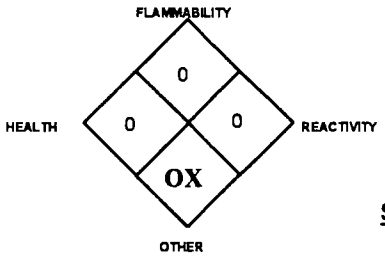
In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit, Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s). Medical care providers should refer to Section 11 of this MSDS for additional information.

5. FIRE-FIGHTING MEASURES

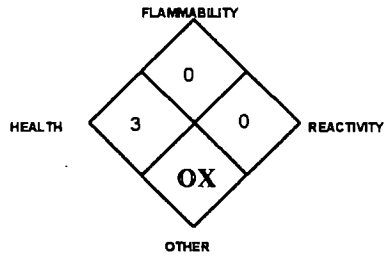
OXYGEN GAS

NFPA RATING



LIQUID OXYGEN

NFPA RATING



See Section 16 for Definition of Ratings

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

5. FIRE-FIGHTING MEASURES (Continued)

FIRE EXTINGUISHING MATERIALS: Non-flammable gas. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxygen does not burn; however, cylinders, when involved in fire, may rupture or burst in the heat of the fire. Oxygen will support and accelerate combustion. Common combustible materials will burn readily in elevated oxygen environments.

Water Spray: YES	Carbon Dioxide: YES	Foam: YES
Halon: YES	Dry Chemical: YES	Other: Any "ABC" Class.

RESPONSE TO FIRE INVOLVING CRYOGEN: Cryogenic oxygen may contribute to the ignition of any combustible material, including asphalt and wood. Extreme caution must be used when cryogenic oxygen storage vessels are involved in a fire. Cryogenic liquids can be particularly dangerous during fires because of their potential to rapidly freeze water. Careless use of water may cause heavy icing. Furthermore, relatively warm water greatly increases the evaporation rate of Oxygen. If large concentrations of Oxygen gas are present, the water vapor in the surrounding air will condense, creating a dense fog that may make it difficult to find fire exits or equipment. Liquid Oxygen, when exposed to the atmosphere, will produce a cloud of ice/fog in the air upon its release.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.
Explosion Sensitivity to Static Discharge: Not Sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Do not enter areas which have more than 23.5% oxygen in the atmosphere, since a serious fire and explosion hazard exists. Remove all flammable and combustible materials from vicinity of a release, if it can be done without risk to firefighters. Direct water onto vessels to keep the vessels cool. Shut-off the flow of oxygen or move vessels from fire area if it can be done safely. Withdraw from the area in case of rising sounds from venting safety devices or any discoloration of vessels due to fire.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area and protect people. Minimum Personal Protective Equipment should be **Level B: fire protective clothing, mechanically-resistant, fire protective gloves and Self-Contained Breathing Apparatus**. In general, **DO NOT ENTER AN AREA IF THE OXYGEN CONTENT EXCEEDS 23.5%. USE VENTILATION TO REDUCE THE OXYGEN LEVELS.** Locate and seal the source of the leaking gas. Protect personnel attempting the shut-off with water-spray. Allow the gas to dissipate. Monitor the surrounding area for oxygen levels. The atmosphere must have at least 19.5 percent and less than 23.5% oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.

RESPONSE TO CRYOGENIC RELEASE: Clear the affected area and allow the liquid to evaporate and the gas to dissipate. After the gas is formed, follow the instructions provided in the previous paragraph. If the area must be entered by emergency personnel, SCBA, Kevlar gloves, and appropriate foot and leg protection and fire protective clothing must be worn.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Do not eat or drink while handling chemicals. Be aware of any signs of overexposure to this gas (see Section 3, Hazard Information).

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits. Post "No Smoking or Open Flames" signs in storage or use areas.

7. HANDLING and STORAGE (Continued)

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F). Use only storage containers and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the storage of Oxygen. Do not store containers where they can come into contact with moisture.

Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting.

Keep Dewar flasks of liquid oxygen covered with loose fitting cap. This prevents air or moisture from entering the container, yet allows pressure to escape. Use only the stopper or plug supplied with the container. Ensure that ice does not form in the neck of flasks. If the neck of Dewar flask is blocked by ice or "frozen" air, follow owner's instruction for removing it. A plugged Dewar or storage flask may develop sufficient pressure to cause catastrophic failure. Ice can also cause pressure release valves to fail. Never tamper with pressure relief devices in valves and cylinders. The temperature of Liquid Oxygen is sufficiently cold to condense and freeze most gases. Consequently, there is a danger of pipes or vents becoming plugged. Liquid Oxygen should therefore be stored and handled under positive pressure or in a closed system to prevent the infiltration and solidification of air or other gases. The following rules are applicable to situations in which cylinders are being used:

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap, if provided, in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Replace valve protection cap, if provided. Mark empty cylinders "EMPTY".

NOTE: Use only DOT or ASME code containers. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. For cryogenic liquids, refer to CGA P-12, *Safe Handling of Cryogenic Liquids*. Additionally, refer to CGA Bulletins G-4.3, "*Commodity Specification for Oxygen*", and G-4.1 "*Cleaning Equipment for Oxygen Service*".

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (e.g., Nitrogen) before attempting repairs.

TANK CAR SHIPMENTS: Tank cars carrying Oxygen should be loaded and unloaded in strict accordance with tank-car owner's recommendations and all established on-site safety procedures. Appropriate personal protective equipment must be used during tank car operations (see Section 8). All loading and unloading equipment must be inspected, prior to each use. Loading and unloading operations must be attended, at all times. Tank cars must be level and wheels must be locked or blocked prior to loading or unloading. Tank car (for loading) or storage tank (for unloading) must be verified to be correct for receiving this product and be properly prepared, prior to starting the transfer operations. Hoses must be verified to be clean and free of incompatible chemicals, prior to connection to the tank car or vessel. Valves and hoses must be verified to be in the correct positions, before starting transfer operations. A sample (if required) must be taken and verified (if required) prior to starting transfer operations. All lines must be blown-down and purged before disconnecting them from the tank car or vessel. Refrigerated Liquid Oxygen is capable of causing the ignition of asphalt. Transfers should be performed on concrete surfaces.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to maintain Oxygen levels between 19.5% and 23.5% in the work area. Local exhaust ventilation is preferred, because it prevents Oxygen dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of Oxygen.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% and below 23.5% in the workplace. Use supplied air respiratory protection during emergency response to a release of Oxygen. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards. DO NOT ENTER AN AREA IF THE OXYGEN CONTENT EXCEEDS 23.5%.

EYE PROTECTION: Safety glasses. Face-shields must be worn when using cryogenic Oxygen.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of Oxygen. Use low-temperature protective gloves (e.g., Kevlar) when working with containers of Liquid Oxygen.

BODY PROTECTION: Use body protection appropriate for task. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from splashes of liquefied product, as well provide sufficient insulation from extreme cold.

9. PHYSICAL and CHEMICAL PROPERTIES

VAPOR DENSITY: 1.326 kg/m^3 (0.083 lb/ft^3)

EVAPORATION RATE (nBuAc = 1): Not applicable.

SPECIFIC GRAVITY (air = 1): 1.105

FREEZING POINT: -218.8°C (-361.8°F)

SOLUBILITY IN WATER v/v @ 0°C (32°F): 4.9%

BOILING POINT @ 1 atm.: -297.4°F (-183.0°C)

VAPOR PRESSURE (psia): Not applicable.

pH: Not applicable.

EXPANSION RATIO: 861 (cryogenic liquid).

ODOR THRESHOLD: Not applicable. Odorless.

COEFFICIENT WATER/OIL DISTRIBUTION: Log P -0.65

SPECIFIC VOLUME (ft^3/lb): 12.1

APPEARANCE AND COLOR: Oxygen is a colorless, odorless gas or a colorless and odorless, cryogenic liquid.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of Oxygen. A release of the Refrigerated Liquid will be obvious as a result of the fog of atmospheric moisture which condenses in the vicinity of the release. An oxygen monitor can be used to detect oxygen levels.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.

DECOMPOSITION PRODUCTS: None.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Oxygen is incompatible with combustible and flammable materials, chlorinated hydrocarbons, hydrazine, reduced boron compounds, ethers, phosphine, phosphorous tribromide, phosphorous trioxide, tetrafluorethylene, and compounds which readily form peroxides. The Refrigerated Liquid will cause asphalt to ignite.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: Oxygen is the vital element in the atmosphere in which we live and breathe. The following toxicity data are for oxygen and are for exposure to high levels in extreme situations:

Cytogenetic Analysis System (hamster lung) 80 pph
TCLo (inhalation-woman) 12 pph for 10 minutes. Teratogenic effects.
TCLo (inhalation-human) 100 pph for 14 hours. Pulmonary effects.

SUSPECTED CANCER AGENT: Oxygen is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC; therefore it is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases or the refrigerated liquid can cause frostbite and damage to exposed skin and eyes.

SENSITIZATION OF PRODUCT: Oxygen is not a sensitizer.

11. TOXICOLOGICAL INFORMATION (Continued)

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of Oxygen on the human reproductive system.

Mutagenicity: Oxygen is not expected to cause mutagenic effects in humans. High concentrations of Oxygen at atmospheric pressure caused chromosomal aberrations and mutations in specific test animal tissues.
Embryotoxicity: Oxygen is not expected to cause embryotoxic effects in humans.
Teratogenicity: Oxygen is not expected to cause teratogenic effects in humans. Exposure of pregnant hamsters to 3-4 atmospheres of 100% oxygen for periods of 2-3 hours on days 6, 7, and 8 of pregnancy produced teratogenic effects in small, but significant number of fetuses.
Reproductive Toxicity: Oxygen is not expected to cause adverse reproductive effects in humans.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions may be aggravated by overexposure to Oxygen.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce overexposure. Symptoms of overexposure usually are relieved quickly. Immediate sedation and anticonvulsive therapy should be provided, as needed.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for this compound.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: Oxygen occurs naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are available for Oxygen.

OXYGEN: Log K_{ow} = -0.65, oxygen does not bioconcentrate in aquatic organisms

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No adverse effect is anticipated to occur to animal or plant-life, except for frost produced in the presence of rapidly expanding gases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on Oxygen's effects on aquatic life.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Return cylinders with any residual product to Airgas Inc. Do not dispose of locally.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

For Oxygen, Gas:

PROPER SHIPPING NAME:	Oxygen, compressed
HAZARD CLASS NUMBER and DESCRIPTION:	2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER:	UN 1072
PACKING GROUP:	Not Applicable
DOT LABEL(S) REQUIRED:	Non-Flammable Gas, Oxidizer

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 122

For Oxygen, Liquid:

PROPER SHIPPING NAME:	Oxygen, refrigerated liquid
HAZARD CLASS NUMBER and DESCRIPTION:	2.2 (Non-Flammable Gas)
UN IDENTIFICATION NUMBER:	UN 1073
PACKING GROUP:	Not Applicable
DOT LABEL(S) REQUIRED:	Non-Flammable Gas, Oxidizer

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 122

14. TRANSPORTATION INFORMATION (Continued)

MARINE POLLUTANT: Oxygen is not classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: Oxygen is not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

CANADIAN DSL/NDSL INVENTORY STATUS: Oxygen is on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: Oxygen is on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: Oxygen is covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No.
California - Permissible Exposure Limits for Chemical Contaminants: No.
Florida - Substance List: Oxygen.
Illinois - Toxic Substance List: No.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen.
Minnesota - List of Hazardous Substances: No.
Michigan - Critical Materials Register: No.
Missouri - Employer Information/Toxic Substance List: No.
New Jersey - Right to Know Hazardous Substance List: Oxygen.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen.
Rhode Island - Hazardous Substance List: Oxygen.
Texas - Hazardous Substance List: No.
West Virginia - Hazardous Substance List: No.
Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): Oxygen is not on the California Proposition 65 lists.

LABELING (for Liquid):

ALWAYS KEEP CONTAINER IN UPRIGHT POSITION.

WARNING: EXTREMELY COLD, OXIDIZING LIQUID AND GAS UNDER PRESSURE.
VIGOROUSLY ACCELERATES COMBUSTION.
COMBUSTIBLES IN CONTACT WITH LIQUID OXYGEN MAY EXPLODE ON IGNITION OR CONTACT.
CAN CAUSE SEVERE FROSTBITE.

Keep oil, grease, and combustibles away.
Use only with equipment cleaned for oxygen service.
Do not get liquid in eyes, on skin, or clothing.
For liquid withdrawal, wear face shield and gloves.
Do not drop. Use hand truck for container movement.
Avoid spills. Do not walk on or roll equipment over spills.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

FIRST-AID: **IN CASE OF FROSTBITE,** obtain immediate medial attention.

DO NOT REMOVE THIS PRODUCT LABEL.

15. REGULATORY INFORMATION (Continued)

LABELING (for Compressed Gas):

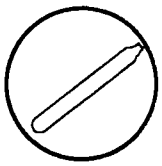
WARNING: HIGH PRESSURE OXIDIZING GAS.
VIGOROUSLY ACCELERATES COMBUSTION.

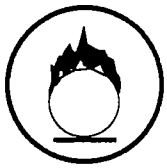
Keep oil and grease away.
Open valve slowly.
Use only with equipment cleaned for oxygen service and rated for cylinder pressure.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

DO NOT REMOVE THIS PRODUCT LABEL.

CANADIAN WHMIS SYMBOLS:

Class A: Compressed Gases
Class C: Oxidizer





16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AIRGAS, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AIRGAS, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

TLV - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). NIOSH issues exposure guidelines called **R**ecommended **E**xposure **L**evels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); 1 (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD_{50}** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC_{50}** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations.

L-4715-D
October 1993

MATERIAL SAFETY DATA SHEET

An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices.
(Essentially similar to US Department of Labor Form OMB No. 1218-0072)
Do Not Duplicate This Form. Request an Original.

PRAXAIR

I. PRODUCT IDENTIFICATION

PRODUCT	25% Carbon Dioxide—75% Argon Mixture		
CHEMICAL NAME	Carbon Dioxide—Argon Mixture	SYNONYMS	C-25 Shielding Gas
FORMULA	Mixture of CO_2 and Ar	CHEMICAL FAMILY	Not applicable
		MOLECULAR WEIGHT	Not applicable
TRADE NAME	C-25 Shielding Gas (This product is intended for electric welding use.)		

II. HAZARDOUS INGREDIENTS

This section covers the materials from which this product is manufactured. The fumes and gases produced during cutting with the normal use of this product are covered by Section VI. The term "hazardous" should be interpreted as a term required and defined in OSHA 29 CFR 1910.1200 and does not necessarily imply the existence of any hazard.

MATERIAL (CAS NO.)	Wt (%)	1992-1993 ACGIH TLV-TWA (OSHA-PEL)	
Argon (7440-37-1)	75	Simple asphyxiant	(None currently established)
Carbon Dioxide (124-38-9)	25	5000 ppm	(5,000)

III. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	Not applicable	FREEZING POINT	Not applicable
SPECIFIC GRAVITY (H_2O = 1)	Gas	VAPOR PRESSURE AT 20°C.	Gas
VAPOR DENSITY (air = 1)	1.42	SOLUBILITY IN WATER, % by wt.	Negligible
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl acetate = 1)	Not applicable

APPEARANCE AND ODOR Colorless, odorless gas at normal temperature and pressure.

EMERGENCY PHONE NUMBER

IN CASE OF EMERGENCIES involving this material, further information is available at all times:

Call CHEMTREC 800-424-9300 only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals. For routine information contact your supplier.

This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

Praxair requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

Revised

PRAXAIR, INC.

Printed on recycled paper.

PRODUCT: 25% Carbon Dioxide–75% Argon Mixture

L-4715-D
October 1993

IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: The ACGIH 1992-1993 recommended limit for welding fume, not otherwise classified (NOC), is 5 mg/m³. TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations. See Section VI for specific fume constituents which may modify this TLV-TWA. Carbon dioxide TLV 5000 ppm, argon is classified as a simple asphyxiant (ACGIH 92-93).

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN ABSORPTION—No evidence of adverse effects from available information.

INHALATION—Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, stinging of the nose and throat, excitation, rapid breathing, excess salivation, vomiting, and unconsciousness.

SKIN CONTACT—No evidence of adverse effects from available information.

EYE CONTACT—No evidence of adverse effects from available information.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE: Damage to retinal ganglion cells and central nervous system may occur.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: A knowledge of the available toxicology information and of the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: A single study has shown an increase in heart defects in rats exposed to 6% carbon dioxide in air for 24 hours at different times during gestation. There is no evidence that carbon dioxide is teratogenic in humans.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN—No emergency care anticipated.

INHALATION—Remove to fresh air. Give artificial respiration if not breathing. Qualified personnel may give oxygen if breathing is difficult. Obtain medical attention.

EYE CONTACT—Flush with water. Obtain medical attention if discomfort persists.

***NOTES TO PHYSICIAN**: There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.*

WORKING WITH WELDING AND CUTTING MAY CREATE ADDITIONAL HEALTH HAZARDS

FUMES AND GASES can be dangerous to your health and may cause serious lung disease.*

Keep your head out of the fumes. Do not breathe fumes and gases caused by the process. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. The type and amount of fumes and gases depend on the equipment and supplies used. Possibly dangerous materials may be found in fluxes, coatings, gases, metals, etc. Get a Material Safety Data Sheet (MSDS) for every material used. Air samples can be used to find out what respiratory protection is needed.

Short term overexposure to fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

NOTES TO PHYSICIAN:

Acute — *Gases, fumes, and dusts may cause irritation to the eyes, lungs, nose, and throat. Some toxic gases associated with welding and related processes may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty breathing, frequent coughing, or chest pains.*

Chronic — *Protracted inhalation of air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest X-rays. The severity of change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on X-rays may be caused by non-work related factors such as smoking, etc.*

A detailed description of the Health Hazards and their consequences may be found in Praxair's free publication, L-52-1, "Precautions and Safe Practices for Electric Welding and Cutting." You may obtain copies from your local supplier or by writing to Praxair, Inc., Technical Communications, PO Box 44, Tonawanda, NY 14151-0044.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before your produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

PRODUCT: 25 % Carbon Dioxide—75% Argon Mixture

L-4715-D
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V. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	Not applicable	**AUTOIGNITION TEMPERATURE**	Not applicable

FLAMMABLE LIMITS IN AIR, % by Volume	**LOWER** Not applicable	**UPPER**	No applicable

EXTINGUISHING MEDIA: Gas mixture cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate all personnel from danger area. Immediately cool cylinders with water spray from maximum distance until cool, then move containers away from fire area if without risk. Shut off leak if without risk.

Arcs and sparks can ignite combustibles. Refer to American National Standard Z49.1 "Safety In Welding and Cutting," for fire prevention information during the use of welding and allied procedures.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Gas mixture cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are provided with a pressure-relief device designed to vent the contents when they are exposed to elevated temperature.

VI. REACTIVITY DATA

STABILITY	
UNSTABLE	STABLE
	X

CONDITIONS TO AVOID: See Section IX.

INCOMPATIBILITY (materials to avoid): Titanium burns in carbon dioxide above 550°C. Magnesium burns in carbon dioxide above 775°C.

HAZARDOUS DECOMPOSITION PRODUCTS: The arc process may form gaseous reaction products such as carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. See Section IV. Other decomposition products of normal operation originate from the volatilization, reaction or oxidation of the material being worked.

HAZARDOUS POLYMERIZATION	
May Occur	Will not Occur
	X

CONDITIONS TO AVOID: None currently known.

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: This gas mixture is an asphyxiant. Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off cylinder if without risk. Ventilate area of leak or move cylinder to well-ventilated area. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

WASTE DISPOSAL METHOD: Slowly release into atmosphere. Discard any product, residue, disposable container or liner in an environmentally acceptable manner in full compliance with federal, state and local regulations.

PRODUCT: 25% Carbon Dioxide—75% Argon Mixture

L-4715-D
October 1993

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): Use air-purifying or air-supplied respirators as appropriate, where the local and/or the general exhaust ventilation is not adequate to keep worker's exposure below the applicable TLVs during welding operations with this product. Air-supplied respirator is required while working in confined spaces. The respiratory protection use must conform with OSHA rules as specified in 29 CFR 1910.134.

VENTILATION	**LOCAL EXHAUST**—Use local exhaust system, if necessary, to maintain the concentration of hazardous fumes and gases below the applicable TLVs in the worker's breathing zone.
	MECHANICAL (general)—Under certain conditions, general exhaust ventilation may be acceptable provided that it is adequate to maintain the concentration of hazardous fumes and gases below the applicable TLVs in the worker's breathing zone.
	SPECIAL—None.
	OTHER—None.

PROTECTIVE GLOVES: Welding gloves recommended.

EYE PROTECTION: Wear a helmet or use a face shield with a filter lens selected as per ANSI Z49.1. Provide protective screens and flash goggles, if necessary, to protect others. Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: As needed, wear hand, head, and body protection which help to prevent injury from radiation, sparks, and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the worker not to touch live electrical parts.

IX. SPECIAL PRECAUTIONS

...es and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being worked, ...e process, procedure and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being worked (such as paint, plating, or galvanizing), the number of workers and the volume of the work area, the quality and amount of ventilation, the position of the worker's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). Train workers to keep their head out of the fumes. Avoid using electric arcs in the presence of chlorinated hydrocarbon vapors—highly toxic phosgene may be produced. Avoid arc operations on parts with phosphate residues (anti-rust, cleaning preparations)—highly toxic phosphine may be produced.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the worker's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the American Welding Society, 550 N.W. Le Jeune Road, Miami, FL 33135.

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, "Safety in Welding and Cutting," published by the American Welding Society and OSHA Publication 2206 (29 CFR 1910), US Government Printing Office, Washington, DC 20402 for more details. For further safety and health information refer to Praxair's free safety booklet, L-5...-529, "Precautions and Safe Practices for Electric Welding and Cutting."

OTHER HANDLING AND STORAGE CONDITIONS: Arcs and sparks during use could be the source of ignition of combustible materials. Prevent fires. Refer to NFPA 51B, "Cutting and Welding Processes." High pressure gas mixture. Use piping and equipment adequately designed to withstand pressures to be encountered. Gas can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve when not in use and when empty. Do not strike arc on cylinder. The defect produced by an arc burn could lead to cylinder rupture. Do not ground cylinder or allow to become part of electrical circuit. Never work on a pressurized system.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

PRAXAIR

GENERAL OFFICES
Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113

L-4563-D
October 1992

MATERIAL SAFETY DATA SHEET

An explanation of the terms used herein may be found in OSHA 29 CFR 1910.1200, available from OSHA regional or area offices.
(Essentially similar to US Department of Labor Form OMB No. 1218-0072)
Do Not Duplicate This Form, Request an Original.

PRAXAIR

I. PRODUCT IDENTIFICATION

PRODUCT	Argon		
CHEMICAL NAME	Argon	**SYNONYMS**	Shielding Gas, Argon-40
FORMULA	Ar	**CHEMICAL FAMILY**	(Rare Gas) Noble Gas
		MOLECULAR WEIGHT	39.948
TRADE NAME	Argon (This product is usually intended for electric welding use.)		

II. HAZARDOUS INGREDIENTS

This section covers the materials from which this product is manufactured. The fumes and gases produced during cutting with the normal use of this product are covered by Section VI. The term "hazardous" in "Hazardous Materials" should be interpreted as a term required and defined in OSHA 29 CFR 1910.1200 and does not necessarily imply the existence of any hazard.

MATERIAL (CAS NO.)	Wt (%)	1992-1993 ACGIH TLV-TWA (OSHA-PEL)
Argon (7440-37-1)	100	Simple asphyxiant (None currently established)

III. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	−185.9°C (−302.6°F)	**FREEZING POINT**	−189.2°C (−308.6°F)
SPECIFIC GRAVITY (H_2O = 1)	Gas	**VAPOR PRESSURE AT 20°C.**	Gas
VAPOR DENSITY (air = 1)	1.378 @ 21.2°C (70°F)	**SOLUBILITY IN WATER, % by wt.**	Negligible
PERCENT VOLATILES BY VOLUME	100	**EVAPORATION RATE (Butyl acetate = 1)**	Not applicable

APPEARANCE AND ODOR Colorless, odorless gas at normal temperature and pressure.

EMERGENCY PHONE NUMBER

IN CASE OF EMERGENCIES involving this material, further information is available at all times:

Call CHEMTREC 800-424-9000 only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals. For routine information contact your supplier.

This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

Praxair requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

PRODUCT: Argon

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IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: Simple asphyxiant—ACGIH 1992-1993. ACGIH 92-93 recommends a TLV-TWA of 0.5 mg/m^3 for welding fumes not otherwise classified (NOC) which may be generated during welding with this product.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN ABSORPTION—No evidence of adverse effects from available information.

INHALATION—Asphyxiant. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting and unconsciousness.

SKIN CONTACT—No harmful effect expected from vapor.

EYE CONTACT—No harmful effect expected from vapor.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE: Argon is an asphyxiant. Lack of oxygen can cause death.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: A knowledge of the available toxicology information and of the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None currently known.

EMERGENCY AND FIRST AID PROCEDURES:

SWALLOWING—This product is a gas at normal temperature and pressure.

SKIN CONTACT—Flush with water.

INHALATION—Remove to fresh air. Give artificial respiration if not breathing. Give oxygen if breathing is difficult. Call a physician.

EYE CONTACT—Flush with water.

NOTES TO PHYSICIAN: *This product is inert. There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition.*

WORKING WITH WELDING AND CUTTING MAY CREATE ADDITIONAL HEALTH HAZARDS.

FUMES AND GASES can be dangerous to your health and may cause serious lung disease.*

Keep your head out of the fumes. Do not breathe fumes and gases caused by the process. Use enough ventilation, local exhaust, or both to keep fumes and gases from your breathing zone and the general area. The type and amount of fumes and gases depend on the equipment and supplies used. Possible dangerous materials may be found in fluxes, coatings, gases, metals etc. Get a Material Safety Data Sheet (MSDS) for every material used. Air samples can be used to find out what respiratory protection is needed.

Short term overexposure to fumes may result in discomfort such as dizziness, nausea, or dryness or irritation of nose, throat, or eyes.

****NOTES TO PHYSICIAN:***

Acute— *Gases, fumes, and dusts may cause irritation to the eyes, lungs, nose, and throat. Some toxic gases associated with welding and related processes may cause pulmonary edema, asphyxiation, and death. Acute overexposure may include signs and symptoms such as watery eyes, nose and throat irritation, headache, dizziness, difficulty breathing, frequent coughing, or chest pains.*

Chronic— *Protracted inhalation of air contaminants may lead to their accumulation in the lungs, a condition which may be seen as dense areas on chest x-rays. The severity of change is proportional to the length of exposure. The changes seen are not necessarily associated with symptoms or signs of reduced lung function or disease. In addition, the changes on x-rays may be caused by non-work related factors such as smoking, etc.*

A detailed description of the Health Hazards and their consequences may be found in Praxair's free publication L-52-529, "Precautions and Safe Practices for Electric Welding and Cutting." You may obtain copies from your local supplier.

MIXTURES: When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

PRODUCT: Argon

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V. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	Not applicable	**AUTOIGNITION TEMPERATURE**	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume	**LOWER** Not applicable	**UPPER**	Not applicable

EXTINGUISHING MEDIA: Argon cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate all personnel from danger area. Immediately cool containers with water spray from maximum distance until cool, then move containers away from fire area if without risk. Shut off leak if without risk.

Arcs and sparks can ignite combustibles. Refer to American National Standard Z49.1 "Safety in Welding and Cutting" for fire prevention information during the use of welding and allied procedures.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Argon cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52°C (approximately 125°F). Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

VI. REACTIVITY DATA

STABILITY	
UNSTABLE	STABLE
	X

CONDITIONS TO AVOID: High pressure gas. Close valve when not in use and when empty. Use with equipment rated to adequately withstand pressures to be encountered. Do not strike arc on cylinder. Do not ground cylinder. See Section IX.

INCOMPATIBILITY (materials to avoid): None currently known. Argon is chemically inert.

HAZARDOUS DECOMPOSITION PRODUCTS: Ozone and Nitrogen Oxides may be formed by the radiation from the arc. See Section IV. Other decomposition products of normal operation originate from the volatilization, reaction or oxidation of the material being worked.

HAZARDOUS POLYMERIZATION	
May Occur	Will not Occur
	X

CONDITIONS TO AVOID: None currently known.

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Argon is an asphyxiant. Evacuate all personnel from danger area. Use self contained breathing apparatus where needed. Shut off cylinder if without risk. Ventilate area of leak or move cylinder to well ventilated area. Test area, especially confined areas, for sufficient oxygen content prior to permitting re-entry of personnel.

WASTE DISPOSAL METHOD: Slowly release into the atmosphere. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

PRODUCT: Argon

L-4563-D
October 1992

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): Use air-purifying or air-supplied respirators, as appropriate, where the local and/or general exhaust ventilation is not adequate to keep worker exposure below the applicable TLVs during welding operations using argon. Air supplied respirator is required while working in confined spaces. The respiratory protection use must conform with OSHA rules as specified in 29 CFR 1910.134.

VENTILATION	**LOCAL EXHAUST**—Use local exhaust system, if necessary, to maintain the concentration of hazardous fumes and gases below the applicable TLVs in the worker's breathing zone.
	MECHANICAL (general)—Under certain working conditions, general exhaust ventilation may be acceptable provided that it is adequate to maintain the concentration of hazardous fumes and gases below the applicable TLVs in the worker's breathing zone.
	SPECIAL—None
	OTHER—None

PROTECTIVE GLOVES: Welding gloves recommended.

EYE PROTECTION: Wear a helmet or use a face shield with a filter lens selected as per ANSI Z49.1. Provide protective screens and flash goggles, if necessary, to protect others. Select as per OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: As needed, wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the worker not to touch live electrical parts.

IX. SPECIAL PRECAUTIONS

Fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being worked, the process, procedure and electrodes used. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being worked (such as paint, plating, or galvanizing), the number of workers and the volume of the work area, the quality and amount of ventilation, the position of the worker's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). Avoid using electric arcs in the presence of chlorinated hydrocarbon vapors – highly toxic phosgene may be produced. Avoid arc operations on parts with phosphate residues (anti-rust, cleaning preparations) – highly toxic phosphine may be produced.

One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample from inside the worker's helmet if worn or in the worker's breathing zone. See ANSI/AWSF1.1, available from the American Welding Society, 550 N.W. Le Jeune Rd., Miami, FL 33126.

Read and understand the manufacturer's instructions and the precautionary label on the product. See American National Standard Z49.1, "Safety In Welding and Cutting" published by the American Welding Society and OSHA Publication 2206 (29 CFR 1910), US Government Printing Office, Washing, DC 20402 for more details. For further safety and health information refer to Praxair's free publication L-52-529, "Precautions and Safe Practices for Electric Welding and Cutting."

OTHER HANDLING AND STORAGE CONDITIONS

Arcs and sparks during use could be the source of ignition of combustible materials. Prevent fires. Refer to NFPA 51B, "Cutting and Welding Processes." High pressure gas mixture. Use piping and equipment adequately designed to withstand pressures to be encountered. Gas can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve when not in use when empty. Do not strike arc on cylinder. The defect produced by an arc burn could lead to cylinder rupture. Do not ground cylinder or allow to become part of an electrical circuit. Never work on a pressurized system.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and these opinions and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

MATERIAL SAFETY DATA SHEET FOR ODORIZED PROPANE

1. Chemical Product and Company Identification

Product Name: Odorized Commercial Propane
Chemical Name: Propane
Chemical Family: Paraffinic Hydrocarbon
Formula: C_3H_8
Synonyms: Dimethylmethane, LP-Gas, Liquefied Petroleum Gas (LPG), Propane, Propyl Hydride

Name & Address:
AmeriGas Propane, L.P.
P. O. Box 965
Valley Forge, PA. 19482

Transportation Emergency Number:
CHEMTREC 1-800-424-9300

For General Information, Call:
1-888-808-0396, Safety Dept.

2. Composition / Information on Ingredients

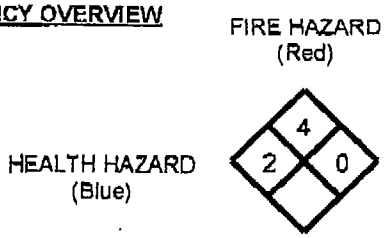
INGREDIENT NAME /CAS NUMBER	PERCENTAGE	OSHA PEL	ACGIH TLV
Propane / 74-98-6	87.5 -100	1,000 ppm[1]	Simple asphyxiant
Ethane / 74-84-0	0 - 7.0		Simple asphyxiant
Propylene / 115-07-1	0 - 5.0		Simple asphyxiant
Butanes / 106-97-8	0 - 2.5		Simple asphyxiant
Ethyl Mercaptan / 75-08-1	0 - 50 ppm	0.5 ppm	0.5 ppm

WARNING: The intensity of the chemical odorant (e.g., ethyl mercaptan) may "fade" or diminish due to chemical oxidation, adsorption or absorption. Individuals with nasal perception problems may not be able to smell the odorant. Leaking propane from underground gas lines may lose its odor as it passes through certain soils. No odorant is effective 100% of the time. Therefore, circumstances can exist when individuals are in the presence of leaking propane and not be alerted by the smell. Contact AmeriGas for more information about odor, propane gas detectors and other safety considerations associated with the handling, storage and use of propane.

3. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable liquefied gas under pressure. Keep away from heat, sparks, flame, and all other ignition sources. Vapor replaces oxygen available for breathing and may cause suffocation in confined spaces. Use only with adequate ventilation. Reliance upon detection of odor may not provide adequate warning of potentially hazardous concentrations. Vapor is heavier than air; may collect at low levels. Liquid can cause freeze burn similar to frostbite. Do not get liquid in eyes, on skin, or on clothing. Avoid breathing vapor. Keep service valve closed when not in use.



SPECIAL HAZARDS*

Minimal 0 Slight 1 | Moderate 2 Serious 3 | Severe 4 *(Ref. NFPA 704)

POTENTIAL HEALTH EFFECTS INFORMATION

ROUTES OF EXPOSURE:

Inhalation: Asphyxiation. Before suffocation could occur, the lower flammability limit of propane in air would be exceeded, possibly causing both an oxygen-deficient and explosive atmosphere. Exposure to concentrations >10% may cause dizziness. Exposure to atmospheres containing 19% or less oxygen will bring about unconsciousness without warning. Lack of sufficient oxygen may cause serious injury or death.
Eye Contact: Contact with liquid can cause freezing of tissue.
Skin Contact: Contact with liquid can cause frostbite.
Skin Absorption: None.
Ingestion: Ingestion is not expected to occur in normal use. However, liquid can cause freeze burn similar to frostbite.

CHRONIC EFFECTS: None.

CARCINOGENICITY: Propane is not listed by NTP, OSHA or IARC.

4. First Aid Measures

INHALATION: Individuals suffering from lack of oxygen should be removed to fresh air. If victim is not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain immediate medical assistance.

EYE CONTACT: Gently flush eyes with lukewarm water. Obtain immediate medical assistance.

SKIN CONTACT: Remove saturated clothes, shoes and jewelry. Immerse affected area in lukewarm water not exceeding 105° F. Keep immersed. Obtain immediate medical assistance.

AMERIGAS BIRMINGHAM Fax:1-205-323-1506 Jan 30 2012 10:15am P001/005

INGESTION: If swallowed, obtain immediate medical assistance.

5. Fire Fighting Measures

FLASH POINT: -156°F (-104°C) **AUTOIGNITION:** 842°F (432°C)

IGNITION TEMPERATURE IN AIR: 920°F to 1120°F (493°C to 549°C)

FLAMMABLE LIMITS IN AIR (% by volume): Lower: 2.15% Upper: 9.6%

EXTINGUISHING MEDIA: Dry chemical, CO_2, water spray or fog for surrounding area. Do not attempt to extinguish fire until propane source is isolated.

SPECIAL FIRE-FIGHTING INSTRUCTIONS: Evacuate all unnecessary personnel from the area. Allow only properly trained and protected emergency response personnel in area. A NIOSH approved self-contained breathing apparatus may be required. If gas flow cannot be shut off, do not attempt to extinguish fire. Allow fire to burn itself out. Use high volume water supply to cool exposed pressure containers and nearby equipment. Approach a flame-enveloped container from the sides, never from the ends. Use extreme caution when applying water to a container that has been exposed to heat or flame for more than a short time. For uncontrollable fires and/or when flame is impinging on container, withdraw all personnel and evacuate vicinity immediately.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Propane is heavier than air and can collect in low areas. Flash back along a vapor trail is possible. Pressure in a container can build up due to heat; and, container may rupture suddenly and violently without warning if pressure relief devices fail to function properly. If flames are against the container, withdraw immediately on hearing a rising sound, if venting increases in volume or intensity or if there is discoloration of the container due to fire. Propane released from a properly functioning relief valve on an overheated container can also become ignited.

HAZARDOUS COMBUSTION PRODUCTS: None.

6. Accidental Release Measures

IF MATERIAL IS RELEASED OR SPILLED: Evacuate the immediate area. Eliminate any possible sources of ignition and provide maximum ventilation. Shut off source of propane, if possible. If leaking from container or valve, contact your supplier or AmeriGas immediately.

7. Handling and Storage

HANDLING PRECAUTIONS: Propane vapor is heavier than air and can collect in low areas that are without sufficient ventilation. Conduct system checks for leaks with a leak detector or solution, never with flame. Make certain the container service valve is shut off prior to connecting or disconnecting. If container valve does not operate properly, discontinue use and contact AmeriGas. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into pressure relief valve or cylinder valve cap openings. Do not drop or abuse cylinders. Never strike an arc on a gas container or make a container part of an electrical circuit. See Section 16, "OTHER INFORMATION", for additional precautions.

STORAGE PRECAUTIONS: Store in a safe, authorized location (outside, detached storage is preferred) with adequate ventilation. Specific requirements are listed in NFPA 58, LP-GAS CODE. Isolate from heat and ignition sources. Containers should never be allowed to reach temperature exceeding 125°F (52°C). Isolate from combustible materials. Provide separate storage locations for other compressed and flammable gases. Propane containers should be separated from oxygen cylinders or other oxidizers by a minimum distance of 20 feet, or by a barrier of non-combustible material at least 5 feet high having a fire rating of at least 1/2 hour. Full and empty cylinders should be segregated. Keep cylinders in an upright position at all times so that each pressure relief valve communicates with the vapor space. Keep container valve closed and plugged or capped when not in use. Install protective caps when cylinders are not connected for use. Empty containers retain some residue and should be treated as if they were full.

8. Exposure Control / Personal Protection

ENGINEERING CONTROLS

Ventilation: Provide ventilation adequate to ensure propane does not reach a flammable mixture.

RESPIRATORY PROTECTION

General Use: None.

Emergency Use: If concentrations are high enough to warrant supplied-air or NIOSH self-contained breathing apparatus, then the atmosphere may be flammable (See Section 5). Appropriate precautions must be taken regarding flammability.

PROTECTIVE CLOTHING: Avoid skin contact with liquid propane because of possibility of freeze burn. Wear gloves and protective clothing that are impervious to the product for the duration of the anticipated exposure.

EYE PROTECTION: Safety glasses, goggles or face shields are recommended when handling cylinders.

OTHER PROTECTIVE EQUIPMENT: Safety shoes are recommended when handling cylinders.

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9. Physical and Chemical Properties

BOILING POINT: @ 14.7 psia = -44° F (@1.00 atm.pressure = -42°C)
SPECIFIC GRAVITY OF VAPOR (Air = 1) at 60° F (15.56°C): 1.50
SPECIFIC GRAVITY OF LIQUID (Water = 1) at 60° F: 0.504
VAPOR PRESSURE: @ 70° F (20°C) = 127 psig; @ 105° F (45°C) = 210 psig; @ 130°F (55°C) = 287 psig
EXPANSION RATIO (From liquid to gas @ 14.7 psia): 1 to 270
SOLUBILITY IN WATER: Slight, 0.1 to 1.0%
APPEARANCE AND ODOR: A colorless and tasteless gas at normal temperature and pressure. An odorant (ethyl mercaptan) is added to provide a strong unpleasant odor. Should a propane-air mixture reach the lower limits of flammability, the ethyl mercaptan concentration will be approximately 0.5 ppm in air.

ODORANT WARNING: Odorant is added to aid in the detection of leaks. One common odorant is ethyl mercaptan, CAS No. 75-08-1. Odorant has a foul smell. The ability of people to detect odors varies widely. Also, the odor level can be reduced by certain chemical reactions with material in the propane system or when fugitive propane gas from underground leaks passes through certain soils. No odorant will be 100% effective in all circumstances. If the presence of the odorant is not obvious, notify AmeriGas immediately.

10. Stability and Reactivity

STABILITY: Stable.

Conditions to Avoid: Keep away from high heat, strong oxidizing agents and sources of ignition.

REACTIVITY:

Hazardous Decomposition Products: Under fire conditions, fumes, smoke, carbon monoxide, aldehydes and other decomposition products. In most applications where there is inadequate venting to the outside air, incomplete combustion will produce carbon monoxide (a toxic gas) and potentially develop concentrations that can create a serious health hazard.

Hazardous Polymerization: Will not occur.

11. Toxicological Information

Propane is non-toxic and is a simple asphyxiant. It has slight anesthetic properties. Higher concentrations may cause dizziness.

IRRITANCY OF MATERIAL: None.
SENSITIZATION TO MATERIAL: None
REPRODUCTIVE EFFECTS: None
MUTAGENICITY: None
TERATOGENICITY: None
SYNERGISTIC MATERIALS: None

12. Ecological Information

No adverse ecological effects are expected. Propane does not contain any Class I or Class II ozone-depleting chemicals (40 CFR Part 82). Propane is not listed as a marine pollutant by DOT (49 CFR Part 171).

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused product in the container; return it to your supplier or contact AmeriGas for safe disposal. Residual product within a process system may be burned at a controlled rate if a suitable burning unit is available on site, and is done in accordance with federal, state and local regulations.

14. Transport Information

DOT SHIPPING NAME: Liquefied Petroleum Gas
IDENTIFICATION NUMBER: UN 1075
IMO SHIPPING NAME: Propane
IMO IDENTIFICATION NUMBER: UN 1978
HAZARD CLASS: 2.1 (Flammable Gas)
PRODUCT RQ: None
SHIPPING LABEL (S): Flammable Gas
PLACARD (WHEN REQUIRED): Flammable Gas
SPECIAL SHIPPING INFORMATION: Container must be transported in a well-ventilated vehicle, secured, and in a position such that the pressure relief device is in communication with the vapor space.

AMERIGAS BIRMINGHAM Fax:1-205-323-1506 Jan 30 2012 10:16am P003/005

15. Regulatory Information

The following information concerns U.S. Federal regulatory requirements potentially applicable to this product. Not all such requirements are identified. Users of this product are responsible for their own regulatory compliance on a federal, state [provincial] and local level.

U.S. FEDERAL REGULATIONS

Environmental Protection Agency (EPA)

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) - 40 CFR Parts 117 and 302

Reportable Quantity (RQ): None

Superfund Amendment and Reauthorization Act (SARA)

- Sections 302/304: Relates to emergency planning on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR Part 355).

  Extremely Hazardous Substances: None **Threshold Planning Quantity (TPQ):** None

- Sections 311/312: Relates to submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA-defined hazard classes (40 CFR Part 370). The hazard classes for this product are:
  IMMEDIATE: No **PRESSURE:** Yes **DELAYED:** No **REACTIVITY:** No **FLAMMABLE:** Yes

- Section 313: Relates to submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372. Propane does not require reporting under Section 313.

Toxic Substance Control Act (TSCA)

Propane is listed on the TSCA inventory.

Occupational Safety and Health Administration (OSHA)

The following 29 CFR Parts may apply to propane:

29 CFR 1910.110: *Storage and Handling of Liquefied Petroleum Gases*
29 CFR 1910.119: *Process Safety Management of Highly Hazardous Chemicals*
29 CFR 1910.1200: *Hazardous Communications*

Food and Drug Administration (FDA)

21 CFR 184.1655: Generally recognized as safe (GRAS) as a direct human food ingredient when used as a propellant, aerating agent and gas.

16. Other Information

SPECIAL PRECAUTIONS: Use piping and equipment adequately designed to withstand pressure to be encountered. NFPA 58, LP-GAS CODE and OSHA 29 CFR 1910.10 require that all persons employed in handling LP-gases be trained in proper handling and operating procedures, which the employer shall document. Contact your propane supplier or AmeriGas to arrange for the required training. Allow only trained and qualified persons to install and service propane containers and systems.

ISSUE INFORMATION

Issue Date: August 2011 **Supersedes Date: December 2002**
Issued By: Director of Safety and Technology **Phone Number: 1-610-337-7000**

This material safety data sheet and the information it contains is offered to you in good faith as accurate. This Supplier does not manufacture this product, but is a supplier of the product that is independently produced by others. Much of the information contained in this data sheet was received from sources outside our Company. To the best of our knowledge this information is accurate, but this Supplier does not guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely, comply with all applicable laws and regulations and to assume the risks involved in the use of this product.

AMERIGAS BIRMINGHAM Fax:1-205-323-1506 Jan 30 2012 10:17am P004/005

NO WARRANTY OR MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSES, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OF COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.

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MATERIAL SAFETY DATA SHEET

PRODUCT NAME: PIPE COATING	HMIS CODES:	H	F	R	P
CUTBACK ASPHALT #1710		2	3	0	

SECTION I – MAUFACTURER IDENTIFICATION

MANUFACTURER'S NAME:	MANOR CHEMICAL CO.		
ADDRESS:	6901 HEEGE ROAD, AFFTON, MO 63123		
EMERGENCY PHONE:	314-892-4901	INFORMATION PHONE:	314-351-2343
DATE REVISED:	05/01/2009	NAME OF PREPARER:	CONNIE JESTIS

SECTION II – HAZARDOUS INGREDIENTS/SARA III INFORMATION

HAZARDOUS COMPONENTS	CASE NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	IDLE	VAPOR PRESSURE mm Hg @ TEMP	WEIGHT PERCENT
Petroleum Asphalt	8052-42-4		.5 mg/m³ TWA as fumes			55-95%
Naptha	8032-32-4		100 ppm			40% (+/- 5%)

*Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

SECTION III – PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	>250°F	SPECIFIC GRAVITY (H2O=1):	.80-.95 g/ml @ 60°F
VAPOR DENSITY:	>4.0	EVAPORATION RATE: (Butyl Acetate = 1):	>1
VAPOR PRESSURE (mm HG):	5-10 @ 70°F	WEIGHT PER GALLON:	7.67 LBS PER GALLON
WATER SOLUBILITY (%):	INSOLUBLE		
SOFTENING POINT:	NOT APPLICABLE		
% VOLATILES:	40% (+/- 5%)		
% NON-VOLATILES:	60% (+/- 5%)		

APPEARANCE AND ODOR: DARK BROWN TO BLACK VISCOUS LIQUID. ASPHALT ODOR WILL INCREASE WITH TEMPERATURE.

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (TAG OPEN CUP): <100°

FLAMMABLE LIMITS IN AIR BY VOLUME: 1.0%

AUTO IGNITION TEMPERATURE: NO DATA AVAILABLE

HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE, OXIDIZED HYDROCARBONS, SULFUR DIOXIDE.

FIRE FIGHTING: DRY CHEMICAL, CARBON DIOXIDE, OR FOAM. TREAT AS FUEL FIRE; WEAR SELF-CONTAINED BREATHING APPARATUS.

SECTION V – HEALTH HAZARDS

EFFECTS OF OVEREXPOSURE ARE AS FOLLOWS:

- EYES: PETROLEUM DISTILLATES CAN CAUSE SEVERE IRRITATION IN CONTACT WITH THE EYES.
- SKIN: CAN CAUSE SLIGHT IRRITATION. CONTACT WITH MOLTEN PRODUCT WILL CAUSE THERMAL BURNS.
- INHALATION: INHALING OF MIST OR VAPORS CAN CAUSE DIZZINESS, HEADACHE, NAUSEA AND IRRITATION TO THE NOSE AND THROAT.
- INGESTION: CAN CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING AND DIARRHEA.

SPECIAL FIRST-AID ACTION:

- SKIN IRRITATION: REMOVE CONTAMINATED CLOTHING, FLUSH WITH WATER TO SOLIDIFY MOLTEN ASPHALT, APPLY PETROLEUM JELLY AND APPLY LOOSE BANDAGE. GET MEDICAL ATTENTION FOR THERMAL BURN.
- EYES: FLUSH WITH WATER AND GET MEDICAL ATTENTION.
- INHALATION: REMOVE TO FRESH AIR.
- INGESTION: **DO NOT** INDUCE VOMITING. GET MEDICAL ATTENTION.

NFPA CODE: (HEALTH: 2) (FLAMMABILITY: 3) (REACTIVITY: 0)

SECTION VI – REACTIVITY DATA

STABILITY: STABLE, DO NOT INTRODUCE WATER. AVOID SOURCES OF IGNITION.

CONDITIONS TO AVOID INSTABILITY: OVERHEATING

HAZARDOUS POLYMERIZATION: NOT EXPECTED TO OCCUR.

MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY: ANY OTHER LIQUID, ESPECIALLY WATER, AND STRONG OXIDIZERS.

SECTION VII – SPILL CONTROL PROCEDURE

CONTAINMENT PROCEDURES: PREVENT RUN-OFF TO SEWERS, STREAMS OR OTHER BODIES OF WATER. IF RUN-OFF OCCURS, NOTIFY THE PROPER AUTHORITIES. EXCLUDE IMPROPERLY PROTECTED PEOPLE FROM THE SPILL AREA. LET MATERIAL COOL AND HARDEN, SHOVEL MATERIAL INTO CONTAINERS.

DISPOSAL: THIS PRODUCT IS NOT CLASSIFIED AS A HAZARDOUS MATERIAL WHEN COOL. DISPOSE OF SPILLED MATERIALS IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.

SECTION VIII – PROTECTIVE EQUIPMENT

RESPIRATORY INFORMATION: USE WITH ADEQUATE VENTILATION. IF OPERATING CONDITIONS CAUSE HIGH VAPOR CONCENTRATIONS OR TLV IS EXCEEDED, USE SUPPLIED-AIR RESPIRATOR APPROVED BY NIOSH.

PROTECTIVE GLOVES: NEOPRENE OR HEAVY-DUTY LEATHER GLOVES WITH GAUNTLET STYLE CUFF.

EYE PROTECTION: CHEMICAL SPLASH GOGGLES: (SEE YOUR SAFETY SUPPLIER)

VENTILATION: PROVIDE SUFFICIENT MECHANICAL VENTILATION TO REDUCE THE RISK OF FUMES.

OTHER PROTECTIVE EQUIPMENT: LONG COTTON PANTS, LONG SLEEVE COTTON SHIRT AND LEATHER BOOTS.

SECTION IX – STORAGE AND HANDLING

DO NOT HEAT ABOVE THE MANUFACTURERS RECOMMENDED TEMPERATURES TO MINIMIZE FIRE HAZARD. DO NOT ALLOW WATER TO MIX WITH HOT ASPHALT. USE PROTECTIVE EQUIPMENT WHEN HANDLING UNCONFINED MATERIALS.

SECTION X – SPECIAL PRECAUTIONS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. PRODUCT RESIDUES WARRANT OBSERVANCE OF ALL HAZARD PRECAUTIONS GIVEN IN THIS DATA SHEET.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH MANOR CHEMICAL CO., INC. OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE AND SUITABLE TO THEIR CIRCUMSTANCES. THIS INFORMATION IS BASED ON THE PARAMETERS OF THE COMPONENT PARTS.

10-05-10;11:14 ;ManorChemical 12058411972 ; # 3/ 3

Material Safety Data Sheet

Zep Sales & Service, A Unit of Zep Inc.
1310 Seaboard Industrial Blvd.
Atlanta, GA 30318
1-877-I-BUY-ZEP (428-9937)
www.zep.com

Section 1. Chemical Product and Company Identification

Product name SWEEPING COMPOUND
Product use Sweeping Compound
Product code 2305
Date of issue 03/31/08 **Supersedes** 11/02/06

00027 B310
BARRY PATTERN FOUNDRY CO
3333 35TH AVE N
BIRMINGHAM AL 35207-2927

Printing date: 05/23/08

Emergency Telephone Numbers

For MSDS Information:
Compliance Services 1-877-I-BUY-ZEP (428-9937)

For Medical Emergency
INFOTRAC: (877) 541-2016 Toll Free - All Calls Recorded

For Transportation Emergency
CHEMTREC: (800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

Prepared By
Compliance Services
1420 Seaboard Industrial Blvd.
Atlanta, GA 30318

Section 2. Hazards Identification

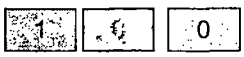
Emergency overview

CAUTION

MAY CAUSE EYE IRRITATION.

Contains material which can cause cancer.

*Hazard Determination System (HDS): Health, Flammability, Reactivity



NOTE: MSDS data pertains to the product as delivered in the original shipping container(s). Risk of adverse effects are lessened by following all prescribed safety precautions, including the use of proper personal protective equipment.

Acute Effects **Routes of Entry** Inhalation.

Eyes May cause eye irritation. Dust may cause mechanical irritation to eye. Inflammation of the eye is characterized by redness, watering and itching.

Skin No known acute effects of this product resulting from skin contact.

Inhalation Inhalation not likely under normal use conditions. Avoid breathing dust.

Ingestion No data on acute toxicity of the product when ingested.

Chronic effects Contains crystalline silica, which may cause lung disease and/or cancer. Repeated inhalation of dust can produce varying degrees of respiratory irritation or lung damage. Prolonged or repeated contact may dry skin and cause irritation.

Additional Information: See Toxicological Information (Section 11)

Section 3. Composition/Information on Ingredients

Name of Hazardous Ingredients	CAS number	% by Weight
PARAFFIN OIL; blend of heavy and light naphthenic petroleum distillate	64742-52-5	5 - 10
CRYSTALLINE SILICA-QUARTZ; silicon dioxide; flint; chalcedony	14808-60-7	<1

Section 4. First Aid Measures

Eye Contact Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Skin Contact Wash with soap and water. Get medical attention if irritation develops.

Inhalation Move exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If irritation persists, get medical attention.

Ingestion Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Section 5. Fire Fighting Measures

National Fire Protection Association (U.S.A.)

Flash Point Not applicable

Flammable Limits Not applicable

Flammability Not applicable

Fire hazard Keep away from heat, sparks and flame.

Fire-Fighting Procedures Use an extinguishing agent suitable for the surrounding fire.

Section 6. Accidental Release Measures

Spill Clean up Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and Storage

Handling Put on appropriate personal protective equipment (see section 8). Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Avoid breathing dust. Use with adequate ventilation. Do not ingest. Wash thoroughly after handling. Do not use with other products. Do not reuse container.

Storage Keep away from heat, sparks and flame. Store between the following temperatures: 40°F - 120°F (4.4°C - 49°C). Keep container tightly closed and sealed until ready for use. Keep away from incompatibles. Keep out of the reach of children.

Section 8. Exposure Controls/Personal Protection

Product name	Exposure limits
PARAFFIN OIL; blend of heavy and light naphthenic petroleum distillate	**OSHA PEL (United States).** TWA: 5 mg/m³ 8 hour(s). Form: Mist **ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hour(s). Form: Mist
CRYSTALLINE SILICA-QUARTZ; silicon dioxide; flint; chalcedony	**ACGIH TLV (United States).** : 0.05 mg/m³ Form: Respirable fraction **NIOSH (United States).** : 0.05 mg/m³ Form: Respirable dust

Personal Protective Equipment (PPE)

Eyes Safety glasses.

Body For prolonged or repeated handling, use gloves. Recommended: Rubber gloves. Neoprene gloves.

Respiratory If dust is generated and ventilation is inadequate, use respirator that will protect against dust/mist.

Section 9. Physical and Chemical Properties

Physical State Solid. [Moist solid.]

pH Not applicable.

Boiling Point Not applicable.

Specific Gravity Not applicable.

Solubility Insoluble in the following materials: cold water and hot water.

Color Red.

Odor Petroleum-like. [Slight]

Vapor Pressure Not available.

Vapor Density Not applicable.

Evaporation Rate Not applicable.

VOC (Consumer) Not applicable.

Section 10. Stability and Reactivity

Stability and Reactivity The product is stable.

Incompatibility Incompatible with ammonia. Reactive or incompatible with the following materials: oxidizing materials and acids.

Hazardous Polymerization Will not occur.

Hazardous Decomposition Products carbon oxides (CO, CO_2)

Section 11. Toxicological Information

Acute Toxicity

Not available.

Section 12. Ecological Information

Environmental Effects No known significant effects or critical hazards.

Aquatic Ecotoxicity

Not available.

Section 13. Disposal Considerations

Waste Information

Waste must be disposed of in accordance with federal, state and local environmental control regulations. Consult your local or regional authorities for additional information.

Waste Stream Non-hazardous waste

Section 14. Transport Information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label
DOT Classification	Not regulated.	Not a DOT controlled material (United States).	-	-	
IMDG Class	Not determined.				

NOTE: DOT classification applies to most package sizes. For specific container size classifications or for size exceptions, refer to the Bill of Lading with your shipment.

PG* : Packing group

Section 15. Regulatory Information

U.S. Federal Regulations

SARA 313 toxic chemical notification and release reporting:

No products were found.

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

All Components of this product are listed or exempt from listing on TSCA Inventory.

State Regulations

California Prop 65 **WARNING:** This product contains a chemical or chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.: Crystalline Silica-Quartz

Section 16. Other Information

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

**NOTE. Hazard Determination System (HDS) ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although these ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them HDS ratings are to be used with a fully implemented program to relay the meanings of this scale.*

Allied Energy

GASC0220 Revised 1-SEP-1993 Printed 3-JUN-1994

No. 2 Diesel Fuel

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification
CAS Number 68476-34-6

Tradenames and Synonyms
Diesel Fuel No. 2, Low Sulfur
Diesel Fuel No. 2, High Sulfur

3502, 3504, 3510, 3512

PHONE NUMBERS

Transport Emergency	CHEMTREC 1-800-424-9300
Medical Emergency	1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components Material	CAS Number	%
Diesel Fuel, No. 2	68476-34-6	100

HAZARDS IDENTIFICATION

Potential Health Effects

Primary Routes of Exposure/Entry: Skin, Inhalation.

Signs and Symptoms of Exposure/Medical Conditions Aggravated by Exposure:
The product may cause irritation to the eyes, lungs, and skin after prolonged or repeated exposure. Extreme

(Continued)

HAZARDS IDENTIFICATION (Continued)

overexposure or aspiration into the lungs may cause lung damage and death. Overexposure may cause weakness, headache, nausea, confusion, blurred vision, drowsiness, and other nervous system effects; greater exposure may cause dizziness, slurred speech, flushed face, unconsciousness, and convulsions.

It is highly unlikely that human exposure at or below the recommended exposure level poses a significant health hazard. In this regard, good workplace practices and proper engineering designs will minimize exposure.

Decomposition Products:
Studies in mice and rats have shown that chronic exposure (8 hours/day, 7 days/week, 24 months) to unfiltered diesel exhaust produced tumors of the lung and also lymphomas. On the basis of these studies, NIOSH recommends that whole diesel exhaust be regarded as a potential carcinogen.

Carbon monoxide is a gas that can result from incomplete combustion of hydrocarbons, from detoxification of some chemicals like methylene chloride, tobacco smoke, and even from natural body processes. Carbon monoxide binds tightly to hemoglobin and interferes with oxygen transport to body tissues. Overexposure can cause headache, nausea, nervous system depression, coma, and death.

Carcinogenicity Information
None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Wash skin thoroughly with soap and water after handling. If irritation develops and persists, consult a physician.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

(Continued)

FIRST AID MEASURES (Continued)

If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

Notes to Physicians
Activated charcoal mixture may be administered. To prepare activated charcoal mixture, suspend 50 grams activated charcoal in 400 mL water and mix thoroughly. Administer 5 mL/kg, or 350 mL for an average adult.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point	130 F (54 C)
Method	TCC
Flammable limits in Air, % by Volume	
LEL	0.4
UEL	6
Autoignition	494 F (257 C)

Vapor forms explosive mixture with air. Vapors or gases may travel considerable distances to ignition source and flash back.

NFPA Classification Class II Combustible Liquid.

Extinguishing Media
Water Spray, Foam, Dry Chemical, CO2.

Fire Fighting Instructions
Special Fire Fighting Procedures: Use water to keep fire exposed containers cool. If leak or spill has not ignited, use water spray to disperse the vapors and to provide protection for personnel attempting to stop a leak. Water spray may be used to flush spills away from exposures.

Unusual Fire and Explosion Hazards: Products of combustion may contain carbon monoxide, carbon dioxide and other toxic materials. Do not enter enclosed or confined space without proper protective equipment including respiratory protection.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)
NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Remove source of heat, sparks, flame, impact, friction and electricity including internal combustion engines and power tools. *If equipment is used for spill cleanup, it must be explosion proof* and suitable for flammable liquid and vapor.

(Continued)

ACCIDENTAL RELEASE MEASURES (Continued)

NOTE: Vapors released from the spill may create an explosive atmosphere.

Initial Containment
Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up
Soak up with sawdust, sand, oil dry or other absorbent material.

HANDLING AND STORAGE

Handling (Personnel)
Avoid breathing vapors or mist. Wash thoroughly after handling. Wash clothing after use.

Handling (Physical Aspects)
Ground container when pouring. Keep away from heat, sparks and flames.

Storage
Store in a well ventilated place. Keep container tightly closed. Store in accordance with National Fire Protection Association recommendations. Store away from heat, sparks and flames, oxidizers.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls
Use only with adequate ventilation. Keep container tightly closed.

Personal Protective Equipment
Respiratory Protection: Select appropriate NIOSH-approved respiratory protection when needed to avoid inhalation of mist or vapors and to maintain exposures below acceptable limits.

Protective Gloves: Impervious gloves, such as neoprene or NBR, should be worn when the potential exists for prolonged or repeated skin exposure.

Eye Protection: Safety glasses with side shields. Chemical goggles required when exposed to spray or mist or if splashing is probable.

Other Protective Equipment: Coveralls if splashing is probable. Launder contaminated clothing before reuse.

Exposure Guidelines
Exposure Limits
No. 2 Diesel Fuel

PEL	(OSHA)	None Established
TLV	(ACGIH)	None Established

(Continued)

PHYSICAL AND CHEMICAL PROPERTIES

 # Physical Data

Boiling Point	350-690 F (177-366 C)
Vapor Pressure	1 mm Hg @ 68 F (20 C)
Vapor Density	>1 (Air = 1)
% Volatiles	(by volume) Nil
Solubility in Water	Insoluble
Odor	Aromatic
Form	Liquid
Color	*
Specific Gravity	0.84-0.88 @ 60 F (16 C))

*Color : High Sulfur Diesel - Green
Others - Clear or Light Yellow

STABILITY AND REACTIVITY

Chemical Stability
Stable at normal temperatures and storage conditions.

Conditions to Avoid
Avoid heat, sparks, and flame.

Incompatibility with Other Materials
Incompatible or can react with strong oxidizers.

Decomposition
Incomplete combustion may produce carbon monoxide.

Polymerization
Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data
Animal studies have shown that prolonged or repeated inhalation exposures to high concentrations of some petroleum distillates have caused liver tumors in mice and kidney damage and tumors in male rats. However, kidney effects were not seen in similar studies involving female rats, guinea pigs, dogs, or monkeys. Present studies indicate the kidney effects will only occur in male rats. Also, human studies do not indicate this peculiar sensitivity for kidney damage and studies reported in 1992 showed that this particular type of rat kidney damage is not useful in predicting a human health hazard. The significance of liver tumors in mice exposed to high doses of chemicals is highly speculative and probably not a good indicator for predicting a potential human carcinogenic hazard.

Mouse skin painting studies have shown that petroleum middle distillates (boiling range 100-700 F; naphtha, jet fuel, diesel fuel, kerosene, etc.) can cause skin cancer when repeatedly applied and never washed from the animal's skin. The relative

(Continued)

TOXICOLOGICAL INFORMATION (Continued)

significance of this to human health is uncertain since the petroleum distillates were not washed from the skin and resulting skin effects (irritation, cell damage, etc.) may play a role in the tumorigenic response. A few studies have shown that washing the animal's skin with soap and water between treatements greatly reduces the carcinogenic effect of some petroleum oils.

Diesel Fuel -
Skin : Extremely irritating; no mortality at 5 ml/kg in rabbits
Oral : LD50 of 9 ml/kg in rats

DISPOSAL CONSIDERATIONS

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Do not flush to surface water or sanitary sewer system.

By itself, the liquid is expected to be a RCRA ignitable hazardous waste.

TRANSPORTATION INFORMATION

Shipping Information

INTERNATIONAL HM-181

Proper Shipping Name	Gas Oil
Hazard Class	3
UN/NA Number	UN 1202
Packing Group	III
Label	Flammable liquid
Placard	Flammable

DOMESTIC HM-181

Proper Shipping Name	Diesel fuel
Hazard Class	Combustible liquid
UN/NA Number	NA 1993
Packing Group	III
Label	None
Placard	Combustible
Special Information	If shipped by vessel or air, use international description.

(Continued)

REGULATORY INFORMATION

U.S. Federal Regulations

OSHA HAZARD DETERMINATION
This material is hazardous as defined by OSHA's Hazard Communication Standard, 29 CFR 1910.1200.

CERCLA/SUPERFUND
Not applicable; this material is covered by the CERCLA petroleum exclusion. Releases are not reportable.

SARA, TITLE III, 302/304
This material is not known to contain extremely hazardous substances.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute	: Yes
Chronic	: Yes
Fire	: Yes
Reactivity	: No
Pressure	: No

SARA, TITLE III, 313
This material is not known to contain any chemical(s) at a level of 1.0% or greater (0.1% for carcinogens) on the list of Toxic Chemicals and subject to release reporting requirements.

TSCA
This material is in the TSCA Inventory of Chemical Substances (40 CFR 710) and/or is otherwise in compliance with TSCA.

RCRA
This material, when discarded or disposed of, is not specifically listed as a hazardous waste in Federal regulations. It could become a hazardous waste if it is mixed with, or comes in contact with, a listed hazardous waste. If it is a hazardous waste, regulations at 40 CFR 262-266 and 268 may apply.

CLEAN WATER ACT
The material contains the following ingredient(s) which is considered hazardous if spilled into navigable waters and therefore reportable to the National Response Center (1-800-424-8802).

Ingredient(s)	Petroleum Hydrocarbons
Reportable Quantity	Film or sheen upon, or discoloration of, any water surface.

State Regulations (U.S.).

CALIFORNIA "PROP 65"
This material is not known to contain any ingredient(s) subject to the Act.

PENNSYLVANIA WORKER & COMMUNITY RIGHT TO KNOW ACT
This material contains the following ingredient(s) subject to the

(Continued)

REGULATORY INFORMATION (Continued)

Pennsylvania Worker and Community Right to Know Hazardous Substances List.

Ingredient	Diesel Fuel Oil
Category	Hazardous Substance

Canadian Regulations

CLASS B Division 3 - Combustible Liquid.

CLASS D Division 2 Subdivision B - Toxic Material. Chronic Toxic Effects.

Transport/Medical Emergency Phone Number: 1-613-348-3618

OTHER INFORMATION

NFPA, NPCA-HMIS

NFPA Rating	
Health	0
Flammability	2
Reactivity	0
NPCA-HMIS Rating	
Health	1
Flammability	2
Reactivity	0

Personal Protection rating to be supplied by user depending on use conditions.

# Indicates updated section.

End of MSDS

Zep Inc.
1310 Seaboard Industrial Blvd.
Atlanta, GA 30318
1-877-I-BUY-ZEP (428-9937)
Superior Solutions www.zep.com

Material Safety Data Sheet
and Safe Handling and Disposal Information

106

BARRY PATTERN FOUNDRY CO
3333 35TH AVE N
BIRMINGHAM AL 35207-2998

Printing date: 08/18/11

Section 1. Chemical Product and Company Identification

Product name ZEP-O-BRITE
Product use Abrasive Cleaner
Product code 1038
Date of issue 01/27/05 **Supersedes 11/01/96**

Emergency Telephone Numbers

For MSDS Information:
Compliance Services 1-877-I-BUY-ZEP (428-9937)

For Medical Emergency
INFOTRAC: (877) 541-2016 Toll Free - All Calls Recorded

For Transportation Emergency
CHEMTREC: (800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

Prepared By
Compliance Services
1420 Seaboard Industrial Blvd.
Atlanta, GA 30318

Section 2. Composition, Information on Ingredients

Name of hazardous ingredients	CAS #	% by Weight	Exposure Limits
FELDSPAR; silicate feldspar	68476-25-5	60 - 70	Not established
CHLORINATED TRISODIUM PHOSPHATE; TSP chlorinated; phosphoric acid; trisodium salt (chlorinated)	56802-99-4	10 - 20	**ACGIH TLV (United States).** TWA: 10 mg/m³ 8 hour(s). Form: Dust **OSHA PEL Z2 (United States).** TWA: 15 ppm 8 hour(s). Form: Total dust TWA: 5 ppm 8 hour(s). Form: Respirable fraction
CRYSTALLINE SILICA-QUARTZ; silicon dioxide; flint; chalcedon	14808-60-7	<10	**OSHA (United States).** TWA: 10 mg/m³

ction 3. Hazards Identification

HMIS

Health	2
Fire Hazard	0
Reactivity	0
Personal Protection	A, t

Acute Effects **Routes of Entry** Inhalation

Skin May cause slight transient irritation. Skin inflammation is characterized by itching, scaling, or reddening.

Eyes Hazardous by the following route of exposure: of eye contact (irritant). Inflammation of the eye is characterized by redness, watering and itching.

Inhalation Hazardous by the following route of exposure: of inhalation (lung irritant). May cause irritation of respiratory tract, coughing, shortness of breath.

Ingestion No data on acute toxicity of the product when ingested.

NOTE: MSDS data pertains to the product as delivered in the original shipping container(s). Risk of adverse health effects are lessened by following all prescribed safety precautions, including use of proper personal protective equipment.

Carcinogenic Effects Crystalline Silica-Quartz: Classified 1 (Proven for human) by IARC, Part 1 (Known To Be A Human Carcinogen) by NTP

Chronic Effects Contains crystalline silica, which may cause lung disease and/or cancer. Repeated inhalation of dust can produce varying degrees of respiratory irritation or lung damage. Repeated or prolonged exposure to the substance can produce damage to skin and eyes.

See Toxicological Information (section 11)

Section 4. First Aid Measures

Eye Contact Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin Contact In case of contact, immediately flush skin with plenty of water. Get medical attention if irritation develops.

Inhalation If inhaled, remove to fresh air. If irritation persists, get medical attention.

Ingestion Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If affected person is conscious, give plenty of water to drink. Get medical attention immediately.

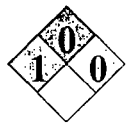
Section 5. Fire Fighting Measures

Flash Point Not applicable. **Flammable Limits** Not applicable.

Flammability Not applicable.

Fire hazard May emit toxic fumes under fire conditions.

Fire-fighting procedures Cool closed containers exposed to fire with water.



Section 6. Accidental Release Measures

Spill Clean up Put on appropriate personal protective equipment (see section 8). Use appropriate tools to transfer the spilled solid to a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Section 7. Handling and Storage

Handling Avoid contact with eyes, skin and clothing. Avoid breathing dust. Wash thoroughly after handling. Do not use with other products.

Storage Keep container tightly closed and dry. Keep away from heat and direct sunlight. Keep away from incompatibles. Keep out of the reach of children.

Section 8. Exposure Controls, Personal Protection

Personal Protection

Eyes Splash goggles.

Body For prolonged or repeated handling, use gloves.

Respiratory Use with adequate ventilation. Recommended: Approved/certified disposable particulate dust mask.

Protective Clothing (Pictograms)

Section 9. Physical and Chemical Properties

Physical State Powder.

pH Not applicable.

Boiling Point Not applicable.

Specific Gravity Not applicable.

Solubility Partially soluble in the following materials: cold water, hot water.

Color Yellowish.

Odor Lemon-like.

Vapor Pressure Not applicable.

Vapor Density Not applicable.

Evaporation Rate Not applicable.

VOC (Consumer) Not applicable.

Section 10. Stability and Reactivity

Stability and Reactivity The product is stable.

Incompatibility Reactive with acids and ammonia.

Hazardous Polymerization Will not occur.

Hazardous Decomposition Products Carbon dioxide., Carbon monoxide., Hydrogen chloride (HCl)., Chlorine and Phosgene gas.

Section 11. Toxicological Information

Toxicity to Animals Not determined.

Section 12. Ecological Information

Ecotoxicity Not available.

Biodegradable/OECD Not available.

Section 13. Disposal Considerations

Waste Information Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Waste Stream Code: - (Not applicable.)
Classification: - (Non-hazardous waste)

Consult your local or regional authorities.

Section 14. Transport Information

Proper shipping name None.

DOT Classification Not a DOT controlled material (United States).

UN number Not regulated.

NOTE: DOT classification applies to most package sizes. For specific container size classifications or for size exceptions, refer to the Bill of Lading with your shipment.

TDG Classification Not a TDG-controlled material.

Section 15. Regulatory Information

U.S. Federal Regulations SARA 313 toxic chemical notification and release reporting:
No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.
All Components of this product are listed or exempt from listing on TSCA inventory.

State Regulations **WARNING:** This product contains a chemical or chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.: Crystalline Silica-Quartz

WHMIS (Canada) Class D-2B: Material causing other toxic effects (Toxic).

Section 12. Ecological Information

Ecotoxicity Not available.

Biodegradable/OECD Not available.

Section 13. Disposal Considerations

Waste Information Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Waste Stream Code: - (None.)
Classification: - (Non-hazardous waste)

Consult your local or regional authorities.

Section 14. Transport Information

Proper shipping name Consumer Commodity

DOT Classification ORM-D

UN number Not available.

Section 15. Regulatory Information

U.S. Federal Regulations SARA 313 toxic chemical notification and release reporting:
Piperonyl Butoxide
Clean Water Act (CWA) 311: No products were found.
Clean air act (CAA) 112 regulated toxic substances: No products were found.

State Regulations California prop. 65: No products were found.

Section 16. Other Information

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

ZEP MANUFACTURING COMPANY
Acuity Specialty Products Group, Inc.
P.O. BOX 2015
ATLANTA, GA 30301
1- 877- I - BUY- ZEP

Material Safety Data Sheet
and Safe Handling and Disposal Information

Issue Date 05/07/01
Supersedes
Product Name **DZ-7 NEUTRAL CLNR DISINFECTANT**
Product No. **7520**
Disinfectant and Sanitizer

00037 B310

BARRY PATTERN FOUNDRY CO
3333 35TH AVE N
BIRMINGHAM AL 352072998

Printing date: 12/19/03

SECTION I - EMERGENCY CONTACTS

For MSDS Information:
Acuity Specialy Products Group, Inc.
Compliance Services 1-877-I-BUY-ZEP

For Medical Emergency:
INFOTRAC
(877) 541-2016 Toll Free - All Calls Recorded

For a Transportation Emergency:
CHEMTREC
(800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

SECTION II - HAZARDOUS INGREDIENTS

** QUATERNARY AMMONIUM CHLORIDES ** blend of alkyl (C12-C16) dimethylbenzylammonium chloride and ethanol (CAS# 68424-85-1 / 64-17-5); OSHA PEL (ethanol) - 1000 ppm; TLV - N/D; EFFECTS - COR TOX CBL; % IN PROD - < 10
@ -Reportable under the SARA 313 Toxic Release Inventory

SECTION III - HEALTH HAZARD DATA

SPECIAL NOTE: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.
ACUTE EFFECTS OF OVEREXPOSURE:
This product can be corrosive to eyes and skin. Eye contact can cause corneal damage or blindness. Skin contact can produce inflammation, reddening, and blistering. Inhalation of spray mist or vapors may cause respiratory tract irritation. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders.
CHRONIC EFFECTS OF OVEREXPOSURE:
Repeated or prolonged skin contact may produce chronic inflammation or dermatitis, characterized by redness, scaling, or itching. Repeated eye exposure may produce chronic inflammation of the eye or corneal damage. None of the ingredients are listed as carcinogens by IARC, NTP, or OSHA.
EST'D PEL/TLV: Not established
PRIMARY ROUTES OF ENTRY: Ing.
HMIS CODES: HEALTH 2; FLAM 0; REACT 0; PERS. PROTECT B; CHRONIC HAZ NO
FIRST AID PROCEDURES:
SKIN: Immediately flush contaminated skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops.
EYES: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower lids. Get medical attention at once.
INHALE: If symptoms occur, move affected person to fresh air. If symptoms persist, get medical attention promptly.
INGEST: If this product is swallowed, do not induce vomiting. If individual is alert, give plenty of water to drink. Get medical attention at once.

SECTION IV - SPECIAL PRECAUTION INFORMATION

PROTECTIVE CLOTHING: Wear neoprene, nitrile, or natural rubber gloves or gloves with proven resistance to the ingredients listed.
EYE PROTECTION: Wear splash-proof safety goggles especially if contact lenses are worn.
RESPIRATORY PROTECTION: No special measures are required.
VENTILATION: No special measures are required.

SECTION V - PHYSICAL DATA

BOILING POINT (F) - ~220
SPECIFIC GRAVITY - 1.01
VAPOR PRESSURE(mmHg) - N/D
EVAPORATION RATE (WATER=1) - 1.0
VAPOR DENSITY(AIR-1) - N/D
pH(CONCENTRATE) - 6.0-7.0
SOLUBILITY IN WATER - COMPLETE
pH(USE DILUTION OF) - 1:32 6.0-7.0
VOC CONTENT (CONCENTRATE) - 0.5% 0.04 lb/gl
APPERANCE AND ODOR - A CLEAR, COLORLESS, THIN LIQUID WITH A PLEASANT FRAGRANCE.

SECTION VI - FIRE AND EXPLOSION DATA

FLASH POINT(F) (METHOD USED): None N/A
FLAMMABLE LIMITS:LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Noncombustible.
SPECIAL FIRE FIGHTING: Wear self-contained positive pres. breathing apparatus.
UNUSUAL FIRE HAZARDS: Fire exposed drums should be cooled with stream of water.

SECTION VII - REACTIVITY DATA

STABILITY: Stable
INCOMPATIBILITY(AVOID): None known
POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION: Carbon dioxide, carbon monoxide, ammonia, oxides of nitrogen, hydrogen chloride.

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIALS IS RELEASED OR SPILLED:
Observe safety procedures in section 4 & 9 during clean-up. Absorb spill on an inert absorbent material and place in a suitable waste container or, if permitted, flush to sewer. Rinse area well with water.
WASTE DISPOSAL METHOD:
Liquid wastes are not permitted in landfills. This product is not considered a hazardous waste under RCRA. Unusable liquid may be absorbed on an inert absorbent material, drummed, and taken to a chemical or industrial landfill. In some areas disposal by flushing into a sanitary sewer with plenty of water may be permissible. Consult local, state, and federal agencies for proper disposal method in your area.
RCRA HAZ WASTE NOS: N/A

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING
Store tightly closed container in a dry area at temps. between 40-120 degrees F. Store away from strong acids and oxidizing compounds. Keep product away from skin and eyes. Clothing or shoes which become contaminated with substance should be removed promptly and not reworn until thoroughly cleaned. Keep out of the reach of children.

SECTION X - REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: INDUSTRIAL CLEANERS NOI LIQUID KEEP FROM FREEZING
NOTE: DOT information applies to larger package sizes of affected products. For some products, DOT may require alternate names and labeling in accordance with packaging group requirements.
DOT HAZARD CLASS: NA DOT PACKING GROUP:
DOT I.D. NUMBER: DOT LABEL/PLACARD:
EPA TSCA CHEMICAL INVENTORY - ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR PART 117 SUBSTANCE(RQ IN A SINGLE CONTAINER): NONE
EPA CAA: N/A

MATERIAL SAFETY DATA SHEET

NOTICE

Thank you for your interest in, and use of, this product. Acuity Specialty Products Group is pleased to be of service to you by supplying this Material Safety Data Sheet for your files. Acuity Specialty Products Group is concerned for your health and safety. This product and all others supplied by Acuity Specialty Products Group companies can be used safely with proper protective equipment and proper handling practices consistent with label instructions and the MSDS. Before using any this product, be sure to read the complete label and the Material Safety Data Sheet.

As a further word of caution, Acuity Specialty Products Group wishes to advise that serious accidents have resulted from the misuse of "emptied" containers. "Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, or other sources of ignition; they may explode or develop harmful vapors and possibly cause injury or death. Clean empty containers by triple rinsing with water or an appropriate solvent. Empty containers must be sent to a drum reconditioner before reuse.

TERMS AND ABBREVIATIONS
Listed Alphabetically by Section

SECTION II: HAZARDOUS INGREDIENTS

CAR: Carcinogen - A chemical listed by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC) or OSHA as a definite or possible human cancer causing agent.
CAS#: Chemical Abstract Services Registry Number - A universally accepted numbering system for chemical substances.
CBL: Combustible - At temperatures between 100°F and 200°F chemical gives off enough vapor to ignite if a source of ignition is present as tested with a closed cup tester.
CNS: Central Nervous System depressant that reduces the activity of the brain and spinal cord.
COR: Corrosive - Causes irreversible injury to living tissue (e.g. burns).
DESIGNATIONS: Chemical and common names of hazardous ingredients.
EIR: Eye Irritant Only - Causes reversible reddening and/or inflammation of eye tissues.
EXPOSURE LIMITS: The time weighted average (TWA) airborne concentration at which most workers can be exposed without any expected adverse effects. Primary sources include ACGIH TLVs, and OSHA PELs.
ACGIH: American Conference of Governmental Industrial Hygienists
CEILING: "The concentration that should not be exceeded in the workplace during any part of the working exposure." Source, ACGIH
OSHA: Occupational Safety and Health Administration.
PEL: Permissible Exposure Limit - A set of time weighted average exposure values, established by OSHA, for a normal 8-hour day and a 40-hour workweek.
PPM: Parts per million - unit of measure for exposure limits.
(S) SKIN: Skin contact with substance can contribute to overall exposure.
STEL: Short Term Exposure Limit - Maximum concentration for a continuous 15-minute exposure period.
TLV: Threshold Limit Value - A set of time weighted average exposure limits, established by the ACGIH, for a normal 8-hour day and a 40-hour workweek.
FBL: Flammable - At temperatures under 100°F, chemical gives off enough vapors to ignite if a source of ignition is present as tested with a closed cup tester.
HAZARDOUS INGREDIENTS: Chemical substances that are determined to be potential health or physical hazards based on the criteria established in the OSHA Hazard Communication Standard - 29 CFR 1910.1200
HTX: Highly toxic - the probable lethal dose for a 70 kg (150 lb.) man, which may be approximated as less than 6 teaspoons (2 tablespoons)
IRR: Irritant - Causes reversible effects in living tissues (e.g. inflammation) - primarily skin and eyes.
N/A: Not Applicable - Category is not appropriate for this product.
N/D: Not Determined - Insufficient information to make a determination for this item.
RTECS#: Registry of Toxic Effects of Chemical Substances - an unreviewed listing of published toxicology data on chemical substances.
SARA: Superfund Amendment and Reauthorization Act - Section 313 designates certain chemicals for possible reporting for the Toxic Chemical Release Inventory.
SEN: Sensitizer - Causes allergic reaction after repeated exposure.
TOX: Toxic - The probable lethal dose for a 70 kg (150 kg) man is one ounce (2 tablespoons) or more.

SECTION III: HEALTH HAZARD DATA

ACUTE EFFECT: An adverse effect on the human body from a single exposure with symptoms developing almost immediately after exposure or within a relatively short time.
CHRONIC EFFECT: Adverse effects that are most likely to occur from repeated exposure over a long period of time.
EST'D PEL/TLV: This estimated, time-weighted-average, exposure limit, developed by using a formula provided by the ACGIH, pertains to airborne concentrations from the product as a whole. This value should serve as guide for providing safe workplace conditions to nearly all workers.
HMIS CODES: Hazardous Material Identification System - a rating system developed, by the National Paint and Coating Association for estimating the hazard potential of a chemical under normal workplace conditions. These risk estimates are indicated by a numerical rating given in each of three hazard areas (Health/ Flammability/Reactivity) ranging from a low of zero to a high of 4. The presence of a chronic hazard is indicated by a "YES". Consult HMIS training guides for Personal Protection letter codes, which indicate necessary protective equipment.
PRIMARY ROUTE OF ENTRY: The way one or more hazardous ingredients may enter the body and cause a generalized systemic or specific-organ toxic effect.
ING: Ingestion - A primary route of exposure through swallowing of material.
INH: Inhalation - A primary route of exposure through breathing of vapors.
SKIN: A primary route of exposure through contact with the skin.

SECTION IV: SPECIAL PROTECTION INFORMATION

Where respiratory protection is recommended, use only MSHA and NIOSH approved respirators and dust masks.
MSHA: Mine Safety and Health Administration
NIOSH: National Institute for Occupational Safety and Health.

SECTION V: PHYSICAL DATA

EVAPORATION RATE: Refers to the rate of change from the liquid state to the vapor state at ambient temperature and pressure in comparison to a given substance (e.g. water).
pH: A value representing the acidity or alkalinity of an aqueous solution (Highly Acidic pH = 1; Neutral pH = 7; Highly Alkaline pH = 14)
VOC CONTENT: The percentage or amount in pounds per gallon of the product that is regulated as a Volatile Organic Compound under the Clean Air Act of 1990 and various state jurisdictions.
SOLUBILITY IN WATER: A description of the ability of the product to dissolve in water.

SECTION VII: REACTIVITY DATA

HAZARDOUS DECOMPOSITION: Breakdown products expected to be produced upon product decomposition by extreme heat or fire.
INCOMPATIBILITY: Keep product away from listed substances or conditions to prevent hazardous reactions.
POLYMERIZATION: Indicates the tendency of the product's molecules to combine with themselves in a chemical reaction releasing excess pressure and heat.
STABILITY: Indicates the susceptibility of the product to decompose spontaneously and dangerously.

SECTION VIII: SPILL AND DISPOSAL PROCEDURES

RCRA WASTE NOs: RCRA (Resource Conservation and Recovery Act) waste codes (40 CFR 261) applicable to the disposal of spilled or unusable product from the original container.

SECTION X: TRANSPORTATION DATA

CWA: Clean Water Act - Federal law that regulates chemical releases to bodies of water.
RQ: Reportable Quantity - The amount of the specific ingredient that, when spilled to the ground and, can enter a storm sewer or natural watershed, must be reported to the National Response Center, and other regulatory agencies.
TSCA: Toxic Substances Control Act - A federal law requiring all commercial chemical substances to appear on an inventory maintained by the EPA.

DISCLAIMER

All statements, technical information, and recommendations contained herein are based on available scientific tests or data that we believe to be reliable. The accuracy and completeness of such data are not warranted or guaranteed. We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. Acuity Specialty Products Group assumes no liability or responsibility for loss or damage resulting from the improper use or handling of our products, from incompatible product combinations, or from the failure to follow instructions, warnings, and advisories in the product label and Material Safety Data Sheet

(rev 06/02)

ZEP MANUFACTURING COMPANY
Acuity Specialty Products Group, Inc.
P.O. BOX 2015
ATLANTA, GA 30301
1- 877- I - BUY- ZEP

Material Safety Data Sheet
and Safe Handling and Disposal Information

Issue Date 02/09/98
Supersedes
Product Name **SUPER ROYAL FLUSH - NEW**
Product No. **9232**
Toilet Bowl Deodorant

BARRY PATTERN FOUNDRY CO
3333 35TH AVE N
BIRMINGHAM AL 352072998

Printing date: 12/19/03

SECTION I - EMERGENCY CONTACTS

For MSDS Information:
Acuity Specialy Products Group, Inc.
Compliance Services 1-877-I-BUY-ZEP

For Medical Emergency:
INFOTRAC
(877) 541-2016 Toll Free - All Calls Recorded

For a Transportation Emergency:
CHEMTREC
(800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

SECTION II - HAZARDOUS INGREDIENTS

THIS PRODUCT CONTAINS NO INGREDIENTS WHICH ARE INHERENTLY HAZARDOUS AS DEFINED IN OSHA'S HAZARD COMMUNICATION STANDARD(29 CFR 1910.1200).
@ -Reportable under the SARA 313 Toxic Release Inventory

SECTION III - HEALTH HAZARD DATA

SPECIAL NOTE: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.
ACUTE EFFECTS OF OVEREXPOSURE:
There are no known effects from acute overexposure to this product. However, in light of good industrial hygiene, exposure to any chemical should be kept to a minimum.
CHRONIC EFFECTS OF OVEREXPOSURE:
There are no known effects from chronic exposure to this product. None of the ingredients are listed as carcinogens by IARC, NTP, or OSHA.
EST'D PEL/TLV: Not established
PRIMARY ROUTES OF ENTRY: N/A
HMIS CODES: HEALTH 0; FLAM 1; REACT 0; PERS. PROTECT -; CHRONIC HAZ NO
FIRST AID PROCEDURES:
SKIN: Flush contaminated skin with plenty of water. Consult a physician if irritation develops.
EYES: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower lids. Get medical attention at once.
INHALE: If symptoms occur, move affected person to fresh air. If symptoms persist, get medical attention promptly.
INGEST: If this product is swallowed, do not induce vomiting. If individual is alert, give plenty of water to drink. Get medical attention at once.

SECTION IV - SPECIAL PRECAUTION INFORMATION

PROTECTIVE CLOTHING: No special measures are required.
EYE PROTECTION: No special measures are required.
RESPIRATORY PROTECTION: No special measures are required.
VENTILATION: No special measures are required.

SECTION V - PHYSICAL DATA

BOILING POINT (F) - N/A
SPECIFIC GRAVITY - N/A
VAPOR PRESSURE(mmHg) - N/A
EVAPORATION RATE (=1) - SLOW
VAPOR DENSITY(AIR-1) - N/A
pH(CONCENTRATE) - N/A
SOLUBILITY IN WATER - DISPERSIBLE
pH(USE DILUTION OF) - N/A N/A
VOC CONTENT (CONCENTRATE) - N/A
APPERANCE AND ODOR - A DYE-COLORED BLUE BLOCK WITH A CHERRY FRAGRANCE.

SECTION VI - FIRE AND EXPLOSION DATA

FLASH POINT(F) (METHOD USED): None
FLAMMABLE LIMITS:LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: WATER FOG, CO2, DRY CHEMICAL, FOAM
SPECIAL FIRE FIGHTING: Wear self-contained positive pres. breathing apparatus.
UNUSUAL FIRE HAZARDS: NONE

SECTION VII - REACTIVITY DATA

STABILITY: Stable
INCOMPATIBILITY(AVOID): Strong acids and oxidizing agents.
POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION: Carbon dioxide, carbon monoxide, and other unidentified organic compounds.

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIALS IS RELEASED OR SPILLED:
Observe safety precautions in sections 4 & 9 during clean-up. Sweep up uncontaminated product and place in a container for reuse. Place contaminated materials in a suitable waste container and rinse area well with water.
WASTE DISPOSAL METHOD:
Product is consumed in use. Product is not considered a hazardous waste by RCRA. Unusable material should be drummed and taken to a chemical or industrial landfill. Liquid which separates should be absorbed on an inert absorbent and drummed with the solid material. Consult local, state and federal agencies for proper disposal in your area.
RCRA HAZ WASTE NOS: N/A

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING
Store tightly closed container in a dry area at temps. between 40-120 degrees F. Keep out of the reach of children.

SECTION X - REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: PLASTIC ARTICLES, NOI, HAVING A DENSITY OF 6
NOTE: DOT information applies to larger package sizes of affected products. For some products, DOT may require alternate names and labeling in accordance with packaging group requirements.
DOT HAZARD CLASS: NA DOT PACKING GROUP:
DOT I.D. NUMBER: DOT LABEL/PLACARD:
EPA TSCA CHEMICAL INVENTORY - ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR PART 117 SUBSTANCE(RQ IN A SINGLE CONTAINER): NONE
EPA CAA: N/A

MATERIAL SAFETY DATA SHEET

NOTICE

Thank you for your interest in, and use of, this product. Acuity Specialty Products Group is pleased to be of service to you by supplying this Material Safety Data Sheet for your files. Acuity Specialty Products Group is concerned for your health and safety. This product and all others supplied by Acuity Specialty Products Group companies can be used safely with proper protective equipment and proper handling practices consistent with label instructions and the MSDS. Before using any this product, be sure to read the complete label and the Material Safety Data Sheet.

As a further word of caution, Acuity Specialty Products Group wishes to advise that serious accidents have resulted from the misuse of "emptied" containers. "Empty" containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, or other sources of ignition; they may explode or develop harmful vapors and possibly cause injury or death. Clean empty containers by triple rinsing with water or an appropriate solvent. Empty containers must be sent to a drum reconditioner before reuse.

TERMS AND ABBREVIATIONS
Listed Alphabetically by Section

SECTION II: HAZARDOUS INGREDIENTS

CAR: Carcinogen - A chemical listed by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC) or OSHA as a definite or possible human cancer causing agent.
CAS#: Chemical Abstract Services Registry Number - A universally accepted numbering system for chemical substances.
CBL: Combustible - At temperatures between 100°F and 200°F chemical gives off enough vapor to ignite if a source of ignition is present as tested with a closed cup tester.
CNS: Central Nervous System depressant that reduces the activity of the brain and spinal cord.
COR: Corrosive - Causes irreversible injury to living tissue (e.g. burns).
DESIGNATIONS: Chemical and common names of hazardous ingredients.
EIR: Eye Irritant Only - Causes reversible reddening and/or inflammation of eye tissues.
EXPOSURE LIMITS: The time weighted average (TWA) airborne concentration at which most workers can be exposed without any expected adverse effects. Primary sources include ACGIH TLVs, and OSHA PELs.
- **ACGIH:** American Conference of Governmental Industrial Hygienists
- **CEILING:** "The concentration that should not be exceeded in the workplace during any part of the working exposure." Source, ACGIH
- **OSHA:** Occupational Safety and Health Administration.
- **PEL:** Permissible Exposure Limit - A set of time weighted average exposure values, established by OSHA, for a normal 8-hour day and a 40-hour workweek.
- **PPM:** Parts per million - unit of measure for exposure limits.
- **(S) SKIN:** Skin contact with substance can contribute to overall exposure.
- **STEL:** Short Term Exposure Limit - Maximum concentration for a continuous 15-minute exposure period.
- **TLV:** Threshold Limit Value - A set of time weighted average exposure limits, established by the ACGIH, for a normal 8-hour day and a 40-hour workweek.

FBL: Flammable - At temperatures under 100°F, chemical gives off enough vapors to ignite if a source of ignition is present as tested with a closed cup tester.
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HTX: Highly toxic - the probable lethal dose for a 70 kg (150 lb.) man, which may be approximated as less than 6 teaspoons (2 tablespoons)
IRR: Irritant - Causes reversible effects in living tissues (e.g. inflammation) - primarily skin and eyes.
N/A: Not Applicable - Category is not appropriate for this product.
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SEN: Sensitizer - Causes allergic reaction after repeated exposure.
TOX: Toxic - The probable lethal dose for a 70 kg (150 kg) man is one ounce 2 tablespoons) or more.

SECTION III: HEALTH HAZARD DATA

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EST'D PEL/TLV: This estimated, time-weighted-average, exposure limit, developed by using a formula provided by the ACGIH, pertains to airborne concentrations from the product as a whole. This value should serve as guide for providing safe workplace conditions to nearly all workers.
HMIS CODES: Hazardous Material Identification System - a rating system developed, by the National Paint and Coating Association for estimating the hazard potential of a chemical under normal workplace conditions. These risk estimates are indicated by a numerical rating given in each of three hazard areas (Health/ Flammability/Reactivity) ranging from a low of zero to a high of 4. The presence of a chronic hazard is indicated by a "YES". Consult HMIS training guides for Personal Protection letter codes, which indicate necessary protective equipment.
PRIMARY ROUTE OF ENTRY: The way one or more hazardous ingredients may enter the body and cause a generalized systemic or specific-organ toxic effect.
- **ING:** Ingestion - A primary route of exposure through swallowing of material.
- **INH:** Inhalation - A primary route of exposure through breathing of vapors.
- **SKIN:** A primary route of exposure through contact with the skin.

SECTION IV: SPECIAL PROTECTION INFORMATION

Where respiratory protection is recommended, use only MSHA and NIOSH approved respirators and dust masks.
MSHA: Mine Safety and Health Administration
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VOC CONTENT: The percentage or amount in pounds per gallon of the product that is regulated as a Volatile Organic Compound under the Clean Air Act of 1990 and various state jurisdictions.
SOLUBILITY IN WATER: A description of the ability of the product to dissolve in water.

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RQ: Reportable Quantity - The amount of the specific ingredient that, when spilled to the ground and, can enter a storm sewer or natural watershed, must be reported to the National Response Center, and other regulatory agencies.
TSCA: Toxic Substances Control Act - A federal law requiring all commercial chemical substances to appear on an inventory maintained by the EPA.

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(rev 06/02)

ZEP Manufacturing Company
Acuity Specialty Products Group, Inc.
P.O. Box 2015
Atlanta, GA 30301
1-877-I-BUY-ZEP

Material Safety Data Sheet
and Safe Handling and Disposal Information

Section 1. Chemical Product and Company Identification

Product name ZEP METER MIST INSECT KILLER S
Product Use Insecticide.
Product Code 0188
Date of issue 04/14/04 **Supersedes** 01/05/99

This product is a registered pesticide. Number: 9444-158-1270

BARRY PATTERN FOUNDRY CO
3333 35TH AVE N
BIRMINGHAM AL 35207-2927

Printing date: 09/17/10

Emergency Telephone Numbers

For MSDS Information:
Acuity Specialty Products Group, Inc.
Compliance Services 1-877-I-BUY-ZEP

For Medical Emergency
INFOTRAC:
(877) 541-2016 Toll Free - All Calls Recorded

For a Transportation Emergency
CHEMTREC:
(800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

Prepared by Compliance Services Group
Acuity Specialty Products Group
1420 Seaboard Industrial Blvd.
Atlanta, GA 30318

Section 2. Composition, Information on Ingredients

Name of Hazardous Ingredients	CAS #	% by Weight	Exposure Limits
PYRETHRINS; pyrethrum extract	8003-34-7	0.975	**ACGIH TLV (United States).** TWA: 5 mg/m³ 8 hour(s). **OSHA PEL (United States).** TWA: 5 mg/m³ 8 hour(s).
PIPERONYL BUTOXIDE; alpha-(2-(2-butoxyethoxy)ethoxy)-4,5-(methylenedioxy)-2	51-03-6	1.95	Not established
n-Octyl Bicycloheptene Dicarboximide	113-48-4	1-5	Not established
LOW ODOR PARAFFINIC SOLVENT; odorless base oil; dispersol	64742-47-8	<5	**OSHA PEL (United States).** TWA: 500 ppm 8 hour(s). **ACGIH TLV (United States).** TWA: 500 ppm 8 hour(s).
1,1-Difluoroethane	75-37-6	15-25	**ACGIH TLV (United States).** TWA: 1000 ppm 8 hour(s).
Blend of Propane & n-Butane	74-98-6;106-97-8	30-40	**OSHA PEL (United States).** TWA: 800 ppm 8 hour(s).

Section 3. Hazards Identification

HMIS

[redacted]	1
[redacted]	4
Reactivity	0
Personal Protection	A

Acute Effects **Routes of Entry** Absorbed through skin. Inhalation. Ingestion.

Skin Non-irritating under conditions of use. Non-sensitizer for skin. Prolonged or repeated contact may dry skin and cause irritation.

Eyes Hazardous in case of eye contact (irritant). Direct contact may cause irritation and redness. Inflammation of the eye is characterized by redness, watering, and itching.

Inhalation Hazardous in case of inhalation. May cause irritation of respiratory tract, coughing, shortness of breath. High vapor concentrations can cause headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness.

Ingestion Unlikely in this form. Vomiting increases risk of chemical pneumonia or pulmonary edema caused by aspiration of hydrocarbon solvents.

Carcinogenic Effects Ingredients: Not listed as carcinogen by OSHA, NTP or IARC.

Chronic Effects Repeated or prolonged exposure is not known to aggravate medical condition.

See Toxicological Information (section 11)

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Section 4. First Aid Measures

Eye Contact Check for and remove any contact lenses. Get medical attention. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open.

Skin Contact Wash with soap and water. Get medical attention if irritation develops.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

Section 5. Fire Fighting Measures

Flash Point Closed cup: <-18°C (-0.4°F). (Liquid.)

Flammable Limits LOWER: 1.8% UPPER: 17.1% (Liquid.)

Flammability Extremely flammable in presence of open flames, sparks and static discharge. (Liquid.)

Fire Hazard Container explosion may occur under fire conditions or when heated.

Fire-Fighting Procedures Cool closed containers exposed to fire with water.

Section 6. Accidental Release Measures

Spill Clean up Spills are unlikely due to packaging.

Section 7. Handling and Storage

Handling Keep away from heat, sparks and flame. Avoid breathing vapors or spray mists. Avoid contact with eyes.

Storage Keep container in a cool, well-ventilated area. Do not puncture, incinerate, store the container at temperatures above 49°C (120°F) or in direct sunlight.

Section 8. Exposure Controls, Personal Protection

	Personal Protection	Protective Clothing (Pictograms)
Eyes	Recommended: Safety glasses.	
Body	No special measures required.	
Respiratory	Avoid direct inhalation of spray.	

Section 9. Physical and Chemical Properties

Physical State	Liquid.	**Color**	Not available.
pH	Not applicable.	**Odor**	Mild. Pleasant.
Boiling Point	Not determined.	**Vapor Pressure**	510.1 kPa (3827 mmHg) (at 20°C)
Specific Gravity	0.84 (Water = 1)	**Vapor Density**	Not determined.
Solubility	Insoluble in cold water, hot water.	**Evaporation Rate**	Not determined.
		VOC (Consumer)	278 (g/l). (33.1%, 2.32 lbs./gal.)

Section 10. Stability and Reactivity

Stability and Reactivity The product is stable.

Incompatibility Reactive with acids, alkalis.

Hazardous Polymerization Will not occur.

Hazardous Decomposition Products Carbon dioxide and carbon monoxide and other unspecified organic materials.

Section 11. Toxicological Information

Toxicity to Animals

PYRETHRINS; pyrethrum extract:
ORAL (LD50): Acute: 1500 mg/kg [Rat-high].

Piperonyl Butoxide:
ORAL (LD50): Acute: 4300 mg/kg [Rat].
DERMAL (LD50): Acute: >2000 mg/kg [Rabbit].

n-Octyl Bicycloheptene Dicarboximide:
ORAL (LD50): Acute: 4980 mg/kg [Rat].
DERMAL (LD50): Acute: 2000 mg/kg [Rabbit].

LOW ODOR PARAFFINIC SOLVENT; odorless base oil; dispersol
LD50: Not available.
LC50: Not available.

Difluorethane:
GAS (LC50): Acute: 977000 mg/m^3 2 hour(s) [Mouse].

Blend of Propane & n-Butane:
GAS (LC50): Acute: 658000 mg/m^3 4 hour(s) [Rat].

CLEAN ACROSS AMERICA AND THROUGHOUT THE WORLD™

MATERIAL SAFETY DATA SHEET
AND SAFE HANDLING AND DISPOSAL INFORMATION

1-877-I-BUY-ZEP (1-877-428-9937)
ZEP MANUFACTURING COMPANY
P.O. BOX 2015
ATLANTA, GEORGIA 30301

ISSUE DATE: 04/14/97
SUPERSEDES: 06/15/88
Date printed: 11/23/00
ZEP TKO
Prod No: **0960** **Abrasive Hand Cleaner**

SOLD TO:

01569
(325)
BARRY PATTERN & FOUNDRY CO
3333 35TH AVE N
BIRMINGHAM AL 35207-2998

A07890

SECTION I -EMERGENCY CONTACTS

TELEPHONE:
(404) 352-1680 *BETWEEN 8:00 AM - 5:00 PM (EST)*
MEDICAL EMERGENCY:
(770) 439-4200 *NON OFFICE HOURS, WEEKENDS*
(770) 432-2873 *AND HOLIDAYS, PLEASE CALL*
(770) 424-4789 **LOCAL POISON CONTROL**
(770) 424-2048
(770) 455-8160
(770) 552-8836
TRANSPORTATION EMERGENCY:
(770) 922-0923
CHEMTREC:
(800) 424-9300 **TOLL FREE-CALLS RECORDED**
DISTRICT OF COLUMBIA:
(202) 483-7616 **ALL CALLS RECORDED**

SECTION II - HAZARDOUS INGREDIENTS

DESIGNATIONS	(PPM)	EFFECTS (SEE NOTICE)	% IN PROD.
** ALPHA OLEFIN SULFONATE, SODIUM SALT ** sulfonic acids, c14-18 alkane and c12-20 alkene and c12-20- alkenehydroxy, sodium salts; CAS# 68439-57-6; RTECS# NONE; OSHA PEL N/D	N/D	EIR	< 10
** NONYLPHENOXYPOLY(ETHYLENEOXY)ETHANOL ** npe; poly(oxy-1,2-ethanediyl), alpha-(nonylphenyl)-omega- hydroxy; CAS# 9016-45-9; RTECS# MD0905000; OSHA PELN/D	N/D	EIR	< 10

SECTION III - HEALTH HAZARD DATA

SPECIAL NOTE: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.
ACUTE EFFECTS OF OVEREXPOSURE:
This product can be an eye irritant. Inflammation of eye tissue is characterized by redness, watering, and/or itching.
CHRONIC EFFECTS OF OVEREXPOSURE:
Prolonged skin contact (4-8 hrs.), Without rinsing, may result in irritation characterized by itching or reddening of the skin.
of the hazardous ingredients are listed as carcinogens by IARC, NTP, & OSHA
PEL/TLV: Not established PRIMARY ROUTES OF ENTRY: N/A

HMIS CODES: HEALTH 0; FLAM. 0; REACT. 0; PERS. PROTECT. - ; CHRONIC HAZ. NO

FIRST AID PROCEDURES:
SKIN: This product is formulated for use on the skin, but it should be rinsed off with water.
EYES: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower lids. Get medical attention at once.
INHALE: This route of exposure is not likely due to product nature.
INGEST: If this product is swallowed, do not induce vomiting. If individual is alert, give plenty of water to drink. Get medical attention at once.

SECTION IV - SPECIAL PROTECTION INFORMATION

PROTECTIVE CLOTHING: No special measures are required.
EYE PROTECTION: No special measures are required.
RESPIRATORY PROTECTION: No special measures are required.
VENTILATION: No special measures are required.

SECTION V - PHYSICAL DATA

BOILING POINT (F):	212	SPECIFIC GRAVITY:	0.96
VAPOR PRESSURE(mmHg):	N/A	EVAPORATION RATE (WATER=1):	1
VAPOR DENSITY(AIR=1):	N/A	pH(CONCENTRATE):	5.5-6.5
SOLUBILITY IN WATER:	85%	pH(USE DILUTION OF):	N/A
VOC CONTENT (CONCENTRATE):	0.2% 0.02 lb/gl		

APPEARANCE AND ODOR: VISCOUS, GREEN ABRASIVE LIQUID/LEMON-LIME FRAGRANCE

SECTION VI - FIRE AND EXPLOSION DATA

FLASH POINT(F) (METHOD USED): N/A ( )
FLAMMABLE LIMITS: LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Noncombustible.
SPECIAL FIRE FIGHTING: None
UNUSUAL FIRE HAZARDS: None

SECTION VII - REACTIVITY DATA

STABILITY: Stable
INCOMPATIBILITY(AVOID): Strong acids and oxidizing agents.
POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION: Carbon dioxide, carbon monoxide, and other unidentified organic compounds.

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
Observe safety procedures in section 4 & 9 during clean-up. Absorb spill on inert absorbent material (eg Zep-O-Zorb). Pick up and place residue in a suitable waste container or, if permitted, flush to sewer. Thoroughly rinse spill area with water.
WASTE DISPOSAL METHOD:
Liquid wastes are not permitted in landfills. This product is not considered a hazardous waste under RCRA. Unusable liquid may be absorbed on an inert absorbent material (eg. Zep-O-Zorb), drummed, and taken to a chemical or industrial landfill. In some areas disposal by flushing into a sanitary sewer with plenty of water may be permissible. Consult local, state, and federal agencies for proper disposal method in your area.
RCRA HAZ. WASTE NOS.: N/A

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING:
Store tightly closed container in a dry area at temps. between 40-120 degrees F.
Keep product out of eyes.
Keep out of the reach of children.

SECTION X - REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: INDUSTRIAL CLEANERS NOI LIQUID KEEP FROM FREEZING
NOTE: DOT information applies to larger package sizes of affected products. For some products, DOT may require alternate names and labeling in accordance with packaging group requirements.
DOT HAZARD CLASS: DOT PACKING GROUP:

(Continued on Page: 2)

Product No: 0960 **SECTION X - REGULATORY INFORMATION (continued)**

DOT I.D. NUMBER: DOT LABEL/PLACARD:
EPA TSCA CHEMICAL INVENTORY - ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR PART 117 SUBSTANCE(RQ IN A SINGLE CONTAINER): N/A

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(rev. 1/98)

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(rev. 1/98)

HOOVER GROUP
ALUMINUM DIVISION
BEVIS ROAD, FRANKLIN, GA. 30217
(404) 675-3341

ALUMINUM PRODUCTS DIVISION MATERIAL SAFETY DATA SHEET

PRODUCT: ALUMINUM SHAPES

EFFECTIVE DATE: MARCH 3, 1986

--------SECTION 1---------- IDENTITY ----------

COMMON NAME: EXTRUDED AND/OR FABRICATED ALUMINUM SHAPES
CHEMICAL FAMILY: ALUMINUM ALLOYS (GROUP III A-METALS)
CHEMICAL NAME: ALUMINUM FORMULA: Al

--------SECTION 2---------- HAZARDOUS INGREDIENTS ----------

NOTE: THIS IS NOT A SPECIFICATION SHEET. DIFFERENT ALLOYS MAY CONTAIN A PERCENTAGE RANGE OF ONE OR MORE OF THE ALLOYING ELEMENTS BELOW.

ELEMENT	PERCENT RANGE	TLV (ACGIH) mg/m^3
ALUMINUM	87 - 99	10 (dust) 5 (fumes)
COPPER	0 - 5	1 (dust) 0.2 (fumes)
MANGANESE	0 - 1.3	5 (dust) 1 (fumes)
SILICON	0 - 10	10 (dust)
IRON	0 - 1.5	5 (fume as Fe_2O_3)
MAGNESIUM	0 - 11	10 (fumes)
CHROMIUM	0 - 0.5	0.5 (as metal)

--------SECTION 3---------- PHYSICAL & CHEMICAL CHARACTERISTICS ----------

BOILING POINT: 4442°F SPECIFIC GRAVITY (water = 1) 2.7
VAPOR PRESSURE (mm Hg): SOLID PERCENT VOLATILE BY VOLUME: SOLID
EVAPORATION RATE (water = 1): N/A SOLUBILITY IN WATER: NIL
REACTIVITY IN WATER: NONE IN SOLID STATE
APPEARANCE AND ODOR: SILVERY DUCTILE METAL (SOLID) --- MOLECULAR WEIGHT: APPROXIMATELY 27

PRODUCT: ALUMINUM SHAPES

------SECTION 4---------- FIRE AND EXPLOSION DATE ----------

FLASH POINT: N/A
FLAMMABLE LIMITS IN AIR % BY VOLUME: N/A
EXTINGUISHER MEDIA: DOES NOT BURN
AUTO-IGNITION TEMPERATURE: N/A
SPECIAL FIRE FIGHTING PRODEDURE: IN EXTRUDED OR FABRICATED SHAPE, MATERIAL DOES NOT BURN. IN POWDER OR CHIP FORM, USE DRY POWDER OR SAND. DO NOT USE WATER OR HALOGEN EXTINGUISHING AGENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS: WATER, OXIDIZERS, AND MANY OTHER CHEMICALS REACT EXPLOSIVELY IN CONTACT WITH MOLTEN ALUMINUM. FINE CHIPS TURNINGS, AND DUSTS IN AIR MAY BURN AND/OR EXPLODE IF AN IGNITION SOURCE IS PRESENT. HIGH CONCENTRATIONS OF FINELY DIVIDED ALUMINUM DUST (40-50 mg/m^3) MAY EXPLODE IN AIR WHEN EXPOSED TO HEAT OR BY CHEMICAL REACTION.

-------SECTION 5---------- REACTIVITY DATA ----------

STABILITY: STABLE UNDER NORMAL CONDITIONS
INCOMPATIBILITY (MATERIALS TO AVOID): STRONG OXIDIZERS, ie., CHLORATES, BROMATES, PEROXIDES, NITRATES, NITRITES, HALOGEN , ETC. FINELY DIVIDED ALUMINUM MAY REACT WITH WATER, STRONG OXIDIZERS, ACIDS, ALKALIES, AND HALOGENATED COMPOUNDS RESULTING IN HYDROGEN EVOLUTION
ZARDOUS DECOMPOSITION PRODUCTS: NONE IN SOLID STATE
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

-------SECTION 6---------- HEALTH HAZARD INFORMATION ----------

THRESHOLD LIMIT VALUE: SEE SECTION 2
EXPOSURE SIGNS AND SYMPTOMS: PRODUCT IN THE FORM IT IS SOLD IS NOT CONSIDERED A PHYSICAL OR A HEALTH HAZARD. SUBSEQUENT OPERATIONS SUCH AS CUTTING, GRINDING POLISHING, MELTING, WELDING, OR OTHER PROCESSING, MAY PRODUCE FUME OR DUST WHICH CAN BE INHALED, SWALLOWED, OR CONTACT SKIN OR EYES.

OVEREXPOSURE SYMPTOMS:

1. ACUTE - SHORTNESS OF BREATH FROM INHALATION OF ALUMINUM DUSTS.
2. CHRONIC - PULOMARY FIBROSIS FROM INHALATION OF ALUMINUM DUSTS.

MEDICAL CONDITION GENERALLY AGGRAVATED BY EXPOSURE: RESPIRATORY ILLNESS
LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN: NO
EMERGENCY AND FIRST AID PROCEDURE:

1. EYE CONTACT - FLUSH EYES WITH WATER. GET MEDICAL ATTENTION
2. INHALATION - MOVE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION. IF BREATHING HAS STOPPED PERFORM ARTIFICAL RESPIRATION.
3. SKIN - WASH WITH SOAP AND WATER. AVOID CONTACT WITH DUST OR FUME.
4. INGESTION - N/A

ALUMINUM PRODUCTS DIVISION MATERIAL SAFETY DATA SHEET

PRODUCT: ALUMINUM SHAPES

-----SECTION 7---------- SPECIAL PROTECTION INFORMATION ----------

RESPIRATORY PROTECTION: NONE FOR HANDLING SOLID STATE. IF DUST AND/OR FUMES PRESENT, USE NIOSH/MSA APPROVED RESPIRATOR.
VENTILATION: LOCAL EXHAUST AS REQUIRED FOR DUST AND/OR FUME PRODUCING OPERATIONS IS RECOMMENDED.
PROTECTIVE GLOVES: NOT REQUIRED BUT RECOMMENDED.
EYE PROTECTION: SAFETY GLASSES RECOMMENDED
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: NONE REQUIRED UNLESS HANDLING MOLTEN ALUMINUM AND THEN ACCORDING TO ALUMINUM ASSOCIATION'S "GUIDELINES FOR HANDLING MOLTEN ALUMINUM".

-------SECTION 8---------- SPECIAL PRECAUTIONS AND COMMENTS ----------

STORAGE & HANDLING INFORMATION: DO NOT STORE WITH STRONG OXIDIZERS. STORE IN A CLEAN DRY ENVIRONMENT TO PRESERVE PRODUCT QUALITY.
OTHER PRECAUTIONS: CARE IN HANDLING SHOULD BE EXERCISED TO AVOID MECHANICAL INJURY.
WASTE DISPOSAL METHODS: COLLECT SCRAP FOR REMELTING.
HAZARD IDENTITY: CONTACT - 0
HEALTH - 0
FLAMMABILITY - 1
REACTIVITY - 1
DOT CLASS: NONE

****

:S DOCUMENT IS PROVIDED TO SUPPLY THE INFORMATION NECESSARY TO COMPLY WITH OSHA HAZARD COMMUNICATIONS REGULATIONS AND "RIGHT-TO-KNOW" REQUIREMENTS. THE INFORMATION IN THIS MSDS WAS OBTAINED FROM SOURCES WHICH WE BELIEVE TO BE RELIABLE. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY RESPONSIBILITY OR WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OR CORRECTNESS.

THE CONDITIONS OR METHODS OF HANDLING, STORAGE, USE AND DISPOSAL OF THE PRODUCT ARE BEYOND OUR KNOWLEDGE. FOR THIS AND OTHER REASONS ALUMINUM PRODUCTS DIVISION DISCLAIMS ANY RESPONSIBILITY FOR HARM TO PERSONS OR PROPERTY RESULTING FROM CONDITIONS ARISING FROM THE STORAGE, HANDLING OR DISPOSAL OF THIS MATERIAL OR PRODUCT BY INDIVIDUALS BEYOND OUR CONTROL OR RESULTING FROM USE OF THE MATERIAL OR PRODUCT IN A MANNER INCONSISTENT WITH ITS NORMAL COMMERCIAL USE.

MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

N.A. = NOT APPLICABLE N.E. = NOT ESTABLISHED

I. PRODUCT IDENTIFICATION

PRODUCT NAME (s): Avon Non Silica Dry Parting

Manufacturer: Gene Conreaux & Co., Inc.
Address: 3637 Farnsworth Avenue
Indianapolis, Indiana 46241
Telephone: (317) 241-9233

EMERGENCY
TELEPHONE: (800) 424-9300
Call Chemtrec
FAX (317) 248-7725

II. HAZARDOUS MATERIAL IDENTIFICATION SYSTEM *

CATEGORY	RATING	LEGEND
Flammability	0	0=Minimal Hazard
Health	2	2=Moderate Hazard
Reactivity	0	0=Minimal Hazard
Personal Protection	E	E=Glasses, Gloves and Dust Respirator

* These ratings are based on NFPA regulations

III. HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS	CAS.NO	ACGIH THRESHOLD LIMIT VALUE	% RANGE	OSHA PERMISSABLE EXPOSURE LIMIT
Calcium Carbonate	1317-65-3	10 mg/m3	97-99	15 mg/m3
Aluminum Stearate	637-12-7	10 Mg/M3	0-2	10 Mg/M3

* As respirable dust

@ This material contains Silicon Dioxide in some form. IARC Monographs on the evaluation of the Carcinogenic Risk of Chemicals to Humans (Volume 42, 1987) concludes that there is sufficient evidence for the carcinogenicity of crystalline silica to experimental animals, and that there is limited evidence of the carcinogenicity of crystalline silica to humans. Classified by the IARC as 2A

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IV. PHYSICAL/CHEMICAL PROPERTIES

Appearance and Odor: White powder, no odor.

Water Solubility: nil
Melting Point(oF): 212
Boiling Range(oF): NA
Specific Gravity(water=1):NE
Vapor Pressure(mmHg): NA
Percent Volatile By Weight: 0-2
Vapor Density(Air=1): NA
Evaporation Rate(Butyl Acetate=1): NA
TPQ: NA
RQ: NA

V. FIRE AND EXPLOSION INFORMATION

Flash Point(C.O.C.)(oF): NA

Auto-Ignition Temperature(oF): NA

Flammable Limits: LEL NA UEL NA

Extinguishing Media: Not Applicable.

Unusual Fire or Explosion Hazards: High concentrations of dust in high heat environment may cause explosions.
Special Fire-Fighting Procedures: Use full facepiece with self contained breathing apparatus when fighting fires near this product

VI. CHEMICAL REACTIVITY INFORMATION

Conditions Contributing to Instability: None.

Incompatible Materials: Strong acids or oxidizers.

Conditions to Avoid: Dusting

Hazardous Decomposition Products: Possible dusts could be generated but not likely.

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VII. HEALTH HAZARDS A. Summary/Risks

Signs and Symptons of Overexposure: Overexposure could result in coughing, sneezing, shortness of breath or other respiratory problems. Other symptoms may result.

Medical Conditions Generally Aggravated by Exposure: May aggravate pre-existing medical conditions

Primary Route(s) of Entry: Inhalation.

Target Organs: Eyes and lungs

Acute Health Effect: Overexposure could result in temporary mucous membrane or respiratory tract irritation.
Chronic Health Effect: Overexposure could result in irreversible mucous membrane or respiratory tract damage.

Carcinogenicity: See page 1.

Notes to Physician: None.

VII. HEALTH HAZARDS B. FIRST AID/EMERGENCY PROCEDURES

Inhalation: If overcome, immediately remove from exposure and seek medical attention

Skin Contact/Absorption: Wash skin thoroughly with soap and water. If irritation develops, seek medical attention

Eye Contact: Flush with clear flowing water for at least 15 minutes. If irritation persists, seek medical attention.

Ingestion: If ingested, DO NOT induce vomiting; call a physician immediately.

VIII. SPILL, LEAK AND WASTE DISPOSAL PROCEDURES

Procedures for clean-up of spills/leaks:Avoid dusting when possible. Use a vacuum with fine particulate filter to clean spill. A dust mask for powders is recommended. Notify proper authorities if the need exists.
Waste Disposal: Waste generated during application, demolition, breakage or spillage are not hazardous wastes as defined by RCRA (40 CFR part 261). Place waste and spillage in closed containers. Dispose of in approved landfill in accordance with federal, state and local regulations.

IX. PROTECTION AND CONTROL INFORMATION

Hygeinic Practices: Minimize breathing vapors, mists, fumes or dusts. Avoid prolonged or repeated contact with skin. Remove contaminated clothes. launder before reuse. Remove contaminated shoes; clean before reuse.

Ventilation Requirements: Provide ventilation sufficient to prevent exceeding recommended exposure limits.

Respiratory Protection: Use NIOSH approved organic cartridge Type 7 respirator

Eye Protection: Use safety glasses, splash goggles or face shield when eye contact may occur

Protective Gloves: Use chemical-resistant gloves, if needed, to avoid prolonged or repeated skin contact

Other Clothing and Equipment: As required to prevent contact

Engineering Controls/Work Practices: Keep containers and storage containers closed when not in use.

Special Considerations for Repair/Maintenance of Contaminated Equipment: Provide adequate respiratory, eye and skin protection.

X. PRECAUTIONS FOR SAFE HANDLING AND USE

Storage Segregation: Always segregate materials by major hazard class.

Special Handling/Storage: Do not transfer contents to unlabeled container(s).

Other: Comply with all federal, state and local regulations.

XI. DOT SHIPPING REQUIREMENTS

Shipping Name: Compound, NOI, OT Petroleum.

Hazard Class: None.

Identification Number: None

Label(s) Required: None.

Date Prepared: 12-31-1990

Prepared by: Chris Froderman Title : Chemist

As of the date of preparation of this document, the forgoing information is believed to be accurate and is provided in good faith to comply with applicable federal and state law(s). However, no warranty or representation with respect to such information is intended or given.

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MATERIAL SAFETY DATA SHEET

Product Trade Name: **BARAMIX®**

Revision Date: 31-Mar-2005

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: BARAMIX®
Synonyms: None
Chemical Family: Mineral
Application: Additive

Manufacturer/Supplier

BPM Minerals LLC
3000 N Sam Houston Parkway East
Houston, TX 77032

Telephone: (281) 871-7900
Fax: (281) 871-7940
Emergency Telephone: (800) 666-9260 or (713) 753-3000

Prepared By

Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Crystalline silica, cristobalite	14464-46-1	0 - 1%	0.05 mg/m^3	1/2 x 10 mg/m^3 / %SiO2 + 2
Crystalline silica, tridymite	15468-32-3	0 - 1%	0.05 mg/m^3	1/2 x 10 mg/m^3 / %SiO2 + 2
Crystalline silica, quartz	14808-60-7	1 - 5%	0.05 mg/m^3	10 mg/m^3 / %SiO2 + 2
Coal tar pitch	65996-93-2	1 - 5%	0.2 mg/m^3	Not applicable
Sea coal	68409-95-0	0 - 50%	Not applicable	Not applicable
Bentonite	1302-78-9	50 - 100%	Not applicable	Not applicable

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARDS IDENTIFICATION

Hazard Overview	**CAUTION! - ACUTE HEALTH HAZARD** May cause eye and respiratory irritation. May be harmful if swallowed. Potential carcinogen. **DANGER! - CHRONIC HEALTH HAZARD** Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease. This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	350
Flash Point/Range (C):	177
Flash Point Method:	PMCC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases. Organic dust in the presence of an ignition source can be explosive in high concentrations. Good housekeeping practices are required to minimize this potential.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings: HMIS Ratings:	Health 1, Flammability 0, Reactivity 0 Flammability 0, Reactivity 0, Health 1*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH certified, European Standard En 149, or equivalent respirator when using this product. Material is slippery when wet. Wash hands after use.
Storage Information	Store away from oxidizers. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Impervious rubber gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Gray to black
Odor:	Odorless
pH:	7-10
Specific Gravity @ 20 C (Water=1):	1.7-2.65
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	44-58
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers. Strong acids. Strong alkalis. Hydrofluoric acid.
Hazardous Decomposition Products	Oxides of sulfur. Carbon monoxide and carbon dioxide. Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity" subsection below).
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Aggravated Medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.
Contains coal tar pitch volatiles, a skin carcinogen.

Other Information

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768 (1997).

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997).
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined

Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG
Not restricted

Other Shipping Information

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.

California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	Product contains one or more components not listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials (Crystalline silica)

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

MATERIAL SAFETY DATA SHEET

(Complies with 29 CFR 1910.1200)

SECTION I - GENERAL

Reed Minerals, Harsco Corporation
P.O. Box 0515
Camp Hill, PA 17001-0515
regulated.
Emergency Telephone Number
(717) 763-4200

Product Name: Black Beauty® Abrasives
CAS Number: 68476-96-0
Particles not otherwise
Common Name: Slag, Coal
Date: February, 1998

SECTION II - INGREDIENTS

		OSHA *PEL	ACGIH *TLV
Slag, Coal 99% - 100%	**Nuisance Particulate**		
	Total Particulate	15	10
	Respirable Particulate	5	3

* Values expressed as mg/m^3

SECTION III - PHYSICAL DATA

Physical Form: Solid (angular granules)
Boiling Temperature: N/A
Melting Temperature: Greater than 2300°F
Vapor Pressure/Density: N/A
Evaporation Rate: N/A
Specific Gravity: 2.7 g/cc (typical)
Water Solubility: Negligible
Color: Black
Odor: None

SECTION IV - FIRE AND EXPLOSION DATA

Product is non-flammable and non-explosive.

Attn: Bob

REED MINERALS
a Hexion company

SECTION V - REACTIVITY DATA

Product is stable under normal conditions of use, storage, and transportation.

SECTION VI - HEALTH HAZARD DATA

Low health risk by inhalation. Treat as a nuisance dust. Typical free silica less than 0.1%. This material is not a recognized carcinogen or co-carcinogen. Human toxic response has not been demonstrated for any route of entry. Mechanical irritation may occur to eyes, skin or respiratory tract. Pre-existing health conditions may be aggravated.

Carcinogenicity: NTP - No; IARC Monographs - No; OSHA Regulated - No

FIRST AID

IN CASE OF:

1. Eye contact - Immediately flush eyes thoroughly with water or an ophthalmic saline solution.
2. Skin contact - Wash skin with soap and water if irritation occurs.
3. Inhalation - Remove affected person(s) to fresh air source.
4. Oral intake - Rinse mouth out with water.

If symptoms persist, contact a physician or other medical personnel.

SECTION VII - SPILL, LEAK AND DISPOSAL PROCEDURES

No special procedures required for clean-up. Wetting with water will reduce any airborne dust. Uncontaminated product does not exceed Toxicity Characteristic Leaching Procedure (TCLP) limits and may be disposed of as an inert material in an appropriate solid waste landfill according to applicable Federal, State and Local regulations.

SECTION VIII - CONTROL MEASURES

Use appropriate NIOSH certified respiratory protection when exposure limits may be exceeded. Maintain sufficient ventilation to allow visual contact with work surfaces. Appropriate abrasive blaster's protective equipment is required, which may also include gloves, hood with protective lens, safety glasses, and hearing protection.

SECTION IX - SPECIAL PRECAUTIONS

Keep product dry and free of all contamination to assure free flow. Use an appropriate safety screen over fill hatch of blasting pot. Respirable dusts may be generated during pressure abrasive cleaning operations.

- NOTE-

The opinions expressed herein are those of qualified experts within Harsco Corporation. Harsco believes that the information contained herein is current and accurate for the normal and intended use of this product as of the date of this Material Safety Data Sheet. Since the use of this information and of those opinions or the conditions of use of the product are not within the control of Harsco Corporation, it is the user's obligation to determine and observe the conditions of safe use and disposal of the product by their operations.

(RM 6/98)

Reed Minerals, Harsco Corporation
P.O. Box 0515
Camp Hill, PA 17001-0515
Telephone (717) 763-4200 Fax (717) 763-6496

Aggregates, Building, and Commitment. . .REED MINERALS

Starting date for this product 9/09/04

PIN 410900 Black Bull

RENO REFRACTORIES

Material Safety Data Sheet
May be used to comply with
OSHA'S Hazard Communication Standard.
29 CFR 1910.1200. Standard must be
consulted for specific requirements

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form) Form Approved
OMB No. 1218-0072

IDENTITY (As Used on label and list) BLACK BULL	Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

SECTION I

Manufacture's Name: RENO REFRACTORIES	Emergency Telephone Number: 205-647-0240
Address (Number, Street, City, State and Zip Code 601 RENO DRIVE	Telephone Number for information: 205-647-0240
PO BOX 201	Date Prepared: 06/1/09
MORRIS, AL 35116	Signature of Preparer(optional)

SECTION II - Hazardous Ingredients/Identity Information:

Hazardous Components (Specific Chemical Identity: Common Name(s)	CAS#	OSHA PEL	ACGIH TLV	Carcinogen	% (optional)
Sodium Silicate	7732-18-5	NE	NE	No	14-17%
Crystalline Silica	14808-60-7	0.05 mg/m3		yes*	<30%
Carbon Black	1333-86-4		2.0 mg/m3	yes*	<1.1
Graphite	7782-42-5		2.0 mg/m3	yes*	<2.5

* refers to respirable material. Product is sold in wet form so dusting is not a problem.
CALIFORNIA RESIDENTS: This product contains one or more chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm.

SECTION III- Physical/Chemical Characteristics:

Boiling Point	N/A	Specific Gravity (H2O-1)	2.0 - 2.4
Vapor Pressure (mm Hg.)	N/A	Melting Point	3000°F
Vapor Density (AIR-1)	N/A	Evaporation Rate (Butyl Acetate- 1)	N/A

Solubility in Water: LOW

Appearance and Odor: GREY- EARTHY ODOR

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used) N/A	Flammable Limits N/A	LEL N/A	UEL N/A

Extinguishing Media: IGNITION UNLIKELY- ANY MEDIA

Special Fire Fighting Procedures: N/A

Unusual Fire and Explosion Hazards: N/A

PIN # 410900 - **BLACK BULL**

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	NONE

Incompatibility: (Materials to Avoid) N/A

Hazardous Decomposition or Byproducts: N/A

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	NONE

Section VI - Health Hazard Data:

Route(s) of Entry: Inhalation? NO Skin? yes Ingestion? YES

Health Hazard: (Acute and Chronic)
NONE IDENTIFIED

Carcinogenicity: NTP? IARC Monographs? yes OSHA Regulated? no

Signs and Symptoms of Exposure: Chronic overexposure to dust containing *respirable* sized crystalline silica and graphite can cause delayed lung injury (silicosis). Inhalation of dust containing crystalline silica or graphite may contribute to pre-existing pulmonary diseases such as asthma and lung disorders associated with smoking. IARC studies have shown sufficient evidence from animal studies to categorize crystalline silica as a group 1 carcinogen.

Sodium Silicate can cause eye and skin irritation

Medical Conditions
Generally Aggravated by Exposure: . AVOID CONTACT WITH EYES.

Emergency and First Aid Procedures : IN CASE OF EYE CONTACT, FLUSH REPEATEDLY WITH WATER for 15 MINUTES OR UNTIL CLEAR. CONSULT PHYSICIAN IF IRRITATION PERSISTS. FOR SKIN CONTACT, WASH SKIN THOROUGHLY WITH SOAP AND WATER.

Section VII - Precautions for Safe Handling and Use:

Steps to be taken in Case Material is Released or Spilled: CLEAN UP WITH BROOM AND/OR SHOVEL.

Waste Disposal Method: APPROVED LANDFILL.

Precautions to be Taken in Handling and Storing: STORE IN COOL LOCATION.

Other Precautions: N/A

Section VIII - Control Measures:

Respiratory Protection: (Specify Type) N/A

Ventilation	Local Exhaust N/A	Special N/A
	Mechanical (General) N/A	Other N/A
Protective Gloves: REGULAR GLOVES		Eye Protection: SAFETY GLASSES

Other Protective Clothing or Equipment: N/A

Work/Hygienic Practices: N/A

*U.S.G.P.O: 1966-491-529/45775

LA ROCHE CHEMICALS

P.O. BOX 1031 • BATON ROUGE, LOUISIANA • 70821

MATERIAL SAFETY DATA SHEET

Company / Plant	Issue Date	Identification Number
LaRoche Chemicals P.O. Box 1031 Baton Rouge, Louisiana 70821	Revised 10/01/86	BRIA-2
♦Trade Name (Common Name or Synonym) C-1, C-2, C-3, C-4, C-5R, C-5RLS, C-11, C-60, C-70, C-71, C-77, C-79	Emergency Phone Number (504) 355-1260 or (504) 355-3340	
Chemical Name Calcined Alumina LADLE INSERTS	Formula Al_2O_3	DOT Identification Number N/A

I. INGREDIENTS

Material or Component

Dust from this product is considered "nuisance" dust.

Ingredient	CAS #	1984-85 ACGIH TLV*	OSHA 1910.1000 TWA **
Alumina	1344-28-1	10.0 mg/m^3 for total dust 5.0 mg/m^3 for respirable dust	15.0 mg/m^3 for total dust 5.0 mg/m^3 for respirable dust

* TLV = Threshold Limit Value
** TWA = Time Weighted Average

II. PHYSICAL DATA

Material is (At Normal Conditions):	Appearance and Odor			
☐ Liquid ☒ Solid ☐ Gas ☐ Other	White and odorless grains or spheres			
Acidity/Alkalinity	Melting Point N/A °F Boiling Point N/A °F	Specific Gravity (H_2O = 1) 0.96 Solubility in water (% by weight) insoluble	Vapor Pressure (mm Hg at 20°C)
pH = N/A			N/A

III. PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection	Hands, Arms, and Body
NIOSH/MSHA approved respirators for particulates.	Not normally required.
Eyes and Face	**Other Clothing and Equipment**
Eye protection in dusty situations.	Local exhaust ventilation: as necessary to maintain airborne levels below TLV and TWA.

IV. EMERGENCY MEDICAL PROCEDURES

N/A

N/A = Not Applicable

♦ Indicates change or addition from previous issue.

V. HEALTH/SAFETY INFORMATION

Health

INHALATION	• Nuisance dusts have little adverse effect on lungs, and do not produce significant organic disease or toxic effects when exposures are kept below occupational exposure limits.
SKIN CONTACT	• Negligible risk.
EYE CONTACT	• Low risk.
INGESTION	• Negligible risk.

Fire and Explosion

Flash Point	Autoignition Temperature	Flammable Limits in Air	Extinguishing Media
N/A °F [X] Not Flammable	N/A °F	Lower % Upper N/A %	N/A

Unusual Fire and Explosion Hazards	Extinguishing Media Not to be Used
N/A	N/A

Reactivity

Stability	Incompatibility (Materials to Avoid)
[X] Stable [ ] Unstable	N/A
Conditions to Avoid	N/A
Hazardous Decomposition Products	N/A

VI. ENVIRONMENTAL

Spill or leak procedures

We recommend that the purchaser establish a spill prevention, control and countermeasure plan. This plan should include procedures for proper storage as well as clean-up of spills and leaks. The procedures should conform to safe practices and provide for proper recovery or disposal. Depending on the quantity spilled, notification of the National Response Center (800/424-8802) may be required in the case of hazardous substances. (See EPA, DOT and various state and local regulations).

Waste Disposal Method*

Used or unused product should be tested to determine hazard status and disposal requirements under federal, state and local laws and regulations.

*Disposer must comply with federal, state and local disposal or discharge laws.

VII. ADDITIONAL INFORMATION

Store material in dry location because of tendency to absorb moisture.

The information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied, regarding the accuracy or correctness.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product

efractory Sales & Service Co.

1750 Highway 150
P. O. Box 885
Bessemer, Alabama 35020
205/424-3980

March 2, 1989

Barry Pattern, & Foundry Co.
3333-35 Avenue, N.
Birmingham, Al 35207

Dear Customer:

Products supplied to you by this company typically contain between 50% and 90% alumina (CAS# 1344-28-1) which has been listed as a toxic chemical under SARA (Superfund Amendments and Reauthorization Act) Title III, Section 313.

This letter is to inform you that under Section 313, certain businesses are required to submit annual reports to the U. S. EPA and appropriate state agency on the amounts of these chemicals released into the environment. You should either refer to the regulations to determine its applicability to each of your facilities or alternatively you can call the "Community Right-to-Know Information Hotline" at 800-535-0202.

J. Wilton

JW/js

CALCINED PETROLEUM COKE

CHEMICAL NAME

0 HEALTH

1 FLAMMABILITY

0

✓ PROTECTIVE EQUIPMENT

N95 3M 8210 OR EQUAL

HAZARD RATING

4 EXTREME	1 SLIGHT
3 SERIOUS	0 MINIMAL
2 MODERATE	

Great Lakes Carbon LLC

MATERIAL SAFETY DATA SHEET

SECTION I - IDENTIFICATION

EMERGENCY PHONE	PRODUCT NAME	CAS NO.
GLC 281 – 775 - 4741	Calcined Petroleum Coke	64743 – 05 -01

COMPANY NAME and ADDRESS
Great Lakes Carbon LLC
4 Greenspoint Plaza, Suite 2200
16945 Northchase Drive
Houston, TX 77060

TRADE NAME AND SYNONYMS
Calcined Petroleum Coke

CHEMICAL NAME AND SYNONYMS
Calcined Petroleum Coke

QUESTIONS CONCERNING THE MSDS CAN BE DIRECTED TO:
Corporate Technical Manager
Telephone 281 – 775 - 4741

EFFECTIVE
02/08/02
SUPERSEDES
05/22/98

NFPA Rating
0 Least, 1 Slight, 2 Moderate, 3 High, 4 Extreme

Health: 0 Flammability: 1 Reactivity: 0

SECTION II - HAZARDOUS INGREDIENTS

MATERIAL INFORMATION

→ Calcined petroleum coke is not considered to be hazardous as defined by OSHA's Hazard Communication Standard 29 CFR 1910.1200. Calcined petroleum coke is considered to be an inert material.

Calcined Petroleum Coke CAS NO. 64743 – 05 - 01

EXPOSURE LIMITS

OSHA: PEL = 15 mg/m^3 as total dust; 5 mg/m^3 as respirable fraction

ACGIH: PEL = 10 mg/m^3 as total dust; 3 mg/m^3 as respirable fraction

SYMPTOMS OF OVEREXPOSURE

Route(s) of Entry: Inhalation, skin, and eye contact.

This product is nontoxic. The "nuisance dust" exposure values that are listed apply to any inert substance capable of producing airborne particulates. Excessive concentrations of calcined petroleum coke may reduce visibility, cause unpleasant deposits in the eye, ears, and nasal passages, or irritate the skin or mucous membranes by mechanical means. However, normal workplace exposure has not been determined to cause a significant health effect. Calcined petroleum coke, as with many petroleum products, may cause minor skin, eye, or lung irritation, but good hygienic practices can minimize these effects.

See Section VIII for additional health data.
Is product listed as Carcinogen or Potential Carcinogen by: NTP? No IARC? No OSHA? No

RECOMMENDED FIRST AID TREATMENT

Inhalation: Remove to fresh air. If breathing has stopped, administer artificial respiration and supply oxygen. If problems persist, seek medical attention.
Eye Contact: In case of contact, immediately flush eyes with plenty of water until irritation subsides. If irritation persists, seek medical attention.

Skin Contact: Normal skin contact is not known to cause a significant health effect. Particles should be periodically washed off of skin with soap and water.

Ingestion: If swallowed, do not induce vomiting. Immediately give water. Never give anything by mouth to an unconscious person. If symptoms develop, seek medical attention.

FAX 20. 2009 1:15PM No. 3911 P. 2

MSDS – Calcined Petroleum Coke

SECTION III – PHYSICAL DATA

BOILING POINT (° F) Solid	**BULK DENSITY (LB/FT³)** 50 to 55
MELTING POINT (° F) Nonmelting solid	**VAPOR DENSITY (Air = 1)** Not Applicable
SOLUBILITY IN WATER Not Soluble	**ODOR** None
PERCENT VOLATILE BY VOLUME 0.3 Max	**APPEARANCE** Dark gray to black

SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) No Data Available	**AUTO IGNITION TEMPERATURE** See Unusual Fire and Explosion Hazards Section below	**FLAMMABLE LIMITS % BY VOLUME** **LEL** No Data Available **UEL** No Data Available

EXTINGUISHING MEDIA
Water Fog, Dry Chemical, Foam, or Carbon Dioxide

SPECIAL FIRE FIGHTING PROCEDURES Most reported coke fires have occurred when produced calcined coke is inadequately cooled and stored in a manner that allows the movement of air through the coke bed. Coke should be well quenched or cooled before it is stored in a pile out of doors or placed in silos or bins. Storage should be arranged to prevent movement of air through the coke. Should a fire occur, its locations and extent should be determined as quickly as possible. The best procedure is to dig out and remove the coke in the heated zone. The hot coke should be drenched with water as it is exposed. Because of the possibility of steam explosion, great care should be used introducing water into confined storage such as a silo. Whenever possible, bulk material in silos should be removed and material drenched in an open area. Products of combustion may contain carbon monoxide, carbon dioxide and sulfur dioxide. Do not enter permitted confined space or enclosed area without proper PPE. There is no dust explosion hazard from calcined petroleum coke.

UNUSUAL FIRE AND EXPLOSION HAZARDS
May burn if exposed to temperatures greater 1290°F (700°C).

SECTION V – REACTIVITY DATA

STABILITY	**HAZARDOUS POLYMERIZATION**
Unstable ☐	May Occur ☐
Stable X	Will Not Occur X

INCOMPATIBILITY (Materials to avoid)
Strong oxidizing acids; other strong oxidants

HAZARDOUS DECOMPOSITIONS PRODUCTS
CO, CO_2, SO_2

CONDITIONS TO AVOID
Extreme heat and open flames. May burn if exposed to temperatures above 1290°F (700°C).

FEB. 20. 2009 1:16PM FSG No. 3911 P. 3

MSDS – Calcined Petroleum Coke

The information and recommendations contained herein are, to the best of Great Lakes Carbon's (GLC) knowledge and belief, accurate and reliable as of the date issued. GLC does not warrant or guarantee their accuracy or reliability, and GLC shall not be liable for any loss or damage arising out of the use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal counsel should be consulted to insure proper health, safety and other necessary information is included on the container.

SECTION VII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

Select appropriate NIOSH-approved protection where necessary to maintain exposures below the acceptable limits in the Health Hazard Section. Proper respiratory protection should be determined by adequately trained personnel and based on the contaminant(s), the degree of potential exposure and published respirator protection factors.

VENTILATION

Dust should be controlled at point of operation

PROTECTIVE GLOVES

None

EYE PROTECTION

Safety goggles or glasses

OTHER PROTECTIVE EQUIPMENT

None

SECTION VIII - SHIPPING INFORMATION

DEPARTMENT OF TRANSPORTATION (DOT)

Proper Shipping Name	:	Regulated by water mode only, when temperature exceeds 130°F
Hazard Class	:	ORM (other regulated material) - C
Dot Label(s)	:	None
DOT Placard	:	None

INTERNATIONAL MARITIME ORGANIZATION (IMO)

Proper Shipping Name : Not regulated by IMO

Special Information: Must not be loaded in cargo vessels when temperatures exceed 225°F. (46CFR 148.04-17)

MSDS – Calcined Petroleum Coke

SECTION VI – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED

Material is not toxic and can be picked up by sweeping, shoveling, or vacuuming. Provisions should be made to prevent washing, draining, or directing material to storm or sanitary sewers.

WASTE DISPOSAL METHOD

All Federal, State, and Local regulations regarding health and pollution must be followed for disposal of calcined petroleum coke.

SECTION VII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) 3M 8210 N95 or equal

Select appropriate NIOSH-approved protection where necessary to maintain exposures below the acceptable limits in the Health Hazard Section. Proper respiratory selection should be determined by adequately trained personnel and based on the contaminant(s), the degree of potential exposure and published respirator protection factors.

VENTILATION

Dust should be controlled at point of operation.

PROTECTIVE GLOVES

None

EYE PROTECTION

None required. Recommend using dust goggles in areas of high dust concentrations.

OTHER PROTECTIVE EQUIPMENT

None

SECTION VIII – ADDITIONAL HEALTH DATA

Petroleum coke was found to be non-carcinogenic in mice in chronic skin painting studies with coke dust. Petroleum coke was found not to be carcinogenic in monkeys and rats in a two-year inhalation study at concentrations up to 30 mg/m^3. Chronic inflammatory changes similar to those produced by non-specific respiratory irritants were observed in some rats at the highest exposure level.

Petroleum coke was found not to be mutagenic in a rat in vivo Bone Marrow Cytogenetic test, a mouse Lymphoma assay, and an Ames Mutagenicity assay.

SECTION IX – SHIPPING INFORMATION

DEPARTMENT OF TRANSPORATION (DOT)

Proper Shipping Name : Regulated by water mode only, when temperature exceeds 130°F, Petroleum coke, calcined.
Hazard Class : ORM (other regulated material) – C
Dot Label(s) : None
DOT Placard : None

INTERNATIONAL MARITIME ORGANIZATION (IMO)

Proper Shipping Name : Petroleum coke, calcined. Not regulated by IMO

Special Information : Must not be loaded in cargo vessels when temperatures exceed 225°F. (46 CFR 148.04-17)

MATERIAL SAFETY DATA SHEET

SECTION I - GENERAL INFORMATION

SUPPLIER	SOUTHERN SCRAP COMPANY, INC.
EMERGENCY PHONE	904-438-3197
OTHER PHONE CALLS	904-438-3197
ADDRESS	2909 NORTH PALATOX STREET
CITY	PENSACOLA STATE : FL ZIP : 32582
MSDS PREPARED BY	RESOURCE CONSULTANTS, INC.
DATE PREPARED	05/01/91

ADDITIONAL INFORMATION

THIS DATA SHEET IS PREPARED AS A GUIDELINE FOR TYPICAL USES OF SCRAP MATERIALS. THE USER SHOULD BE AWARE THAT THE COMPOSITION OF THE SCRAP CAN VARY BASED UPON THE RAW MATERIALS, PROCESSES USED, AND PROTECTIVE COATINGS THAT MAY HAVE BEEN APPLIED TO THE ORIGINAL MATERIALS. THE LIST OF INGREDIENTS BELOW ARE TYPICAL INGREDIENTS THOUGHT TO BE PRESENT IN THE SCRAP MATERIAL. THIS LIST INCLUDES CONTAMINANTS THAT MAY OR MAY NOT BE PRESENT. THE PERCENTAGES GIVEN VARY FROM SHIPMENT TO SHIPMENT AND MAY NOT BE ENTIRELY ACCURATE FOR A GIVEN SHIPMENT.

PROTECTIVE COATINGS, INCLUDING PAINTS, LUBRICANTS, CORROSION INHIBITORS, ETC., MAY HAVE BEEN APPLIED TO THE MATERIAL BEFORE IT CAME UNDER THE CONTROL OF THE RECYCLER. THESE COATINGS MAY CONTAIN HAZARDOUS MATERIALS. TYPICAL HAZARDOUS MATERIALS CONTAINED IN THESE COATINGS INCLUDE: LEAD, ZINC, CHROMIUM, AND CADMIUM. SOME ORGANIC MATERIALS MAY ALSO BE PRESENT. THE SUPPLIER (RECYCLER) MAY HAVE NO SPECIFIC KNOWLEDGE OF THE PARTICULAR CONTAMINANT. HOWEVER, IT IS ANTICIPATED THAT THE HAZARDOUS MATERIALS PRESENT IN THE COATINGS WOULD GENERALLY REPRESENT LESS THAN 0.1% OF THE TOTAL MATERIAL PRESENT. THE HEALTH HAZARDS PRESENTED BY THESE CONTAMINANTS WOULD PRODUCE THEIR GREATEST POTENTIAL FOR EXPOSURE DURING PROCESSES SUCH AS MELTING, CUTTING, WELDING. THESE PROCESSES COULD GENERATE METAL FUMES THAT MIGHT PRODUCE THE HEALTH HAZARDS IDENTIFIED IN SECTION VI OF THIS MSDS.

IT IS SUGGESTED THAT THE USER PROTECT EMPLOYEES BY UTILIZING ENGINEERING CONTROLS THAT REDUCE EXPOSURES TO ACCEPTABLE CONCENTRATIONS. WHERE ENGINEERING CONTROLS ARE NOT FEASIBLE, APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT SHOULD BE UTILIZED.

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME - CARBON STEEL SCRAP

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	PERCENT
IRON	7439-89-6	10 MG/M3	5 MG/M3		>96
MANGANESE	7439-96-5	1 MG/M3	1 MG/M3		<2
CARBON	7440-44-0				<2
ALUMINUM	7429-90-5	5 MG/M3	5 MG/M3		<0.1
ARSENIC	7440-38-2	.01 MG/M3	.2 MG/M3		<0.1
BORON	7440-42-8	10 MG/M3	10 MG/M3		<0.1
CALCIUM	7440-70-2	5 MG/M3	2 MG/M3		<0.1
CHROMIUM	7440-47-3	1 MG/M3	.5 MG/M3		<0.1
COBALT	7440-48-4	.05 MG/M3	.05 MG/M3		<0.1
COPPER	7440-50-8	.1 MG/M3	.2 MG/M3		<0.1
LEAD	7439-92-1	.05 MG/M3	.15 MG/M3		<0.1
MOLYBDENUM	7439-98-7	10 MG/M3	10 MG/M3		<0.1
NICKEL	7440-02-0	1 MG/M3	1 MG/M3		<0.1

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MATERIAL SAFETY DATA SHEET

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION - Cont'd

NIOBIUM	7440-03-1			<0.1
SILICON	7440-21-3	5 MG/M3	10 MG/M3	<0.1
TIN	7440-31-5	2 MG/M3	2 MG/GM3	<0.1
TITANIUM	7440-32-6			<0.1
VANADIUM	7440-62-2	.05 MG/M3	.05 MG/M3	<0.1
ZIRCONIUM	7440-67-7	5 MG/M3	5 MG/M3	<0.1

ADDITIONAL INFORMATION

ALUMINUM: PEL = 15 MG/M3 AS A TWA FOR TOTAL DUST
= 5 MG/M3 AS A TWA FOR RESPIRABLE FRACTION DUST
= 5 MG/M3 AS A TWA FOR WELDING FUMES
TLV = 10 MG/M3 AS A TWA FOR TOTAL DUST
= 5 MG/M3 AS A TWA FOR WELDING FUMES

SILICON: PEL = 10 MG/M3 AS A TWA FOR TOTAL DUST
= 5 MG/M3 AS A TWA FOR RESPIRABLE FRACTION

COPPER: PEL = 0.1 MG/M3 AS A TWA FOR FUME
= 1 MG/M3 AS A TWA FOR DUSTS AND MISTS
TLV = 0.2 MG/M3 AS A TWA FOR FUME
= 1 MG/M3 AS A TWA FOR DUSTS AND MISTS

IRON: PEL = 10 MG/M3 AS A TWA FOR TOTAL OXIDE FUME
TLV = 5 MG/M3 AS A TWA FOR TOTAL OXIDE FUME

MANGANESE: PEL = 1 MG/M3 AS A TWA FOR FUME
= 3 MG/M3 AS A CEILING FOR FUME
= 5 MG/M3 AS A CEILING FOR DUST
TLV = 1 MG/M3 AS A TWA FOR FUME
= 3 MG/M3 AS A CEILING FOR FUME
= 5 MG/M3 AS A TWA FOR DUST

VANADIUM: PEL = 0.05 MG/M3 AS A TWA FOR RESPIRABLE OXIDE DUST AND OXIDE FUME
TLV = 0.05 MG/M3 AS A TWA FOR RESPIRABLE OXIDE DUST AND OXIDE FUME

SECTION III - CHEMICAL CHARACTERISTICS

BOILING POINT	MELTING POINT	FREEZING POINT	SPECIFIC GRAVITY (H_2O=1)
3000 C/5400 F	1500 C/2800 F	NA	8

PERCENT VOLATILE by VOLUME	THEORETICAL VOC CONTENT (percent of WEIGHT)	WEIGHT PER GALLON	pH NA Conc: NA
NA	NA	NA	

VAPOR PRESSURE (mm of Hg)	VAPOR DENSITY (Air = 1)	DENSITY	EVAPORATION RATE BASIS ( )
NA	NA	NA	NA

SOLUBILITY IN WATER
INSOLUBLE

REACTIVITY IN WATER
MOLTEN METAL REACTS VIOLENTLY

APPEARANCE AND ODOR . . . . . : APPEARANCE IS DEPENDENT UPON SCRAP COMPOSITION, PROCESSING METHODS USED, AND PROTECTIVE COATINGS.

SECTION III - CHEMICAL CHARACTERISTICS - Cont'd

MOST OFTEN APPEARS AS A SILVER-WHITE METAL.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	METHOD	FLAMMABLE LIMITS IN AIR (%)	AUTOIGNITION TEMPERATURE
NA	NA	UPPER: NA LOWER: NA	NA

NFPA CODES:		HMIS CODES:	
HEALTH	1	HEALTH	1
FLAMMABILITY	0	FLAMMABILITY	0
REACTIVITY	0	REACTIVITY	0
OTHER	0	PROTECTION	G

EXTINGUISHER MEDIA: THIS SOLID MATERIAL IS NOT FLAMMABLE. MEDIA SHOULD BE SELECTED BASED UPON SURROUNDING MATERIALS. SMALL FIRES: DRY CHEMICAL, SODA ASH, LIME, SAND. LARGE FIRES: FLOODING QUANTITIES OF WATER.

SPECIAL FIRE FIGHTING PROCEDURES: IF MATERIAL IS IN MOLTEN OR DUST FORM, FLOOD FIRE AREA WITH WATER FROM A DISTANCE. DO NOT GET WATER INSIDE CONTAINER. MOVE CONTAINER FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRES, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN.

UNUSUAL FIRE AND EXPLOSION HAZARDS: MOLTEN METAL MAY REACT VIOLENTLY WITH WATER. FINE PARTICLES, DUST, OR FUMES MAY BE FLAMMABLE OR EXPLOSIVE.

SECTION V - REACTIVITY DATA

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

CONDITIONS TO AVOID (REGARDING STABILITY): AVOID DISPERSION OF DUST IN AIR, MAY BE FLAMMABLE OR EXPLOSIVE.

INCOMPATIBILITY (MATERIALS TO AVOID): CHLORINE: HOT IRON WIRE BURNS IN CHLORINE GAS. CHLORINE TRIFLUORIDE: REACTS WITH IRON WITH INCANDESCENCE. FLUORINE: POWDERED IRON REACTS WITH FLUORINE BELOW REDNESS WITH INCANDESCENCE. HYDROGEN PEROXIDE: VIOLENT DECOMPOSITION OF HYDROGEN PEROXIDE MAY BE CAUSED BY CONTACT WITH IRON. NITROGEN DIOXIDE: REDUCED IRON DECOMPOSES NITROGEN DIOXIDE AT ORDINARY TEMPERATURES WITH INCANDESCENCE. CALCIUM HYPOCHLORITE.

HAZARDOUS DECOMPOSITION PRODUCTS: MAY RELEASE METAL OXIDE FUMES BY THERMAL DECOMPOSITION.

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N)?: N

CONDITIONS TO AVOID (REGARDING POLYMERIZATION): NONE

SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY : INHALATION, INGESTION, EYES

SIGNS AND SYMPTOMS OF ACUTE OVEREXPOSURE : INHALATION - METAL FUME FEVER; MUSCULAR ACHES AND FEVER WITH CHILLS; SWEETISH OR METALLIC TASTE; DRYNESS OF THE THROAT; RESPIRATORY IRRITATION; HEADACHE; NAUSEA; VOMITING; ABDOMINAL PAIN; BRONCHOPNEUMONIA; DYSPNEA; LASSITUDE; MALAISE; FATIGUE; PERSPIRATION; LEUKOCYTOSIS. EYE CONTACT - IRRITATION; CONJUNCTIVITIS; CHOROIDITIS; RETINITIS. SKIN CONTACT - CUTS OR ABRASIONS. INGESTION - SHOCK AND METABOLIC ACIDOSIS; LIVER DAMAGE; RENAL FAILURE AND HEPATIC CIRRHOSIS; LETHARGY; EDEMA, AND DECREASED MOVEMENT OF THE EYES AND EYELIDS.

CHRONIC OVEREXPOSURE : INHALATION - BRONCHITIS; SIDEROSIS; NASOPHARYNGITIS; PNEUMONIA; MANGANISM; HEADACHE; ASTHENIA; SLEEP DISTURBANCES; ANOREXIA; PERSONALITY CHANGES WITH RESTLESSNESS; IRRITABILITY; IMPAIRMENT OF LIBIDO; UNCONTROLLABLE LAUGHTER OR CRYING; VISUAL HALLUCINATIONS; DOUBLE VISION; IMPAIRED HEARING; UNCONTROLLABLE IMPULSES; CONFUSION; EUPHORIA; SALIVATION; MUSCULAR WEAKNESS; RIGIDITY; CRAMPS; TREMORS OF THE HEAD, ARMS, OR HANDS; SLURRED SPEECH; IMPAIRED OR SPASTIC GAIT; ATAXIA AND MENTAL DETERIORATION. LEAD, NICKEL, ARSENIC AND CHROMIUM HAVE BEEN IMPLICATED AS POTENTIAL CARCINOGENS.

CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN

NATIONAL TOXICOLOGY PROGRAM	IARC MONOGRAPHS	OSHA
Y	Y	Y

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE : HEMOCHROMATOSIS, A GENETIC DISORDER RESULTING IN EXCESSIVE IRON ABSORPTION.

ADDITIONAL INFORMATION

IF PAINTS AND COATINGS HAVE BEEN APPLIED TO THIS MATERIAL, FUMES AND DUSTS PRODUCED BY MECHANICALLY OR THERMALLY DISTURBING THE COATING COULD RESULT IN ACUTE SYMPTOMS OF METAL FUME FEVER (I.E. CHILLS, FEVER, AND MUSCLE ACHES), COUGH, IRRITATION OF THE EYES, NOSE, AND UPPER RESPIRATORY TRACT, NAUSEA, VOMITING, AND DIARRHEA. CHRONIC OVEREXPOSURE TO THESE COATINGS COULD RESULT IN SERIOUS ILLNESSES ASSOCIATED WITH THE PARTICULAR CONTAMINANT. THESE MIGHT INCLUDE LUNG DAMAGE, KIDNEY DAMAGE, CENTRAL NERVOUS SYSTEM DAMAGE, AND, IN SOME INSTANCES, CANCER.

EMERGENCY AND FIRST AID PROCEDURES

1. INHALATION : REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION IMMEDIATELY.

2. EYE CONTACT : WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS. UNTIL NO EVIDENCE OF SUBSTANCE REMAINS.

SECTION VI - HEALTH HAZARDS - Cont'd

APPROXIMATELY 15-20 MINUTES. GET MEDICAL ATTENTION IMMEDIATELY.

3. SKIN CONTACT . . . . . : REMOVE CONTAMINATED CLOTHING AND SHOES. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF SUBSTANCE REMAINS. GET MEDICAL ATTENTION IF SIGNIFICANT IRRITATION RESULTS.

4. INGESTION. . . . . : TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS. . . . . : *
U.S. DOT ID . . . . . : NA
UN NUMBER . . . . . : NA
NA NUMBER. . . . . : NA

PRECAUTIONS TO BE TAKEN
IN HANDLING AND STORAGE. . . . . : MATERIAL OXIDIZES IN AIR TO FORM RUST AND CAN DEPLETE OXYGEN CONCENTRATIONS IN CONFINED SPACES RESULTING IN AN OXYGEN DEFICIENT ATMOSPHERE.

OTHER PRECAUTIONS . . . . . : AVOID DUST ACCUMULATION WHICH MAY BE FLAMMABLE OR EXPLOSIVE.

STEPS TO BE TAKEN IN CASE
MATERIAL IS RELEASED OR SPILLED : IF MATERIAL IS IN MOLTEN FORM, KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY. STAY UPWIND; KEEP OUT OF LOW AREAS. DO NOT TOUCH OR WALK THROUGH SPILLED MATERIAL; STOP LEAK IF IT CAN BE DONE WITHOUT RISK. DO NOT GET WATER INSIDE CONTAINER. SOLID MATERIAL SHOULD NOT PRESENT A HAZARD.

WASTE DISPOSAL METHODS. . . . . : IF NOT RECYCLED, DISPOSE OF MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF 40 CFR SUBTITLE C AND OTHER APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

ADDITIONAL INFORMATION

*D.O.T. TRANSPORTATION REGULATIONS

CERTAIN FORMS OF THIS MATERIAL (I.E. POWDERS, BORINGS, SHAVINGS, TURNINGS, CUTTINGS, DROSS, ETC.) MAY BE SUBJECT TO U.S. DOT HAZARDOUS MATERIAL SHIPPING REQUIREMENTS. CONSULT 49CFR PARTS 100 TO 177 SHIPPING SPECIFICATIONS FOR SPECIFIC FORMS OF THIS MATERIAL.

EPCRA REGULATIONS

THIS MATERIAL CONTAINS SUBSTANCES THAT MAY BE REPORTABLE UNDER THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT. REFER TO 40CFR 355, 370, 372 FOR GUIDANCE.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION . . . . . : SELECT AND USE RESPIRATORS ACCORDING TO OSHA REGULATIONS 29 CFR 1910.134. (SEE ADDITIONAL INFORMATION BELOW).

VENTILATION REQUIREMENTS. . . . . : LOCAL EXHAUST AND GENERAL VENTILATION.

LOCAL EXHAUST . . . . . : USE LOCAL EXHAUST DURING WELDING, CUTTING, OR MELTING TO AVOID EXPOSURE TO METAL OXIDE FUMES.

MECHANICAL . . . . . : GOOD GENERAL VENTILATION DURING HANDLING OF SOLID MATERIAL SHOULD BE USED TO CONTROL DUSTS GENERATED.

SPECIAL . . . . . : NA

OTHER. . . . . : NA

PROTECTIVE GLOVES . . . . . : GLOVES RECOMMENDED DURING HANDLING TO PREVENT CUTS AND ABRASIONS. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910, SUBPART I.

EYE PROTECTION . . . . . : SAFETY GLASSES OR GOGGLES. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910.133.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT . . . . . : SAFETY TOE FOOTWEAR. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910, SUBPART I.

WORK/HYGIENIC PRACTICES. . . . . : GOOD PERSONAL HYGIENE HABITS ARE SUGGESTED. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910.141 FOR GENERAL SANITATION REQUIREMENTS.

ADDITIONAL INFORMATION

CONCENTRATION LESS THAN	RESPIRATOR TYPE
10 X PEL	ANY AIR-PURIFYING HALF-MASK RESPIRATOR INCLUDING DISPOSABLE EQUIPPED WITH HEPA PARTICULATE FILTER.
	ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR EQUIPPED WITH HEPA PARTICULATE FILTER.
	ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A HALF-MASK AND OPERATED IN A DEMAND MODE.
50 X PEL	ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR EQUIPPED WITH A HIGH EFFICIENCY FILTER.
	ANY POWERED AIR-PURIFYING RESPIRATOR EQUIPPED WITH A TIGHT-FITTING FACEPIECE AND A HIGH EFFICIENCY FILTER.
	ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A FULL FACEPIECE AND OPERATED IN A DEMAND (NEGATIVE PRESSURE) MODE OR CONTINUOUS FLOW MODE.
	ANY SELF-CONTAINED RESPIRATOR EQUIPPED WITH A FULL

MATERIAL SAFETY DATA SHEET

SECTION I - GENERAL INFORMATION

SUPPLIER	SOUTHERN SCRAP COMPANY, INC.
EMERGENCY PHONE	904-438-3197
OTHER PHONE CALLS	904-438-3197
ADDRESS	2909 NORTH PALATOX STREET
CITY	PENSACOLA STATE : FL ZIP : 32582
MSDS PREPARED BY	RESOURCE CONSULTANTS, INC.
DATE PREPARED	05/01/91

ADDITIONAL INFORMATION

THIS DATA SHEET IS PREPARED AS A GUIDELINE FOR TYPICAL USES OF SCRAP MATERIALS. THE USER SHOULD BE AWARE THAT THE COMPOSITION OF THE SCRAP CAN VARY BASED UPON THE RAW MATERIALS, PROCESSES USED, AND PROTECTIVE COATINGS THAT MAY HAVE BEEN APPLIED TO THE ORIGINAL MATERIALS. THE LIST OF INGREDIENTS BELOW ARE TYPICAL INGREDIENTS THOUGHT TO BE PRESENT IN THE SCRAP MATERIAL. THIS LIST INCLUDES CONTAMINANTS THAT MAY OR MAY NOT BE PRESENT. THE PERCENTAGES GIVEN VARY FROM SHIPMENT TO SHIPMENT AND MAY NOT BE ENTIRELY ACCURATE FOR A GIVEN SHIPMENT.

PROTECTIVE COATINGS, INCLUDING PAINTS, LUBRICANTS, CORROSION INHIBITORS, ETC., MAY HAVE BEEN APPLIED TO THE MATERIAL BEFORE IT CAME UNDER THE CONTROL OF THE RECYCLER. THESE COATINGS MAY CONTAIN HAZARDOUS MATERIALS. TYPICAL HAZARDOUS MATERIALS CONTAINED IN THESE COATINGS INCLUDE: LEAD, ZINC, CHROMIUM, AND CADMIUM. SOME ORGANIC MATERIALS MAY ALSO BE PRESENT. THE SUPPLIER (RECYCLER) MAY HAVE NO SPECIFIC KNOWLEDGE OF THE PARTICULAR CONTAMINANT. HOWEVER, IT IS ANTICIPATED THAT THE HAZARDOUS MATERIALS PRESENT IN THE COATINGS WOULD GENERALLY REPRESENT LESS THAN 0.1% OF THE TOTAL MATERIAL PRESENT. THE HEALTH HAZARDS PRESENTED BY THESE CONTAMINANTS WOULD PRODUCE THEIR GREATEST POTENTIAL FOR EXPOSURE DURING PROCESSES SUCH AS MELTING, CUTTING, AND WELDING. THESE PROCESSES COULD GENERATE METAL FUME THAT MIGHT PRODUCE THE HEALTH HAZARDS IDENTIFIED IN SECTION VI OF THIS MSDS.

IT IS SUGGESTED THAT THE USER PROTECT EMPLOYEES BY UTILIZING THE ENGINEERING CONTROLS THAT REDUCE EXPOSURES TO ACCEPTABLE CONCENTRATIONS. WHERE ENGINEERING CONTROLS ARE NOT FEASIBLE, APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT SHOULD BE UTILIZED.

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

TRADE NAME CAST IRON SCRAP

INGREDIENT NAME	CAS	OSHA PEL	ACGIH TLV	OTHER	PERCENT
IRON	7439-89-6	10 MG/M3	5 MG/M3		>92
CARBON	7440-44-0				<5
SILICON	7440-21-3	5 MG/M3	10 MG/M3		<3
ALUMINUM	7429-90-5	5 MG/M3	5 MG/M3		<0.1
ARSENIC	7440-38-2	.01 MG/M3	0.2 MG/M3		<0.1
BORON	7440-42-8	10 MG/M3	10 MG/M3		<0.1
CALCIUM	7440-70-2	5 MG/M3	2 MG/M3		<0.1
CHROMIUM	7440-47-3	1 MG/M3	0.5 MG/M3		<0.1
COBALT	7440-48-4	.05 MG/M3	.05 MG/M3		<0.1
COPPER	7440-50-8	.1 MG/M3	.2 MG/M3		<0.1
LEAD	7439-92-1	.05 MG/M3	.15 MG/M3		<0.1
MOLYBDENUM	7439-98-7	10 MG/M3	10 MG/M3		<0.1

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MATERIAL SAFETY DATA SHEET

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION - Cont'd

NICKEL	7440-02-0	1 MG/M3	1 MG/M3	<0.1
NIOBIUM	7440-03-1			<0.1
TIN	7440-31-5	2 MG/M3,	2 MG/M3	<0.1
TITANIUM	7440-32-6			<0.1
VANADIUM	7440-62-2	.05 MG/M3	.05 MG/M3	<0.1
ZIRCONIUM	7440-67-7	5 MG/M3	5 MG/M3	<0.1

ADDITIONAL INFORMATION

ALUMINUM: PEL = 15 MG/M3 AS A TWA FOR TOTAL DUST
= 5 MG/M3 AS A TWA FOR RESPIRABLE FRACTION DUST
= 5 MG/M3 AS A TWA FOR WELDING FUMES
TLV = 10 MG/M3 AS A TWA FOR TOTAL DUST
= 5 MG/M3 AS A TWA FOR WELDING FUMES

SILICON: PEL = 10 MG/M3 AS A TWA FOR TOTAL DUST
= 5 MG/M3 AS A TWA FOR RESPIRABLE FRACTION

COPPER: PEL = 0.1 MG/M3 AS A TWA FOR FUME
= 1 MG/M3 AS A TWA FOR DUSTS AND MISTS
TLV = 0.2 MG/M3 AS A TWA FOR FUME
= 1 MG/M3 AS A TWA FOR DUSTS AND MISTS

IRON: PEL = 10 MG/M3 AS A TWA FOR TOTAL OXIDE FUME
TLV = 5 MG/M3 AS A TWA FOR TOTAL OXIDE FUME

VANADIUM: PEL = 0.05 MG/M3 AS A TWA FOR RESPIRABLE OXIDE DUST AND OXIDE FUME
TLV = 0.05 MG/M3 AS A TWA FOR RESPIRABLE OXIDE DUST AND OXIDE FUME

SECTION III - CHEMICAL CHARACTERISTICS

BOILING POINT	MELTING POINT	FREEZING POINT	SPECIFIC GRAVITY (H_2O=1)
3000 C/5400 F	1500 C/2800 F	NA	8

PERCENT VOLATILE by VOLUME	THEORETICAL VOC CONTENT (percent of WEIGHT)	WEIGHT PER GALLON	pH NA
NA	NA	NA	Conc: NA

VAPOR PRESSURE (mm of Hg)	VAPOR DENSITY (Air = 1)	DENSITY	EVAPORATION RATE BASIS ( )
NA	NA	NA	NA

SOLUBILITY IN WATER
INSOLUBLE

REACTIVITY IN WATER
MOLTEN METAL REACTS VIOLENTLY

APPEARANCE AND ODOR .....: APPEARANCE IS DEPENDENT UPON SCRAP COMPOSITION, PROCESSING METHODS USED, AND PROTECTIVE COATINGS. MOST OFTEN APPEARS AS A SILVER-WHITE METAL.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	METHOD	FLAMMABLE LIMITS IN AIR (%)	AUTOIGNITION TEMPERATURE
NA	NA	UPPER: NA LOWER: NA	NA

NFPA CODES: HEALTH . . . . . : 1
FLAMMABILITY . . . . . : 0
REACTIVITY . . . . . : 0
OTHER . . . . . : 0

HMIS CODES: HEALTH . . . . . : 1
FLAMMABILITY. . . . . : 0
REACTIVITY . . . . . : 0
PROTECTION. . . . . : G

EXTINGUISHER MEDIA. . . . . : THIS SOLID MATERIAL IS NOT FLAMMABLE. MEDIA SHOULD BE SELECTED BASED UPON SURROUNDING MATERIALS. SMALL FIRES: DRY CHEMICAL, SODA ASH, LIME, SAND. LARGE FIRES: FLOODING QUANTITIES OF WATER.

SPECIAL FIRE FIGHTING PROCEDURES . . . . : IF MATERIAL IS IN MOLTEN OR DUST FORM, FLOOD FIRE AREA WITH WATER FROM A DISTANCE. DO NOT GET WATER INSIDE CONTAINER. MOVE CONTAINER FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRES, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN.

UNUSUAL FIRE AND EXPLOSION HAZARDS . : MOLTEN METAL MAY REACT VIOLENTLY WITH WATER. FINE PARTICLES, DUST, OR FUMES MAY BE FLAMMABLE OR EXPLOSIVE.

SECTION V - REACTIVITY DATA

IS THIS CHEMICAL STABLE UNDER NORMAL CONDITIONS OF HANDLING/STORAGE (Y/N)? Y

CONDITIONS TO AVOID (REGARDING STABILITY) . . . . . : AVOID DISPERSION OF DUST IN AIR; MAY BE FLAMMABLE OR EXPLOSIVE.

INCOMPATIBILITY (MATERIALS TO AVOID). . . . . : CHLORINE: HOT IRON WIRE BURNS IN CHLORINE GAS. CHLORINE TRIFLUORIDE: REACTS WITH IRON WITH INCANDESCENCE. FLUORINE: POWDERED IRON REACTS WITH FLUORINE BELOW REDNESS WITH INCANDESCENCE. HYDROGEN PEROXIDE: VIOLENT DECOMPOSITION OF HYDROGEN PEROXIDE MAY BE CAUSED BY CONTACT WITH IRON. NITROGEN DIOXIDE: REDUCED IRON DECOMPOSES NITROGEN DIOXIDE AT ORDINARY TEMPERATURES WITH INCANDESCENCE. CALCIUM HYPOCHLORITE.

HAZARDOUS DECOMPOSITION PRODUCTS . . . . . : MAY RELEASE METAL OXIDE FUMES BY THERMAL DECOMPOSITION.

HAZARDOUS POLYMERIZATION POSSIBLE (Y/N)? . . . . . : N

CONDITIONS TO AVOID (REGARDING POLYMERIZATION) . . : NONE

SECTION VI - HEALTH HAZARDS

ROUTES OF ENTRY ..... : INHALATION, INGESTION, EYES, SKIN CONTACT

SIGNS AND SYMPTOMS OF
ACUTE OVEREXPOSURE ..... : INHALATION - METAL FUME FEVER; MUSCULAR ACHES AND FEVER WITH CHILLS; SWEETISH OR METALLIC TASTE; DRYNESS OF THE THROAT; RESPIRATORY IRRITATION; HEADACHE; NAUSEA; VOMITING; ABDOMINAL PAIN; BRONCHOPNEUMONIA; DYSPNEA; LASSITUDE; MALAISE; FATIGUE; PERSPIRATION; LEUKOCYTOSIS. EYE CONTACT - IRRITATION; CONJUNCTIVITIS; CHOROIDITIS; RETINITIS. SKIN CONTACT - CUTS OR ABRASIONS. INGESTION - SHOCK AND METABOLIC ACIDOSIS; LIVER DAMAGE; RENAL FAILURE AND HEPATIC CIRRHOSIS; LETHARGY; EDEMA, AND DECREASED MOVEMENT OF THE EYES AND EYE LIDS.

CHRONIC OVEREXPOSURE ..... : INHALATION - BRONCHITIS; SIDEROSIS; NASOPHARYNGITIS; PNEUMONIA; MANGANISM; HEADACHE; ASTHENIA. LEAD, NICKEL, ARSENIC, AND CHROMIUM HAVE BEEN IMPLICATED AS POTENTIAL CARCINOGENS.

CHEMICAL LISTED AS A CARCINOGEN OR POTENTIAL CARCINOGEN

NATIONAL TOXICOLOGY PROGRAM	IARC MONOGRAPHS	OSHA
Y	Y	Y

MEDICAL CONDITIONS GENERALLY
AGGRAVATED BY EXPOSURE ..... : HEMOCHROMATOSIS, A GENETIC DISORDER RESULTING IN EXCESSIVE IRON ABSORPTION.

ADDITIONAL INFORMATION

IF PAINTS AND COATINGS HAVE BEEN APPLIED TO THIS MATERIAL, FUMES AND DUSTS PRODUCED BY MECHANICALLY OR THERMALLY DISTURBING THE COATING COULD RESULT IN ACUTE SYMPTOMS OF METAL FUME FEVER (I.E. CHILLS, FEVER, AND MUSCLE ACHES), COUGH, IRRITATION OF THE EYES, NOSE, AND UPPER RESPIRATORY TRACT, NAUSEA, VOMITING, AND DIARRHEA. CHRONIC OVEREXPOSURE TO THESE COATINGS COULD RESULT IN SERIOUS ILLNESSES ASSOCIATED WITH THE PARTICULAR CONTAMINANT. THESE MIGHT INCLUDE LUNG DAMAGE, KIDNEY DAMAGE, CENTRAL NERVOUS SYSTEM DAMAGE, AND, IN SOME INSTANCES, CANCER.

EMERGENCY AND FIRST AID PROCEDURES

1. INHALATION ..... : REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. KEEP AFFECTED PERSON WARM AND AT REST. GET MEDICAL ATTENTION IMMEDIATELY.

2. EYE CONTACT ..... : WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF SUBSTANCE REMAINS, APPROXIMATELY 15-20 MINUTES. GET MEDICAL ATTENTION IMMEDIATELY.

3. SKIN CONTACT ..... : REMOVE CONTAMINATED CLOTHING AND SHOES. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF SUBSTANCE REMAINS. GET MEDICAL ATTENTION IF SIGNIFICANT IRRITATION RESULTS.

SECTION VI - HEALTH HAZARDS - Cont'd

4. INGESTION.....: TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

HAZARD CLASS.....: *
U.S. DOT ID .....: NA
UN NUMBER .....: NA
NA NUMBER.....: NA

PRECAUTIONS TO BE TAKEN
IN HANDLING AND STORAGE.....: MATERIAL OXIDIZES IN AIR TO FORM RUST AND CAN DEPLETE OXYGEN CONCENTRATIONS IN CONFINED SPACES RESULTING IN AN OXYGEN DEFICIENT ATMOSPHERE.

OTHER PRECAUTIONS .....: AVOID DUST ACCUMULATION WHICH MAY BE FLAMMABLE OR EXPLOSIVE.

STEPS TO BE TAKEN IN CASE
MATERIAL IS RELEASED OR SPILLED : IF MATERIAL IS IN MOLTEN FORM, KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. STAY UPWIND; KEEP OUT OF LOW AREAS. DO NOT TOUCH OR WALK THROUGH SPILLED MATERIAL; STOP LEAK IF IT CAN BE DONE WITHOUT RISK. DO NOT GET WATER INSIDE CONTAINER. SOLID MATERIAL SHOULD NOT PRESENT A HAZARD.

WASTE DISPOSAL METHODS.....: IF NOT RECYCLED, DISPOSE OF MATERIAL IN ACCORDANCE WITH THE REQUIREMENTS OF 40 CFR SUBTITLE C AND OTHER APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.

ADDITIONAL INFORMATION

*D.O.T. TRANSPORTATION REGULATIONS

CERTAIN FORMS OF THIS MATERIAL (I.E. POWDERS, BORINGS, SHAVINGS, TURNINGS, CUTTINGS, DROSS, ETC.) MAY BE SUBJECT TO U.S. DOT HAZARDOUS MATERIALS SHIPPING REQUIREMENTS. CONSULT 49CFR PARTS 100 TO 177 SHIPPING SPECIFICATIONS FOR SPECIFIC FORMS OF THIS MATERIAL.

EPCRA REGULATIONS

THIS MATERIAL CONTAINS SUBSTANCES THAT MAY BE REPORTABLE UNDER THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT. REFER TO 40CFR 355, 370, 372 FOR GUIDANCE.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION .....: SELECT AND USE RESPIRATORS ACCORDING TO OSHA REGULATIONS 29 CFR 1910.134. (SEE ADDITIONAL INFORMATION BELOW).

VENTILATION REQUIREMENTS.....: LOCAL EXHAUST AND GENERAL VENTILATION.

LOCAL EXHAUST .....: USE LOCAL EXHAUST DURING WELDING, CUTTING, OR MELTING TO AVOID EXPOSURE TO METAL OXIDE FUMES.

SECTION VIII - CONTROL MEASURES - Cont'd

MECHANICAL.....: GOOD GENERAL VENTILATION DURING HANDLING OF SOLID MATERIAL SHOULD BE USED TO CONTROL DUSTS GENERATED.

SPECIAL.....: NA

OTHER.....: NA

PROTECTIVE GLOVES.....: GLOVES RECOMMENDED DURING HANDLING TO PREVENT CUTS AND ABRASIONS. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910, SUBPART I.

EYE PROTECTION.....: SAFETY GLASSES OR GOGGLES. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910.133.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT.....: SAFETY TOE FOOTWEAR. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910, SUBPART I.

WORK/HYGIENIC PRACTICES.....: GOOD PERSONAL HYGIENE HABITS ARE SUGGESTED. REFER TO OSHA REQUIREMENTS IN 29 CFR 1910.141 FOR GENERAL SANITATION REQUIREMENTS.

ADDITIONAL INFORMATION

CONCENTRATION LESS THAN	RESPIRATOR TYPE
10 X PEL	ANY AIR-PURIFYING HALF-MASK RESPIRATOR INCLUDING DISPOSABLE EQUIPPED WITH HEPA PARTICULATE FILTER. ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR EQUIPPED WITH HEPA PARTICULATE FILTER. ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A HALF-MASK AND OPERATED IN A DEMAND MODE.
50 X PEL	ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR EQUIPPED WITH A HIGH EFFICIENCY FILTER. ANY POWERED AIR-PURIFYING RESPIRATOR EQUIPPED WITH A TIGHT-FITTING FACEPIECE AND A HIGH EFFICIENCY FILTER. ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A FULL FACEPIECE AND OPERATED IN A DEMAND (NEGATIVE PRESSURE) MODE OR CONTINUOUS FLOW MODE. ANY SELF-CONTAINED RESPIRATOR EQUIPPED WITH A FULL FACEPIECE AND OPERATED IN A DEMAND (NEGATIVE PRESSURE) MODE.
1,000 X PEL	ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A HALF-MASK AND OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.
2,000 X PEL	ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A FULL

SECTION VIII - CONTROL MEASURES - Cont'd

	FACEPIECE AND OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.
10,000 X PEL	ANY SELF-CONTAINED RESPIRATOR EQUIPPED WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE. ANY SUPPLIED-AIR RESPIRATOR EQUIPPED WITH A FULL FACEPIECE OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

Material Safety Data Sheet

FeSi

EFFECTIVE DATE: MAY 1994
Replaces: February 1994

EMERGENCY TELEPHONE NUMBERS

United States		Canada	
Chemtrec (Emergency Only)	(800) 424-9300 (716) 286-7548	CANUTEC (Emergency Only)	(613) 996-6666
National Response Center (Spills)	(800) 424-8802		

SECTION 1 PRODUCT IDENTIFICATION

PRODUCT FAMILY OR NAME:

Ferrosilicon Alloys

FORMULA: FeSi, Fe_2Si, Fe_5Si_3, $FeSi_2$

SYNONYMS:

PRODUCTS COVERED: 50 to 90% Ferrosilicon, including: Superseed® Inoculant, ReSeed™ Inoculant, Supersead® 50 Inoculant, Vaxon® Inoculant, Vaxon® D Inoculant, Manganese-Silicon, Silicon Briquets, Renod™ Inoculant, Foundrisil™ Inoculant, Ferroaluminum-Silicon, Ferrosilicon Briquets, Gransil™, Minsil™, Alinoc™, and all other 50 to 90% Ferrosilicon-based alloys and inoculants as per specifications.

SECTION 2 PHYSICAL DATA

APPEARANCE AND ODOR:
Silvery metallic. Ferrosilicon alloys are 100% solid. May be in powdered form (30 M x D or finer) or granular form. No odor.

MELTING POINT RANGE (Approx.):
1200 °C to 1250 °C

SPECIFIC GRAVITY (Approx.): 2 to 5

SOLUBILITY:
Insoluble in water.

REACTIVITY IN WATER:
Ferrosilicon alloys may react with moisture to form toxic or explosive gases (see section 6).

OTHER:
Briquet binder is portland cement.

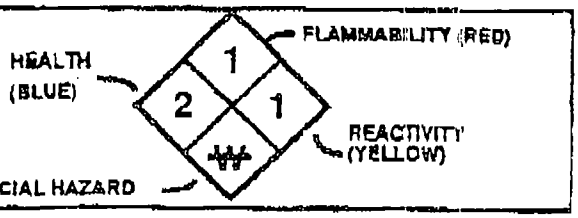
SECTION 3 INGREDIENTS AND EXPOSURE LEVEL DATA

SIGNIFICANT INGREDIENTS:	CAS* NUMBER	% BY WEIGHT
Silicon	7440-21-3	48 to 90
Iron	7439-89-6	10 to 50
Chromium	7440-47-3	<0.5
Nickel	7440-02-0	<0.5
Aluminum	7429-90-5	0.1 to 10
Manganese	7439-96-5	0 to 6
Calcium	7440-70-2	<2
Barium**	7440-39-3	<2

* Chemical Abstracts Service **Foundrisil™ Only

PEL / TLV: No exposure levels exist for ferrosilicon alloys; exposure levels may be applicable to constituent elements.
Silicon: 15 mg/m^3 (OSHA); 10 mg/m^3 (ACGIH*)
Iron Oxide Fume: 10 mg/m^3 (OSHA); 5 mg/m^3 (ACGIH*)
Chromium: 1 mg/m^3 (OSHA); 0.5 mg/m^3 (ACGIH*)
Nickel: 1 mg/m^3 (OSHA), 0.1 mg/m^3 (ACGIH*)
Aluminum: 15 mg/m^3 (OSHA), 10 mg/m^3 (ACGIH*)
Manganese: Dust-Ceiling, 5 mg/m^3 (OSHA); Dust-TWA, 5 mg/m^3(ACGIH*); Fume, 1 mg/m^3 (ACGIH*)
Calcium: 5 mg/m^3 (OSHA), 2 mg/m^3 (ACGIH*)
Barium: 0.5 mg/m^3 (OSHA), 0.5 mg/m^3 (ACGIH*)
* American Conference of Governmental Industrial Hygienists

NFPA DESIGNATION
DEGREE OF HAZARD
4 = EXTREME
3 = HIGH
2 = MODERATE
1 = SLIGHT
0 = INSIGNIFICANT



SECTION 4 FIRE AND EXPLOSION HAZARD DATA

COMBUSTIBILITY: Lump material is not combustible. When suspended in air, dusts of ferrosilicon alloys can be readily ignited, propagate flame, and generate some pressure or explode. The degree of combustibility in air is dependent upon particle size, oxide coating, and quality of dispersion. The hazard increases with particle fineness. Avoid generating sparks or ignition sources in areas of high airborne dust levels or in areas with accumulated dust. Thoroughly clean areas or equipment to be maintained prior to dust disturbing or ignition source generation activities.

AUTO IGNITION TEMPERATURE (dust layer): Approximately 1472 ^{o}F (800 ^{o}C).

LOWER EXPLOSIVE LEVEL: 800 g/m^3.

COMBUSTION PRODUCTS: Oxides of constituent elements.

MINIMUM IGNITION ENERGY: 280 millijoules.

EXTINGUISHING MEDIA: Class D fire: Use dry powder, dry sand, or CO_2 to smother fire. Fire may also be isolated and allowed to burn itself out. Do not disturb burning metal while extinguishing the fire.

SECTION 5 HEALTH HAZARD DATA

FIRST AID PROCEDURES:

Inhalation: Remove individual from dusty area to fresh air. Support breathing as required.

Skin Contact: Wash affected area with mild soap and water.

Ingestion: Unlikely to occur. If large amounts are ingested, contact a physician.

Eye Contact: Flush with water for at least 15 minutes to ensure no particles remain in the eye. Consult a physician if irritation exists.

NOTE: After first aid, seek prompt, professional medical attention.

Primary Route(s) of Entry: Inhalation.

Target Organ(s): Lungs

Medical Condition(s) Aggravated by Exposure: Exposure may aggravate pre-existing chronic obstructive lung disease.

EFFECTS OF OVEREXPOSURE:

Acute: Ferrosilicon alloys are of low toxicity in lump form. High concentrations of dust will cause some irritation to the eyes, nose, and throat.

Chronic: Similar to acute. No progressive residual injury is expected. Inhalation of ferrosilicon alloys dust may cause benign pneumoconiosis similar to that caused by inhalation of a nuisance dust. Excessive inhalation of iron dust may cause mottling of the lungs (siderosis), a benign pneumoconiosis. Manganese poisoning (Manganism) can occur from excessive intake of manganese via inhalation and ingestion. The most notable effects of manganese poisoning are central nervous system disorders which may occur as early as 6 months after initial exposure. Symptoms, which resemble Parkinson Disease, include apathy, drowsiness, sleep disturbance, muscular twitching, spastic gait, and emotion control problems. Permanent injury may occur if chronic manganese poisoning is not treated. These materials are not known to be reproductive toxins, teratogens, or mutagens.

Carcinogenicity: Ferrosilicon alloys are not listed by NTP, IARC, or OSHA as carcinogenic. For chromium and nickel, see Section 9.

LC_{50} and LD_{50} data are not available.

SECTION 6 REACTIVITY DATA

STABILITY: Ferrosilicon alloys are stable in all sizes. Products do not polymerize.	**CONDITIONS TO AVOID:** Avoid prolonged contact with moisture. To reduce the potential for explosion, avoid adding wet product to molten materials. Ventilation should be supplied for areas of extended storage. Avoid generation of airborne dusts. Avoid generation of sparks or other ignition sources in the presence of dust.
MATERIALS TO AVOID: Contact with moisture and/or acids may liberate phosphine, hydrogen, arsine, silanes, and other toxic or explosive gases.	**HAZARDOUS REACTION/DECOMPOSITION PRODUCTS:** Phosphine, arsine, and hydrogen may evolve due to excessive handling, the presence of moisture, or the disintegration of the alloy. Phosphine and arsine are highly toxic gases which if allowed to concentrate can cause serious health problems. Hydrogen is a very explosive gas, which, if allowed to concentrate above the LEL of 4.1% by volume, may explode. Contact with acids (pH<7) may result in the generation of silane (SiH_4), a spontaneously combustible gas.

SECTION 7 SPILL, LEAK, OR DISPOSAL INFORMATION

STEPS TO BE TAKEN IN CASE OF SPILLS:
Cleanup personnel should wear appropriate respiratory protective equipment. Avoid the use of compressed air to maneuver spills or leaks of fine material. Fine material should be swept up or vacuumed using explosion-proof equipment. Keep dry material and wet material separated. Compliance is required with OSHA regulation 29 CFR 1910.120.

WASTE DISPOSAL OR REPACK INFORMATION:
Avoid repacking wet material in sealed containers. Dispose of in accordance with applicable federal, state, and local regulations. Ferrosilicon alloys are not listed RCRA Hazardous Wastes (40 CFR 261). Chromium is an Appendix VIII constituent.

SECTION 8 PER DRAWING REVT EMPLOYEE PROTECTION INFORMATION

OSHA Standard 29 CFR 1910.1200 and WHMIS require that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program. It is your legal duty to make all information on this data sheet available to your employees.

RESPIRATORY PROTECTION:
In enclosed areas with excessive dusting and minimal ventilation, a self-contained breathing apparatus is required for entry. In well-ventilated, open areas, the use of a respirator equipped with combination organic vapor/acid gas/HEPA cartridges (NIOSH 23C/21C) and dust/mist prefilter is recommended. Compliance is required with OSHA respirator regulations, 29 CFR 1910.134 (USA) and CSA Standard Z94.4-M1982 (Canada).

VENTILATION:
Control exposure to below 5 mg/m^3 ceiling as iron oxide and manganese, 10 mg/m^3 as silicon, 0.05 mg/m^3 as arsine, and 0.3 mg/m^3 as phosphine. Ventilate areas of extended storage. Duct velocities should be greater than 4000 feet per minute.

EYE/FACE PROTECTION:
Subject to safety rules. Recommend wearing safety goggles. Contact lenses pose a special problem; soft lenses may absorb and all lenses may concentrate irritants. Compliance is required with OSHA eye and face regulations, 29 CFR 1910.133.

OTHER CLOTHING & EQUIPMENT:
Protective gloves are recommended during handling. Lump material may have sharp edges. As with other metal dusts, avoid contamination of work clothing.

SECTION 9 ADDITIONAL INFORMATION

HANDLING/STORAGE:
Avoid generation of airborne dusts. Keep material dry when storing for long periods of time. To reduce the potential for explosion, avoid adding wet product to molten metal.

MILLING:
Inert atmosphere is required when sizing to minus 200 mesh with more than 50% minus 325 mesh. Grinding wet material may be hazardous due to the possible evolution of hydrogen, a highly explosive gas.

TRANSPORTATION:

U.S. DOT 49 CFR 172.101
Proper Shipping Name: Ferrosilicon
I.D. Number (PIN): UN 1408
Hazard Class: 4.3
Labeling: Dangerous When Wet

LABELING: (Does not apply to briquets.)
Dangerous When Wet labeling is required in the U.S. for ferrosilicon alloys containing between 30 to 90% Si (29 CFR 1910.1200). WHMIS Class B Division 4 Flammable Solid and Class D Division 2-B Toxic Material labels are required in Canada.

TOXIC SUBSTANCES CONTROL ACT-Section 8(e):

SUPPLIER NOTIFICATION UNDER SARA SECTION 313:
The product(s) covered by this data sheet may contain listed Section 313 chemicals in greater than de minimis quantities: Chromium (CAS No. 7440-47-3), Nickel (CAS No. 7440-02-0), and Manganese (CAS No. 7439-96-5). We are required to notify you of the presence of these chemicals under the Emergency Planning and Community Right to Know Act of 1986. If you are unsure if you must report or require more information, call the EPA "Hot Line" at (800) 535-0202.

HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) NOTIFICATION:

These alloys contain chromium and nickel in the metallic state. The International Agency for Research on Cancer has determined that chromium and certain chromium compounds are "causally associated with cancer in humans" but "the compounds responsible for the carcinogenic effect in humans cannot be specified". This requires that chromium in all forms be identified as carcinogenic under OSHA. The American Conference of Governmental Industrial Hygienists has reviewed the available data and concluded that only specific water insoluble hexavalent chromium compounds are carcinogenic to humans. NIOSH/OSHA "Guide for Chemical Hazards" conclusions are consistent with ACGIH; however, NIOSH recommended that all hexavalent chromium compounds be considered carcinogenic until proven otherwise.	No recommendations have been made by ACGIH or NIOSH to include chromium metal or chromous and chromic salts as carcinogens. The International Agency for Research on Cancer has determined that nickel and certain nickel compounds are "probably carcinogenic to humans" but the nickel compounds responsible for the effect have not been specified. This requires that nickel in all forms be identified as carcinogenic under OSHA. The American Conference of Governmental Industrial Hygienists has reviewed the available data and concluded that not all forms of nickel are carcinogenic. The American Industrial Hygiene Association has also concluded that there is no epidemiological evidence of increased risk of respiratory cancer in the refining of oxide ores or "in any other specifically nickel occupational exposures".

DISCLAIMER OF WARRANTY:

All information, recommendations, and suggestions appearing herein concerning our product are based upon data believed to be reliable. However it is the user's responsibility to determine the safety, toxicity, and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied is made by Company as to the effects of such use, the results to be obtained, or the safety and toxicity of the product, nor does Company assume any liability arising out of use by others of the product referred to herein.

Prepared by the Safety, Health, and Environmental Affairs department.

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GRAPH-HEX 18

CHEMICAL NAME

1 **HEALTH**

0 **FLAMMABILITY**

0

✓ **PROTECTIVE EQUIPMENT**

N95 3M 8210 OR EQUAL

HAZARD RATING

4 EXTREME	1 SLIGHT
3 SERIOUS	0 MINIMAL
2 MODERATE	

Larpen Metallurgical Service
1111 Western Drive
Hartford, WI 53027
PH. (262) 673-9709 Fax (262) 673-9710

MATERIAL SAFETY DATA SHEET

PRODUCT: GRAPH-HEX 18

September 1, 2003

I. Identification

Chemical Family: Carbon
D.O.T. Hazard Classification: Inert
NFPA Hazard Rating: 0-0-0

Emergency Phone Number: Chemtrec (800) 424-9300

II. Ingredients (Inert and Hazardous)

Ingredients/Composition	C.A.S.#	Percent	PEL	TLV	Carcinogen (Y/N)
Synthetic Graphite	7782-42-5	>96	15mg/M^3 5mg/M^3 Resp Dust	10mg/M^3 5mg/M^3 Resp Dust	N

III. Physical Data

Boiling Point: None
Melting Point: None
Evaporation Rate: 0
Solubility In Water: Insoluble
Appearance: Black, granular

Volatile By Weight: <0.01%
Specific Gravity: Real Density: 2.1 g/cc
Bulk Density: 50 lbs./ft.3
Vapor Pressure: Negligible at room temp.
Vapor Density: Negligible at room temp.
Odor: None

IV. Fire And Explosion Data

Flash Point: None
Lower/Upper Explosive Limit: None
Extinguishing Media: Water, CO2, sand
Extinguishing Media to Avoid: None
Hazardous Decomposition Products: In normal combustion, CO2 and CO
Special Fire Fighting Procedures: Self-contained breathing apparatus, as normal
Unusual Fire and Explosion Data: Graphite dust is not normally explosive, but it may weakly contribute if the event is initiated by another explosive dust or gas. Graphite is electrically conductive; dust accumulations may cause electrical short circuits or other electrical malfunctions.

V. Health Hazard Data

Permissible Exposure Limit (PEL): See Section II
Primary Route(s) of Entry: None
Effects of Overexposure: Inhalation of dusts

V. **Health Hazard Data (Cont.)**

Eyes: At high dust level, mechanical irritation.
Breathing: Prolonged and repeated over-exposure may lead to benign pneumoconiosis.
Swallowing or Skin: None
First Aid:
If In Eyes: Flush with water if irritation occurs.
If on Skin, Breathed or Swallowed: none necessary.
Medical Conditions Recognized As Possibly Aggravated By Exposure: Individuals with pre-existing chronic respiratory impairments or with serum antitrypain deficiency may be at increased risk of pneumoconoisis.

VI. **Reactivity Data**

Hazardous Polymerization: Will not occur
Stability: Stable
Incompatibility (Materials to Avoid): None Known

VII. **Spill or Leak Procedures**

Steps to be Taken in Case Material Leaked or Spilled: Use normal housekeeping practice.
Waste Disposal Method: Bury in approved landfill.
DISPOSALMUST BE IN COMPLIANCE WITH FEDERAL, STATE & LOCAL LAWS & REGULATIONS.

VIII. **Protective Equipment to be Used**

Respiratory Protection: Respirator used if exposure exceeds PEL
Ventilation: Local ventilation recommended if dust level exceeds PEL limit.
Protective Gloves: Not required.
Eye Protection: If airborne particles are produced.
Other Protective Equipment: None required.

IX. **Special Precautions or Other Comments**

None.

X. **References**

ACGIH Threshold Limit Values for Chemical Substances, current edition
NIOSH Occupational Health Guidelines
OSHA 29 CFR 1910.1000

This material safety data sheet is provided solely for your information, consideration and investigation. Any us of this data and information must be determined by the user to be in compliance with applicable federal, state, and local laws and regulations.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: GRAFLOK STR
Internal ID: 5782

MSDS No: PREMIER / 5782
Revision: 11/90
Date: November, 1990

National Paint and Coatings Association

Hazardous Material Identification System

HEALTH HAZARD	2*
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	0

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: GRAFLOK STR

Description: GRAFLOK* STR is an air-setting, carbon refractory trowelling mix.

CAS: mixture

*GRAFLOK is a registered trademark of Premier Refractories and Chemicals, Inc.

Manufacturer: PREMIER REFRACTORIES AND CHEMICALS **Phone:** 215/337-1100

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	CAS Number:	Percent:	Exposure Limits:
Silica Sand (Quartz)	14808-60-7	25-50	Total Dust 8HrTWA = 30 mg/m^3 divided by (%SiO_2 + 2). Respirable=0.10mg/m^3
Coke	65996-77-2	5-25	See TLV for Mixture
Clay	Non-assigned	5-25	See TLV for Mixture
Water	7732-18-5	5-25	See TLV for Mixture
Sodium Silicate	1344-09-8	5-25	See TLV for Mixture

The TLV:TWA calculated for this product is 0.2 mg/m^3 respirable dust.The TLV:TWA for total dust is 0.6 mg/m^3.

The TLV:TWA for the product is calculated using the general formula given in ACGIH Adopted Appendix C, Subpart A2, Threshold Limit Values for Mixtures of Mineral Dust.

Some of the above ingredients may be integral mineralogical constituents contained in the matrix of the raw materials.

Please be aware that the product in its current state is moist and dust free.

Material Safety Data Sheet

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SECTION III. PHYSICAL DATA

Appearance & Odor: Light gray mixture of fine material in a trowelable mortar consistency. No detectable odor.

Boiling point: Not Applicable
Vapor pressure: Not Applicable
Water solubility (%): 1-3
Vapor density (air=1): Not Applicable
pH: 10-11.5 (10% Aqueous Slurry)
Evaporation rate: Not Applicable
Specific gravity (H_2O=1): 1.5 (94 lbs/ft^3)
Melting point: >2000°F
% volatile by volume: 8-10 (H_2O)

SECTION IV. FIRE AND EXPLOSION DATA

NFPA Fire Hazard Symbol Codes: Flammability: 0 **Health:** 0 **Reactivity:** 0 **Special:** 0

Extinguishing Media: This refractory product is non-combustible. Use extinguishing media appropriate to the surrounding area.

Unusual fire or explosion hazards: None

Special fire-fighting procedures: None

SECTION V. REACTIVITY DATA

Material is stable under all normal conditions of storage. Hazardous polymerization will not occur .

Chemical incompatibilities: Product will react with acids generating heat and steam.

Hazardous decomposition Products: None

This material is stable under normal conditions storage. It does contain an air-setting bond. Store in sealed containers.

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: The alkali (sodium silicate) component in this product is caustic to the eyes and can cause irritation to the skin on repeated or prolonged contact. Some of the Health Hazard Information applies to dried material and any dust that may result therefrom. Dust from the product contains crystalline silica and a dust mask must be used where the TLV is exceeded.

Medical conditions which may be aggravated by contact: Pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

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HEALTH HAZARD INFORMATION continued from page 2

Primary entry route(s): Inhalation

Acute effects: Eye and skin irritant. Transitory upper respiratory physical irritation.

Chronic effect(s): Excessive inhalation above (PEL) of crystalline silica (free silica) over long periods of time may cause a disabling lung disease (silicosis) which reduces breathing capacity, and lead to increased susceptibility to other lung disease. On the basis of initial experimental tests in animals and limited epidemilogical studies in human populations, the International Agency for Research on Cancer (IARC) has concluded that there is limited evidence for the carcinogenicity of crystalline silica to humans. IARC has classified crystalline silica as a "Probable Human Carcinogen", Group 2A. IARC has convened a special task force to review the carcinogenicity of silica.

Signs & symptoms of overexposure:

Eye contact: Caustic irritation and inflammation.

Skin contact: Irritation from repeated or prolonged contact.

Inhalation: Upper respiratory irritation.

First aid:

Eye contact: Flush eyes thoroughly with water for 15 minutes. If irritation persists, seek medical attention.

Skin contact: Wash with mild soap and water,

Inhalation: Remove to fresh air.

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Spill / Leak procedures: Carefully scoop up material into a suitable container. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

Waste management / Disposal: Product is non-biodegradable, and does not possess characteristics of a hazardous waste. Dispose of in accordance with local, state, and federal regulations.

MSDS 5782 continues on page 4

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SECTION VIII. SPECIAL PROTECTION INFORMATION

Personal protective equipment:

Other: The use of eye protection, gloves, and long sleeve clothing is recommended.

Workplace considerations:

Ventilation: Provide adequate general ventilation and local ventilation to control mist and/or dust levels to no more than the TLV.

SECTION IX. SPECIAL PRECAUTIONS

Other precautions:

SARA TITLE III INFORMATION

This product does not contain any substances reportable under SARA TITLE III Sections 302, 304, and 313.

All substances contained in this product are listed on Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

REMOVAL AFTER SERVICE PRECAUTIONS

Because of the possible presence of crystalline silica in used refractory debris, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. Following are recommended precautions to be taken during removal:

1. EMPLOYEES SHOULD BE APPRISED OF THE HAZARDS AND PROPER CONDITIONS AND PRECAUTIONS FOR SAFE USE OR EXPOSURE.
2. Approved respirators, in accordance with requirements of 29 CFR 1910.134, should be used for dust levels above 0.05 mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by the use of dust control equipment or water spray.
4. Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA/ AVOID BREATHING DUST/ DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

DOT Class: Not regulated

Prepared/revised by: A.G. Nighswander

November 21, 1990

Although reasonable care has been taken in the preparation of the information contained herein, Premier Refractories and Chemicals, Inc. extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information to purchaser's intended purposes or for consequences of its use.

Material Safety Data Sheet (MSDS)

SC-000-038 REV.7
DATE 1/15/93

Vendor name and address:

Conforms to requirements of OSHA standard 1910.1200
"Hazard Communication" and to various state "Employee Right to Know" Laws

© Copyright 1993 American Foundrymen's Society, Inc.

Emergency phone number:

AUSTENITIC GRAY IRON

SECTION I — PRODUCT IDENTIFICATION

This MSDS supplied for: AUSTENITIC GRAY IRONS
ASTM ALLOY DESIGNATION

SECTION II — HAZARDOUS COMPONENTS

INGREDIENT	CAS NO.	PERCENT	TLV (mg/m³)	PEL (mg/m³)
Carbon	7440-44-0	2.6-3.0	N/E	N/E
Chromium*	7440-47-3	0.1-6.0		
Chromium (II) Compounds as Cr			0.5	0.5
Chromium (III) Compounds as Cr			0.5	0.5
Chromium Metal as Cr			0.5	1
Chromium VI Compounds Certain Water Insoluble as Cr			0.05	N/E
Chromic Acid and Chromates CL as Cr			N/E	0.1
Chromium VI Compounds Water Soluble as Cr			0.05	N/E
Copper*(as Cu)	7440-50-8	0.5-7.5		
Fume			0.2	0.1
Dust & Mist as Cu			1.0	1.0
Iron	7439-89-6	Remainder		
Iron Oxide Fume (Fe_2O_3) as Fe			5	10
Manganese*(as Mn)	7439-96-5	0.5-1.5		
Dust and Compounds as Mn			5	N/E
Dust and Compounds CL as Mn			N/E	5
Fume as Mn			1	1
STEL as Mn			3	3

SECTION II — HAZARDOUS COMPONENTS (cont'd.)

INGREDIENT	CAS NO.	PERCENT	TLV (mg/m³)	PEL (mg/m³)
Nickel*	7440-02-0	13.5-36.0		
Metal			1	1
Insoluble Compounds as Ni			1	1
Soluble Compounds as Ni			0.10	.1
Silicon	7440-21-3	1.0-6.0		
Total Dust	10	10		
Respirable Fraction	N/E	5		

N/E = none established. N/A = not applicable. N/D = no data available.
TLV = American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (8-hour time weighted average).
PEL = OSHA Permissible Exposure Limit. The PEL values given are those promulgated as final limits as part of OSHA's 1989 PEL project (8-hour time weighted average).
mg/m³ = Milligrams per cubic meter of air.
NTP = National Toxicology Program.
CL = Ceiling Limit.
STEL = Short Term Exposure Limit.

CARCINOGEN CLASSIFICATION

INGREDIENT	OSHA	NTP	IARC	TARGET ORGAN
Chromium Metal	N	Y	3	Lung
Hexavalent	N	Y	1	Lung
Nickel	N	Y	1	Lung, nasal

Y = Listed as Human Carcinogen. N = Not Listed as a Human Carcinogen.
Code for IARC (International Agency for Research on Cancer) evidence for human carcinogenicity: 1 = positive; 2A = probable; 2B = possible; 3 = not classified; 4 = probably negative.
Elements having a listed percentage greater than zero will be present in all grades. Those having a value of "0" may not be present in certain grades.

SECTION II — HAZARDOUS COMPONENTS *(cont'd.)*

*This constituent, a toxic chemical, makes this product subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Quantity threshold amounts are 25,000 pounds for manufacturing, importing or processing and 10,000 pounds for otherwise using the listed chemical. Chemicals marked ** are reportable only if in the form of dust or fume.

SECTION III — OVERVIEW

Austenitic Gray Irons contain large percentages of nickel. There usually no chemical hazards from these castings in solid form at room temperature.

Machining, grinding, flame cutting, or welding of the casting will create air contaminants. Since the casting is primarily nickel and iron, the dust or fumes will contain primarily nickel and iron.

Breathing high concentrations of nickel dust for short time periods can cause irritation of the nose and throat. Nickel has been found to cause cancer in animals. One form, nickel subsulfide, which was present in an old smelting process that is no longer used, apparently caused nasal cancer in humans. Since then, studies of humans exposed to ordinary forms of nickel and its oxides have shown that the potential to cause cancer in humans is very weak, if it exists at all.

There is no TLV for iron dust, but available information indicates that the TLV of a nuisance dust will serve as a guideline until a TLV is established. Flame cutting, arc gouging, or welding on the casting generates nickel oxide and iron oxide fume. Inhalation of too much iron oxide fume over a long time can cause siderosis, sometimes called "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability. Also see the MSDS for the welding rod being used.

Water insoluble hexavalent chromium is classified as a human carcinogen by the ACGIH. Approximately 66% of the total chromium (in welding fume) is hexavalent, and only 5% of that is insoluble. Considering the small amount of chromium in the casting, overexposure to hexavalent chromium is not likely. (There is no hexavalent chromium in the alloy or its dust.)

SECTION III — OVERVIEW *(cont'd.)*

Because of the potential hazard from metal dust and fumes, machining, grinding, welding operations, etc., should be done under local exhaust ventilation. If ventilation is not adequate, wear a NIOSH approved dust respirator for grinding and a NIOSH approved fume respirator for welding.

Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing free silica, which can cause silicosis. IARC has listed crystalline silica as Class 2A, probably can cause lung cancer.

Other toxic metals in the alloy are present in small amounts that will not represent a hazard if nickel and iron dust and fume are adequately controlled.

SECTION IV — PHYSICAL DATA

PHYSICAL DESCRIPTION:	Solid, silver gray in color, no odor
BOILING POINT:	2750C for iron
VAPOR PRESSURE:	N/A
VAPOR DENSITY:	N/A
SOLUBILITY IN WATER:	N/A
SPECIFIC GRAVITY:	7.86 for iron
PERCENT VOLATILE BY VOLUME:	N/A
EVAPORATION RATE:	N/A

SECTION V — FIRE AND EXPLOSION DATA

Castings will not burn or explode.

SECTION VI — HEALTH HAZARD DATA

EYES: Metal particles in the eyes may cause irritation if not removed.

SKIN: None known.

BREATHING: Prolonged or repeated overexposure to dust or fumes from these castings may cause the following health effects.

SECTION VI — HEALTH HAZARD DATA *(cont'd.)*

Chromium (hexavalent chromium in fume from welding or arcing): Lung cancer.

Copper: Nose and throat irritation, sweet or metallic taste, metal fume fever with flu-like symptoms, anemia.

Manganese: Central nervous system effects are: sleepiness, weakness in legs, spastic gait, emotional disturbances.

Nickel: Lung and nasal cancer.

Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.

SWALLOWING: N/A

NOISE: Grinding castings is noisy. The OSHA limit for noise conservation averaged over eight hours is 90 decibels (dBA). A hearing program is required if exposure is over 85 dBA. If noise is at or above 90 dBA, you should wear ear muffs or ear plugs.

FIRST AID

IF IN EYES: Metal particles should be removed by a trained individual such as a nurse or physician.

IF ON SKIN: N/A

IF BREATHED: (Fumes from welding): Move to fresh air.

IF SWALLOWED: N/A

SECTION VII — REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Will not occur

STABILITY: Stable.

INCOMPATIBILITY: Iron may cause violent decomposition of hydrogen peroxide (52% by weight or greater).

SECTION VIII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

If damaged, return castings to vendor or send to scrap reclaimer.

Collected dust from machining, welding, etc., may be classed as a "hazardous waste" depending on circumstances. Consult local authorities regarding disposal.

SECTION IX — PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: Wear a NIOSH approved respirator for dusts or fume if concentrations exceed the TLV or PEL.

VENTILATION: Provide general ventilation and/or local exhaust if necessary to maintain concentrations below the TLVs.

PROTECTIVE GLOVES: Work gloves advisable for handling castings.

EYE PROTECTION: Safety glasses with side shields and/or face shields for particles (grinding). Welding goggles or helmet for welding.

OTHER PROTECTIVE EQUIPMENT: Wear a protective apron and gauntlets if arc-air gouging or cutting, or welding castings.

If noise is at or above 90 dBA, you should wear ear muffs or ear plugs.

SECTION X — SPECIAL PRECAUTIONS OR OTHER COMMENTS

STORAGE: Keep dry to reduce rusting.

THE INFORMATION HEREIN IS BASED ON THE VENDOR'S MSDS WITH ADDITIONS AS NECESSARY TO COMPLY WITH CURRENT REGULATIONS. THE INFORMATION IS BELIEVED TO BE ACCURATE BUT UNDER THE CIRCUMSTANCES IS NOT WARRANTED TO BE.

Material Safety Data Sheet (MSDS)

Label information for SC-000-038 REV. 7 DATE 1/15/93

The following hazard information is required for labels under OSHA Standard 1910.1200 and applicable instructions. Other label information may be added.

AUSTENITIC GRAY IRON

CAUTION

Grinding, welding, or arc gouging of this casting creates dust or fumes containing substances listed below with corresponding possible health effects after prolonged or repeated overexposure:

Chromium (hexavalent): Lung cancer.

Nickel: Lung and nasal cancer.

This casting also contains or may contain carbon, copper, iron, manganese, and silicon.

Wear eye protection. Wear approved dust and fume respirator if exposures exceed safe limits.

For additional information, see Material Safety Data Sheet SC-000-038 Rev. 7 for this material.

AMERICAN ALLOYS, INC.

P. O. BOX 218, NEW HAVEN, WEST VIRGINIA

MATERIAL SAFETY DATA SHEET

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910.1200. Standard must be consulted for specific requirements.

QUICK IDENTIFIER
Common Name: (Used on label & list)
5H

SECTION 1 - PRODUCT

Magnesium Ferrosilicon

Manufacturer's Name: AMERICAN ALLOYS, INC.

Address: P. O. Box 218

City, State, and ZIP: New Haven, West Virginia 25265

Emergency Telephone No. (304) 882-2161

Other Information Calls: (304) 882-3618

Signature of Person Responsible for Preparation: Richard S. Young

Date Prepared: 8-5-91

SECTION 2 - HAZARDOUS INGREDIENTS/IDENTITY

Hazardous Component(s) (chemical & common name(s)):	OSHA PEL	ACGIH TLV	% (By Weight)	CAS NO.
Silicon	10 MG/M^3	10 MG/M^3	44-48	7440-21-3
Iron	10 MG/M^3	10 MG/M^3	42-49	7439-89-6
Magnesium	10 MG/M^3	10 MG/M^3	5.0-6.0	7439-95-4
Calcium	10 MG/M^3	10 MG/M^3	0.8-1.35	7440-70-2
Rare Earth Metals - Mixed (Indisc.)	-	-	1.0 - 1.40	-
Aluminum	10 MG/M^3	10 MG/M^3	1.0	7429-90-5

NOTE 1: No TLV's exist for Ferrosilicon Alloys; TLV's may be applicable to constituent elements.
NOTE 2: PEL's or TLV's are for total nuisance particles.
NOTE 3: PEL's or TLV's are not established for Mixed Rare Earth Metals.

SECTION 3 - PHYSICAL & CHEMICAL CHARACTERISTICS

Boiling Point: N/A

Specific Gravity (H_2O=1): 4.5

Vapor Pressure (mm Hg): Effectively Zero @ 20°C

Vapor Density (Air = 1)

Solubility in Water: Insoluble in Water

Reactivity in Water: May react slightly with moisture (See Section 5)

Appearance and Odor: Silver-Gray Metallic; No Odor

Melting Point: 1100° - 1150°C

5H

SECTION 4 - FIRE & EXPLOSION DATA

Flash Point: N/A F. C.	Method Used: N/A	Flammable Limits in Air % by Volume:	LEL Lower: N/A UEL Upper:
Auto-Ignition Temperature: N/A	Extinguisher Media:	Class D fire; use dry chemical, dry sand or CO_2 to smother fire. Fire may also be isolated and allowed to burn itself out. Do not disturb burning metal while extinguishing the fire.	
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus with a full face piece operated in the positive pressure demand mode when fighting fires.		
Unusual Fire and Explosion Hazards:	Based on combustibility tests of minus 325 Mesh material, Magnesium Ferrosilicon is considered very active. Dust will propagate flame readily and will generate considerable pressure and/or explode. Lump material is not combustible.		

SECTION 5 - PHYSICAL HAZARDS (REACTIVITY DATA)

Stability: Unstable	Conditions to Avoid:	When fine sized, avoid contact with moisture during extended storage. Ventilation should be supplied in areas of extended storage. Avoid generation of airborne dusts.
Stable X		
Incompatibility: (Materials to Avoid)	Moisture and Acids	
Hazardous Decomposition Products:	Small amounts of arsine, phosphine and hydrogen may evolve if moisture is present.	
Hazardous Polymerization:	May Occur	Conditions to Avoid:
Will Not Occur X		

AMERICAN ALLOYS, INC.
P. O. BOX 218, NEW HAVEN, WEST VIRGINIA
MATERIAL SAFETY DATA SHEET

5H

SECTION 6 - HEALTH HAZARDS

1. Acute:	Alloys are of low toxicity in lump form and no residual injury is expected. High concentrations of dust will cause some irritation to eyes, nose and throat.	2. Chronic:	Similar to acute. No residual injury is expected. Dusts of silicon and ferrosilicon alloys are classified as nuisance dusts by ACGIH and OSHA.

Chemical Listed as Carcinogen Or Potential Carcinogen:	National Toxicology Program:	Yes	No X	I.A.R.C. Monographs:	Yes	No X	OSHA:	Yes	No X

Emergency and First Aid Procedures

ROUTES OF ENTRY	1. Inhalation	Remove from dust area to fresh air.
	2. Eyes	Flush with water to ensure that no particles remain in eye.
	3. Skin	No hazard associated with skin contact.
	4. Ingestion	Immediately drink two glasses of water and induce vomiting by either giving IPECAC syrup or by placing finger at back of throat. Get medical attention immediately.

SECTION 7 - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage:	Keep material dry when storing for long periods of time. If material is stored in covered drums, provide vent holes. Magnesium Ferrosilicon alloys should be kept away from sparks, heat and open flames. Adequate ventilation should be provided in bulk storage areas during extended storage if moisture is present.
Other Precautions: Milling:	Special precautions, such as the use of inert atmosphere, should be used when sizing to minus 8 Mesh. Grinding wet material may be hazardous due to possibility of arsine and phosphine evolution.
Steps to be Taken in Case Material is Released or Spilled:	Fine material should be swept up or vacuumed. Avoid using compressed air to maneuver spills or leaks of fine material. No problems associated with spills or leaks of lump material. Keep wet material separated from dry material. Avoid repacking wet material in sealed containers.
Waste Disposal Methods (Consult Federal, State & Local Regulations):	Avoid repacking wet material in sealed containers. Dispose of in accordance with applicable Federal, State and Local regulations.

AMERICAN ALLOYS, INC.
P. O. BOX 218, NEW HAVEN, WEST VIRGINIA
MATERIAL SAFETY DATA SHEET

5H

SECTION 8 - SPECIAL PROTECTION INFORMATION/CONTROL MEASURES

Respiratory Protection (Specify Type):	In dusty areas, use NIOSH - Approved Schedule 21C Respirator						
Ventilation	Local Exhaust:	For dusty Operations	Mechanical (General):	Avoid use of Baghouse	Special:	Other:	Ventilate areas of extended storage
Protective Gloves:	Recommended during handling as lump material may have sharp edges.		Eye Protection:	Subject to safety rules, wearing of safety goggles is recommended.			
Other Protective Clothing or Equipment:	As with other metal dusts, avoid contamination of work clothing.						
Work/Hygienic Practices:	Wash exposed areas after contact with Magnesium Ferrosilicon alloys.						

8-5-91

RSY/cs

11-18-10 (106)

Hickman, Williams & Company

MATERIAL SAFETY DATA SHEET

We believe the following information is accurate. It is offered in good faith but without warranty - express or implied. Since conditions of use are beyond our control, all risks of use are assumed by the user. Nothing herein shall be construed as a recommendation for uses which infringe on valid patents.

IDENTITY (As Used on Label and List)		NOTE:
Non Silica Parting	51102 820	Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name HICKMAN, WILLIAMS & CO	Emergency Telephone Number (800) 424-9300
Address (Number, Street, City, State and Zip Code) BLACK PRODUCTS DIVISION	Telephone Number for Information (773) 468-9700
13513 S. CALUMET AVENUE	Date Prepared 1/31/02 GFG
CHICAGO, IL 60827-0000	Signature of Preparer (optional)

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))		OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
1317-65-3	Limestone	10 mg/m3	10 mg/m3	-	Prop.
'-11-4	Steric Acid	300 ppm	-	-	Prop.

Section III - Physical/Chemical Characteristics

Boiling Point N/A	Specific Gravity (H2O=1) 2.71
Vapor Pressure (mm Hg) N/A	Melting Point N/A
Vapor Density (AIR=1) N/A	Evaporation Rate (Butyl Acetate=1) N/A

Solubility in Water
Nil

Appearance and Odor
White powder - Negligible odor

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A	N/A	N/A	N/A

nguishing Media
1-Flammable

Special Fire Fighting Procedures
None

Unusual Fire and Explosion Hazards
None

51102
830

Section V - Reactivity Data

Stability			Conditions to Avoid
	Unstable		None
	Stable	X	

Incompatibility (Material to Avoid)
Reacts with Acids to liberate C02

Hazardous Decomposition or Byproducts
None known.

Hazardous Polymerization			Conditions to Avoid
	May Occur		None
	Will Not Occur	X	

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
	Dust	Yes	Not Normal

Health Hazards (Acute and Chronic)
Acute: Possible Eye, Lung & Skin Irritation Chronic: Lung injury.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
	No	No	No

Signs and Symptoms of Exposure
Eyes: Irritation, Skin: Irritation, Respiratory: Irritation & Headache.

Medical Conditions
Generally Aggravated by Exposure
Any chronic medical condition may increase irritation.

Emergency and First Aid Procedures
Eyes: Flush w/water, Skin: wash w/soap & water, Respiratory: Remove to fresh air. Contact Physician, if necessary.

Section VII - Precautions for Safe Handling and Use

Steps to be taken in Case Material is Released or Spilled
Normal Cleanup

Waste Disposal Method
According to Local, State and Federal Regulations

Precautions to be taken in Handling and Storing
Store in dry area. Keep closed.

Other Precautions
Accumulation on walkways will cause slippery conditions.

Section VIII - Control Measures

Respiratory Protection (Specify Type)
NIOSH approved respirator for nuisance dust.

Ventilation	Local Exhaust	Special
	Recommended	None
	Mechanical (General)	Other
	None	None

Protective Gloves	Eye Protection
Recommended	Glasses w/shields

Other Protective Clothing or Equipment
None

Hygienic Practices
Good pers. hygiene after handling.

OCT-07-02 08:16 FROM:BLACK PRODUCTS ID:17734588951 PAGE 3/3

MATERIAL SAFETY DATA SHEET

(Data Prepared 03/87)

1. Product Identification

Trade Name :	Perlite Ore	Gas:	None
General Name:	Perlite Ore	Formula:	Aluminum Silicate
Chemical Name:	Amorphous Silicate		

Manufacturer: Silver & Baryte Ores Mining Co.

Address: 21a Amerikis str.
108 72 Athens, Greece

Telephone: (01) 3628.054
Telex: 21-5189 ELO GR
Telefax: (01)3601.169

2. Product Ingredients

Ingredient Name	Cas Number	%	Pel
Perlite Ore	None	100	10mg/m^3
Quartz < 1% in respirable dust	14808 - 60 - 7		

3. Physical Data

Appearance and Odor, Grayish, fine granules

Boiling Point:	NA	Evaporation Rate:	NA
Vapor Pressure:	NA	Specific Gravity (Water 1):	2.4
Water Solubility:	NIL	Melting Point:	ND
Vapor Density (Air - 1):	NA	% Volatile by volume	NIL

4. Fire and Explosion Data

Flash Point (Method):	Nonflammable
Flammable Limits:	LEL: NA% UEL: NA%
Extinguishing Media:	NA
Unusual Fire or Explosion Hazards:	None
Special Fire - Fighting Procedures:	None
NFPA Flammable / Combustible Liquid Classification:	NA
Auto Ignition Temperature:	NA

8. **Special Protection Information**

Goggles: Recommended
Gloves: Not required
Respirator: Use NIOSH approved respirators for protection against pneumoconiosis producing dusts.
Ventilation: Use adequate exhaust ventilation and/or dust collection.
Other: N/A
Special considerations for repair / maintenance of contaminated equipment:
Insure proper respiratory protection.

9. **Special Precautions**

Storage Segregation Hazard Classes: N/A

* * * ALWAYS SEGREGATE MATERIALS BY MAJOR HAZARD CLASS * * *

Special Handling / Storage: None
Special Workplace Engineering Controls: None
Other: None

Prepared / Revised by : Spyros Porphyris - Title: Chief Chemist

As of this date of preparation of this document, the foregoing information is believed to be accurate and is provided in good faith to comply with applicable federal and state law(s). However, no warranty or representation with respect to such information is intended or given.

E. Health Hazards

A. Summary Risks

Summary: Inhalation over long periods of high amounts of Perlite dust may overload lung clearance mechanism and make lungs more vulnerable to respiratory disease.

Medical conditions which may be aggravated; Pre-existing upper respiratory and lung disease, such as, but not limited to bronchitis, emphysema and asthma.

Target Organ(s):	Lungs
Acute Health Effect:	Transitory upper respiratory irritant.
Chronic Health Effects:	None known. See summary. Follow the safe handling practice shown on the label.
Primary Entry Route(s):	Inhalation.

B. Signs / Symptoms of Overexposure

Inhalation:	Congestion and irritation of throat, nasal passages and upper respiratory system.
Skin Contact:	None
Ingestion:	None
Eyes:	Temporary irritation and inflammation.

C. First Aid / Emergency Procedures

Inhalation:	Remove to fresh air. Drink water to clear throat and blow nose.
Skin Contact:	N/A
Skin Absorption:	N/A
Ingestion:	N/A
Eyes:	Flush with copious quantities of water.

6. Reactivity Data

Material is stable. Hazardous polymerization will not occur.

Chemical Incompatibilities:	Hydrofluoric acid.
Conditions to Avoid:	None is designed to use.
Hazardous Decomposition Products:	Reacts with Hydrofluoric acid to form toxic silicon tetrafluoride gas.

7. Spill or Leak Procedures

Procedures for Spill/Leak:	Vacuum clean or wet sweep! Avoid dusting! Use a dust suppressant when sweeping.
Waste Management:	Place waste and spillage in closed containers. Dispose of in approved landfill.

PIN 227000

RENO REFRACTORIES

Material Safety Data Sheet
May be used to comply with
OSHA'S Hazard Communication Standard.
29 CFR 1910.1200. Standard must be
consulted for specific requirements

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved OMB No. 1218-0072

IDENTITY (As Used on label and list) **PL 70 P**	**HMIS: Health-1 Flammability-0 Physical Hazard-0 PPE- B WHMIS: D2A**

SECTION I

Manufacture's Name: RENO REFRACTORIES	Emergency Telephone Number: 205-647-0240
Address (Number, Street, City, State and Zip Code 601 RENO DRIVE	Telephone Number for information: 205-647-0240
PO BOX 201	Date Prepared: 10/29/10
MORRIS, AL 35116	Signature of Preparer(optional)

SECTION II - Hazardous Ingredients/Identity Information:

Hazardous Components (Specific Chemical Identity: Common Name(s)	CAS #	ACGIH TLV	Carcinogen	% (optional)
Monoaluminum Phosphate	7784-30-7	0.5 N/E		<6%
Crystalline Silica			yes(IARC)	<20%
Quartz	14808-60-7	0.05 mg/m3		
Cristobalite	14464-46-1	0.05 mg/m3		
Tridymite	15468-32-3	0.05 mg/m3		

Threshold Limit Value for respirable dust containing crystalline silica:
OSHA PEL: 10 divided by(% Quartz + 2(Tridymite + Crystobalite) in terms of mg/m3

CALIFORNIA RESIDENTS: This product contains one or more chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm.

SECTION III- Physical/Chemical Characteristics:

Boiling Point	N/A	Specific Gravity (H20-1)	2.5-2.7
Vapor Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapor Density (AIR-1)	N/A	Evaporation Rate (Butyl Acetate- 1)	N/A

Solubility in Water: VERY LOW

Appearance and Odor: LIGHT GREY - LIGHT EARTHY ODOR

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used) N/A	Flammable Limits N/A	LEL N/A	UEL N/A

Extinguishing Media: IGNITION UNLIKELY - ANY MEDIA
Special Fire Fighting Procedures: N/A
Unusual Fire and Explosion Hazards: N/A

PIN # 227000 PL 70 P

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	

Incompatibility: (Materials to Avoid) N/A

Hazardous Decomposition or Byproducts: N/A

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section VI - Health Hazard Data:

Route(s) of Entry: Inhalation? N/A | Skin? YES | Ingestion? YES

Health Hazard: (Acute and Chronic) CHRONIC: SEE BELOW ACUTE: NUISANCE DUST, SKIN AND EYE IRRITATION

Carcinogenicity: NTP? NO | IARC Monographs? YES | OSHA Regulated? NO

Signs and Symptoms of Exposure: Chronic overexposure to dust containing *respirable* sized crystalline silica can cause delayed lung injury (Silicosis). Inhalation of dust containing crystalline silica may contribute to pre-existing pulmonary sufficient evidence from animal studies to categorize crystalline silica as a group 1 carcinogen.

Medical Conditions Generally Aggravated by Exposure: Any pre-existing lung disorder.

Emergency and First Aid Procedures: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH REPEATEDLY WITH WATER. CONTACT PHYSICIAN IF IRRITATIONS PERSISTS.

Section VII - Precautions for Safe Handling and Use:

Steps to be taken in Case Material is Released or Spilled: CLEAN UP WITH BROOM AND/OR SHOVEL.

Waste Disposal Method: APPROVED LANDFILL.

Precautions to be Taken in Handling and Storing: STORE IN COOL, DRY LOCATION.

Other Precautions: N/A

Section VIII - Control Measures:

Respiratory Protection: (Specify Type)

Ventilation	Local Exhaust N/A	Special N/A
	Mechanical (General) N/A	Other N/A
Protective Gloves: REGULAR GLOVES		Protection: SAFETY GLASSES OR GOGGLES.

Other Protective Clothing or Equipment: N/A

Work/Hygienic Practices: N/A

 *U.S.G.P.O: 1966-491-529/45775

1-2

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917) 11/85

Cereal Binder

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Krause Milling Company	414/355-7500
ADDRESS (Number, Street, City, State, and ZIP Code)	
P.O. Box 1156, Milwaukee, WI 53201	
CHEMICAL NAME AND SYNONYMS: Pregelatinized Corn Flour	TRADE NAME AND SYNONYMS: Unicore
CHEMICAL FAMILY: N/A	FORMULA: N/A

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		n/a	BASE METAL		n/a
CATALYST		n/a	ALLOYS		n/a
VEHICLE		n/a	METALLIC COATINGS		n/a
SOLVENTS		n/a	FILLER METAL PLUS COATING OR CORE FLUX		n/a
ADDITIVES		n/a	OTHERS		n/a
OTHERS		n/a			n/a

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
This is a food grade product and is not hazardous. This product is derived		n/a
from endosperm portion of cereal grains.		n/a
		n/a
		n/a

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	n/a	SPECIFIC GRAVITY (H_2O=1)	n/a
VAPOR PRESSURE (mm Hg.)	n/a	PERCENT, VOLATILE BY VOLUME (%)	n/a
VAPOR DENSITY (AIR=1)	n/a	EVAPORATION RATE (_____ =1)	n/a
SOLUBILITY IN WATER	n/a		n/a
APPEARANCE AND ODOR	Light Yellow		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	n/a	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA	water			
SPECIAL FIRE FIGHTING PROCEDURES	CO_2 - water - dry chemical			

UNUSUAL FIRE AND EXPLOSION HAZARDS

Usual hazards associated with dust ordinarily encountered with cereal products.

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	No known limit
EFFECTS OF OVEREXPOSURE	None
EMERGENCY AND FIRST AID PROCEDURES	

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	xx	

INCOMPATABILITY *(Materials to avoid)* n/a

HAZARDOUS DECOMPOSITION PRODUCTS n/a

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	xx	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep it up.

WASTE DISPOSAL METHOD: No special disposal instructions.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: Paper mask - optional

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)* Satisfactory	OTHER

PROTECTIVE GLOVES: Not required	EYE PROTECTION: Not required

OTHER PROTECTIVE EQUIPMENT: Not required

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: No special precautions

OTHER PRECAUTIONS: None

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: 85-RAM^R HS
Internal ID: 5087

MSDS No: PREMIER / 5087
Revision: 7/91
Date: May, 1990

National Paint and Coatings Association

Hazardous Material Identification System

HEALTH HAZARD	2*
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	B - Glasses, Gloves

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: 85-RAM^R HS

Description: 85-Ram^R HS is a high strength bauxite based, phosphate bonded, heat setting refractory plastic mix.

CAS: mixture

85-Ram is a registered trademark of Premier Refractories and chemicals, Inc.

Manufacturer: PREMIER REFRACTORIES AND CHEMICALS **Phone:** 215/337-1100

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	CAS Number:	Percent:	Exposure Limits:
Alumina	1344-28-1	20-40	See TLV for Mixture
Aluminosilicate	1302-93-8	40-60	See TLV for Mixture
Clay	Non-assigned	2-7	See TLV for Mixture
Aluminum Phosphate	13530-50-2	0-5	See TLV for Mixture
Phosphoric acid	7664-38-2	0.5-1	OSHA TWA=1mg/m^3, STEL=3mg/m^3 mist.
Water	7732-18-5	5-15	See TLV for Mixture
Quartz (SiO_2)	14808-60-7	0-0.3	Total Dust: 8HrTWA= 30mg/m^3 divided by (% SiO_2 + 2); Respirable=0.10mg/m^3

The TLV:TWA calculated for this product is 3.2 mg/m^3 of respirable dust.

The TLV:TWA for the mixture is calculated using the general formula given in ACGIH Adopted Appendix C, Subpart A2, Threshold Limit Values for Mixtures of Mineral Dust.

Some of the above ingredients are integral mineralogical constituents contained in the matrix of the raw materials.

Please be aware that the product in its current state is damp and dust free. See Section VI for further information.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: 85-RAM[R] HS
Internal ID: 5087

MSDS No: PREMIER / 5087
Revision: 7/91
Date: May, 1990

SECTION III. PHYSICAL DATA

Appearance & Odor: Gray, moldable mixture of aggregrates and moist bonding materials, slight pungent odor.

Boiling point: Not Applicable
Vapor pressure: Not Applicable
Water solubility (%): 2-4
Vapor density (air=1): Not Applicable
pH: 2.5-3.0 (10% Aqueous Slurry)
Evaporation rate: Not Applicable
Specific gravity (H_2O=1): (180 lbs/ft^3)
Melting point: >3200°F
% volatile by volume: 1-2

SECTION IV. FIRE AND EXPLOSION DATA

NFPA Fire Hazard Symbol Codes: Flammability: 0 **Health:** 0 **Reactivity:** 0 **Special:** 0

Extinguishing Media: This product is a non-combustible refractory. Use extinguishing media appropriate to the surrounding area.

Unusual fire or explosion hazards: None

Special fire-fighting procedures: None

SECTION V. REACTIVITY DATA

Material is stable under all normal conditions of storage. Hazardous polymerization will not occur .

Hazardous decomposition Products: None

To avoid dryout, material should be stored in moisture-proof plastic-lined containers.

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: This product in its current state is a moist, moldable material. The phosphoric acid in the product is corrosive to the skin and eyes. Some of the Health Hazard information also applies to dried material and any dust that may result therefrom.

Medical conditions which may be aggravated by contact: Pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma from dust.

Target organs: Skin, eyes and lungs if dust is present.

Primary entry route(s): skin and respiratory tract.

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: 85-RAM^{R} HS
Internal ID: 5087

MSDS No: PREMIER / 5087
Revision: 7/91
Date: May, 1990

HEALTH HAZARD INFORMATION continued from page 2

Acute effects: Transitory upper respiratory physical irritation.

Chronic effect(s): Any dust generated from this product may contain a trace (0-0.5%) of crystalline silica. The excessive inhalation above (TLV) of crystalline silica (free silica), over long periods of time, may cause a disabling lung disease (silicosis) which reduces breathing capacity, and lead to increased susceptibility to other lung disease. On the basis of initial experimental tests in animals and limited epidemilogical studies in human populations, the International Agency for Research on Cancer (IARC) has concluded that there is limited evidence for the carcinogenicity of crystalline silica to humans. IARC has classified crystalline silica as "A Probable Human Carcinogen" in group 2A. IARC has convened a special task force to review the carcinogenicity of silica.

Signs & symptoms of overexposure:

Eye contact: Physical irritation and/or burning sensation from phosphoric acid component in product.

Skin contact: Irritation and inflammation from skin contact.

Inhalation: Breathing difficulties.

First aid:

Eye contact: Flush eyes thoroughly with water for 15 minutes. If irritation persists, seek medical attention.

Skin contact: Wash with mild soap and water,

Inhalation: Remove to fresh air.

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Spill / Leak procedures: Spills should be cleaned up to avoid slipping. Carefully scoop up material into a suitable container. Flush area with copious amount of water. Clean-up personnel should wear approved respiratory protection, gloves and goggles to prevent irritation from contact and/or inhalation.

Waste management / Disposal: Product is non-biodegradable, and does not exhibit any characteristics of a hazardous waste. Follow all local, state and federal regulations for proper disposal.

MSDS 5087 continues on page 4

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
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SECTION VIII. SPECIAL PROTECTION INFORMATION

Personal protective equipment:

Other: The use of eye protection, gloves, and long sleeve clothing is recommended.

Workplace considerations:

Ventilation: Provide adequate general and local ventilation to control mist and dust levels to no more than TLV.

SECTION IX. SPECIAL PRECAUTIONS

Other precautions:
SARA TITLE III INFORMATION.
The following chemical substances reportable under SARA TITLE III are contained in this product:
0.9-1.0% Phosphoric Acid CAS# 9664-38-2.
No other substances reportable under SARA TITLE III, Sections 302, 304 and 313 are contained in this product.

All substances contained in this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

REMOVAL AFTER SERVICE PRECAUTIONS.
Because of the possible presence of crystalline silica in used refractory linings, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. Following are recommended precautions to be taken during removal:
1. EMPLOYEES SHOULD BE APPRISED OF THE HAZARDS AND PROPER CONDITIONS AND PRECAUTIONS FOR SAFE USE OR EXPOSURE.
2. Approved respirators, in accordance with requirements of 29 CFR 1910.134, should be used for dust levels above 0.05mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by use of dust control equipment or water spray.
4. Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA/ AVOID BREATHING DUST/ DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

DOT Class: Not Regulated
Data source code(s): 1,31,81,85,87

Prepared/revised by: A.G. Nighswander

April, 1990

Although reasonable care has been taken in the preparation of the information contained herein, Premier Refractories and Chemicals, Inc. extends not warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

MATERIAL SAFETY DATA SHEET

PREMIER REFRACTORIES AND CHEMICALS, INC.

Phone: PREMIER REFRACTORIES: 1-610-337-1100
CHEMTRAC, 24-Hr Emergency Assistance: 1-800-424-9300

MSDS ID: PRAC 5096
Date Prepared: 5/90
This Revision: 6/95

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material/Product Name(s): 90-RAM® PC

CAS Number: Mixture
Chemical family: Inorganic, oxides
General Use: A moldable, phos-bonded refractory material.

Manufacturer/Supplier: Premier Refractories and Chemicals, Inc.
901 East Eighth Ave.
PO Box 1569
King of Prussia, PA 19406 Phone: 610/337-1100

SECTION 2. INGREDIENTS/COMPOSITION

Ingredient name:	CAS Number:	Percent:	IARC/NTP/OSHA:	Exposure Limits:
Aluminum Oxide	1344-28-1	70-98	No	Nuisance Particulate OSHA PEL:TWA 15mg/m^3; respirable, 5mg/m^3. ACGIH TLV:TWA total dust 10mg/m^3.
Aluminosilicate,	1302-93-8	5-10	No	Nuisance Particulate
Clay,	1332-58-7	1-5	No	OSHA PEL:TWA for mineral dust containing SiO_2, respirable is 10mg/m^3 divided by (% SiO_2 + 2); Total dust 30mg/m^3 (%SiO_2 +2).
Aluminum Phosphate	13530-50-2	1-5	No	Nuisance Particulate
Phosphoric Acid	7664-38-2	0-1	No	OSHA PEL:TWA 1.0mg/m^3; STEL 3.0mg/m^3 as mist.
Quartz (SiO_2)	14808-60-7	0.1-2	Yes	OSHA PEL:TWA respirable quartz 0.10mg/m^3.
Water	7732-18-5	1-10	No	None Established

Quartz, a polymorph of crystalline silica, is listed by IARC as "probable human carcinogen" Group 2A. NTP lists respirable crystalline silica amongst substances which may "reasonably be anticipated to be carcinogens".

SECTION 3. HAZARDS IDENTIFICATION

HMIS

HEALTH HAZARD	2 - MODERATE HAZARD
FLAMMABILITY HAZARD	0 - MINIMAL HAZARD
REACTIVITY HAZARD	0 - MINIMAL HAZARD
PERSONAL PROTECTION	B - Eye Protection & Gloves

Emergency Overview:
Product is damp, moldable and dust free. Not a fire or spill hazard. Corrosive by eye contact. Prolonged skin contact may produce irritation/inflammation.

Target organs: Skin and Upper Respiratory System

Primary route(s) of entry: Skin, Inhalation

Medical conditions which may be aggravated by contact: Pre-existing chronic lung conditions, such as, but not limited to, bronchitis, emphysema, and asthma.

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HAZARD IDENTIFICATION continued from page 1

Acute effects: Possibly corrosive to the eye on contact. Possible upper respiratory irritation. Possible irritation/inflammation to skin from frequent/prolonged contact.

Chronic effects: Dust that may be generated from dried product during installation and "after-service" tear-out may contain free/crystalline silica. The prolonged inhalation (usually years) of mineral dusts containing free/crystalline silica may result in the development of a disabling pulmonary fibrosis known as silicosis; a progressive, incapacitating and sometimes fatal lung disease. IARC has classified crystalline silica as a "probable human carcinogen" Group 2A. NTP lists respirable crystalline silica amongst substances which may "reasonably be anticipated to be carcinogens. See Section 16 for safe "Removal After Service Precautions".

Signs & symptoms of overexposure:

Eye contact: A corrosive and physical eye irritant.

Skin contact: Prolonged contact with bare skin may contribute to the development of a slight skin irritation, especially when product is wet.

Inhalation: Inhalation of excessive airborne particulates may irritate upper respiratory system.

Ingestion: An unlikely route of exposure. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms will include irritation and may include nausea, vomiting and abdominal pain.

SECTION 4. FIRST AID MEASURES

Eye contact: Flush eyes, including under the eyelids, with large amounts of water. If irritation persists, seek medical attention.

Skin contact: Wash affected areas with mild soap and water.

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration. Get immediate medical attention.

Ingestion: Ingestion is an unlikely route of exposure. If ingested in sufficient quantity and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

SECTION 5. FIRE FIGHTING MEASURES

NFPA code: **Flammability:** 0 , **Health:** 0 , **Reactivity:** 0 , **Special:** 0 .

Flash point: PRODUCT IS NOT COMBUSTIBLE

Extinguishing media: Use extinguishing media appropriate to combustibles in area of fire.

Firefighting instructions: Firefighters should wear NIOSH-approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill procedures: Carefully, cleanup and place material into a suitable container, being careful to avoid creating excessive dust. If conditions warrant, clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

SECTION 7. HANDLING AND STORAGE

Storage: Provide cool, dry storage and store in original, unopened cartons. Keep cartons sealed when not in use.

PREMIER REFRACTORIES AND CHEMICALS, INC.

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SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering controls: Provide sufficient ventilation, in both volume and air flow patterns, to control any mist/particulate emissions below allowable limits.
Personal protective equipment: The use of eye protection, gloves and long sleeve clothing is recommended.
Respiration protection: For mist/dust concentrations above allowable exposure limits provide workers with NIOSH/MSHA approved respirators in accordance with requirements of 29 CFR 1910.134

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: A gray, damp, moldable mixture of granular to fine materials; slight pungent odor. Packaged in 55 and 100 pound cartons.

Boiling Point: Not Applicable
Melting Point: >2900°F (1590°C)
Water Solubility: 3-5%
pH (10% aqueous slurry): 2.5 - 3.5
Specific Gravity(g/cc): Mixture
Bulk Weight(lbs/ft^3): 187
% Volatile by volume: 0
Evaporation rate: Not applicable

SECTION 10. STABILITY AND REACTIVITY

Hazardous Polymerization: Will not occur
Chemical Incompatibilities: None
Hazardous Decomposition Products: None

SECTION 11. TOXICOLOGICAL INFORMATION

Quartz CAS# 14808-60-7. Toxic and Hazard Review (Sax): Experimental poison by intratracheal and intravenous routes. An experimental carcinogen, tumorigen, and neoplastigen. Human systemic effects by inhalation: cough, dyspnea, liver effects. Listed by IARC as a "probable human carcinogen" Group 2A. Listed by NTP. No LD_{50} in RTECS. Inhalation human: TCLo 16 million particles per cubic centimeter per 8 hours per 17.9 Years-Intermittent: Pulmonary system effects; Inhalation-human LCLo: 300 micrograms/m^3 per 10 years-intermittent: liver. Other species toxicity data (NIOSH RTECS): intravenous-rat LDLo: 90 mg/kg; intraperitoneal-rat LDLo: 200 mg/kg; intravenous-mouse LDLo: 40 mg/kg; intravenous-dog LDLo: 20 mg/kg.

Phosphoric Acid CAS#7664-38-2. Toxic and Hazard Review (Sax): Moderately toxic by ingestion and skin contact. A corrosive irritant to eyes, skin and mucous membranes and a systemic irritant by inhalation. Toxicity data: unr-man LDLo:220 mg/kg; skn-rbt LD_{50}:2740 mg/kg; eye-rbt:119 mg SEV; orl-rat LD_{50}:1530 mg/kg.

Balance of Ingredients: No LD_{50} or LC_{50} found for oral, dermal, or inhalation routes of administration.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicological/Chemical Fate Information:
No data available on any adverse effects of this material on the environment.

SECTION 13. DISPOSAL INFORMATION

Waste Management/Disposal: This product, as manufactured, does not exhibit any characteristics of a hazardous waste. It is suitable for landfill disposal. However, debris generated during installation, maintenance or tear-out procedures may be contaminated with other hazardous materials. Therefore, appropriate waste analysis may be necessary to determine proper disposal. Waste characterization and disposal/treatment methods should be determined by a qualified environmental professional in accordance with applicable federal, state and local regulations.

PREMIER REFRACTORIES AND CHEMICALS, INC.

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SECTION 14. TRANSPORT INFORMATION

US Department of Transportation: Not regulated by DOT as a hazardous material. No hazard class, no label or placard required, no UN or NA number assigned.
Canadian TDG Hazard Class & PIN: Not regulated

SECTION 15. REGULATORY INFORMATION

SARA TITLE III: This product does not contain any substances reportable under Sections 302, 304 or 313. Sections 311 and 312 do apply. (Routine Reporting and Chemical Inventories)
The product contains 0-1% phosphoric acid CAS#7664-38-2. EPA:CERCLA RQ is 5000 lb; EPCRA section 313 de minimis concentration is 1.0%. Therefore, the phosphoric acid contained in this product is excluded from reporting requirements.

Phosphoric acid is on the folling regulatory lists:
Clean Water Act Section 311
CERCLA Hazardous Substances
SARA Section 313
OSHA Air Contaminants
ACGIH
DOT Hazardous Materials & DOT Hazardous Substances and Reportable Quantities
Canadian CN1, and state lists MA1, NJ1S, and PA1E

TSCA: All substances in this product are listed in the Chemical Substance Inventory of the Toxic Substances Control Act.

SECTION 16. OTHER INFORMATION

Removal After Service/Tear-Out Precautions:
Because of the possible presence of crystalline silica in used refractory debris, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. The following precautions should be taken during tear-out.

1. Employees should be apprised of the hazards and proper conditions and precautions for safe use or exposure.
2. Approved respirators, in accordance with requirements of 29 CFR 1910.134, should be used for dust levels above 0.05mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by the use of dust control equipment or water spray.
4. Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing respirable crystalline silica, the following warning should be posted.

FREE SILICA WORK AREA	AVOID BREATHING DUST
DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS	

ACRONYMS AND REFERENCES USED IN PREPARATION OF MSDS':

ACGIH:	American Conference of Governmental Industrial Hygienists
CAS#:	CAS Registration Number is an assigned number to identify a material. CAS stands for Chemical Abstracts Service.
CERCLA:	Comprehensive Environmental Response, Compensation & Liability Act
EPCRA:	Emergency Planning and Community Right-to-Know Act of 1986
HMIS®:	Hazardous Materials Identification System (National Paint & Coatings Association)
IARC:	International Agency for Research on Cancer

PREMIER REFRACTORIES AND CHEMICALS, INC.

Phone: PREMIER REFRACTORIES: 1-610-337-1100
CHEMTRAC, 24-Hr Emergency Assistance: 1-800-424-9300

MSDS ID: PRAC 5096
Date Prepared: 5/90
This Revision: 6/95

SECTION 16. OTHER INFORMATION continued from page 4

MSHA:	Mine Safety and Health Administration
mg/m^3:	Milligrams per cubic meter
NIOSH:	National Institute for Occupational Safety and Health
NFPA:	National Fire Protection Association
NTP:	National Toxicology Program
OSHA:	Occupational Safety and Health Administration
PEL:	Permissible Exposure Limit (OSHA)
REL:	Recommended Exposure Limit (NIOSH)
SARA:	Superfund Amendments and Reauthorization Act
TITLE III:	Emergency Planning and Community Right To Know Act
Section 302:	Extremely Hazardous Substances
Section 304:	Emergency Release
Section 311:	*Community Right-to-Know*, MSDSs or List of Chemicals
Section 312:	*Community Right-to-Know*, Inventories and Locations, (Tier I/TierII)
Section 313:	Toxic Chemicals, Toxic Chemical Release Reporting, Form R
TLV:	Threshold Limit Values (ACGIH)
TWA:	Time Weighted Average
29CFR1910.134:	OSHA Respiratory Protection Standard

REFERENCES:

Sax, N. Irving: Dangerous Properties of Industrial Materials, Seventh Edition, Van Nostrand Reinhold Co., Inc., 1989.

Kirk, R. and Othmer, D., Encyclopedia of Chemical Technology, Third Edition, Wiley-Interscience, New York, NY 1982.

Clansky, K.B., Suspect Chemicals Sourcebook, 1992-2 Edition, Roytech Publications, Bethesda, Maryland.

Sax, N.Irving and Lewis,R.J. Hawley's Condensed Chemical Dictionary, Eleventh Ed., Van Nostrand Reinhold Co.,Inc., NY

Manufacturers/Suppliers, Material Safety Data Sheets on Raw Materials Used

Prepared/revised: A.G. Nighswander
June 29, 1995

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SOUTHERN PRECISION CORPORATION

1500 Georgia Road, P.O. Box 100035
Birmingham, Al. 35210

Phone: (205)956-3556 Fax: (205)956-8081

MATERIAL SAFETY DATA SHEET

Date Prepared: February 1, 1994

PRODUCT IDENTIFICATION **********

PRODUCT NAME: Raw Silica Sand
SYNONYM(S): NA
FORMULA: NA
CHEMICAL FAMILY:

TYPICAL CHEMICAL COMPOSITION **********

Ingredient(s)	CAS No.	Wt. %	Permissible Air Level (3) OSHA PEL	Permissible Air Level (3) ACGIH TLV
Silica, Crystalline Quartz (Respirable) Silicon Dioxide, SIO_2	14808-60-7			
Crystalline Quartz (Resp.)			Mppcf $\frac{250}{\%SIO_2+5}$	Mg/M^3 $\frac{10\ Mg/M^3}{\%SIO_2+2}$
Quartz Dust				$\frac{30\ Mg/M^3}{\%SIO_2+2}$

ACGIF TLV: Crystalline Quartz TLV-TWA = 0.1 MG/M^3 (Respirable Dust)

OSHA Pel: Exposure to airborne crystalline silica shall not exceed and 8-hour TWA limit as stated in 29CFR1910.1000 Table Z-3 for Mineral Dust.

PHYSICAL DATA **********

Physical State: Solid
Appearance: Granular, White to tan
Odor: No odor
Boiling Point: 4046° F
Melting Point: 3050° F
Solubility in Water: Insoluble
pH: NA
Specific Gravity (H_2O = 1): 2.65

Bulk Density:
Vapor Pressure: NA
Vapor Density: NA
Evaporation Rate: NA
% Volatile by Volume: NA
Particle Size Distribution:

FIRE AND EXPLOSION HAZARD DATA **********

Flash Point (method): Non-Flammable
Autoignition Temperature: NA
Fire Hazard: None
Extinguishing Media: None required, sand may be used as extinguishing media.
Special Fire Fighting Procedures: NA

Lower Explosion Limit: NA
Upper Explosion Limit: NA
Explosion Hazard: None
Unusual Fire and Explosion Hazards: NA

REACTIVITY DATA **********

Stability: Stable Conditions to Avoid: None

Incompatibilities (Materials to avoid): Contact with powerful oxidizing agents such as fluoride may cause fires.

Hazardous Decomposition or Byproducts: Silicon will dissolve in Hydrofluoric Acid and produce a corrosive gas-silicon tetraflo.

Polymerization: Will not occur Conditions to Avoid: None

HEALTH HAZARD DATA **********

Health Effects/Signs & Symptoms: Undue breathlessness, wheezing, cough and sputum production. Prolonged exposure to respirable crystalline quartz may cause delayed (chronic) lung injury (silicosis). Acute or rapidly developing silicosis may occur in a short period of time in heavy exposure.

Usual Route(s) of Entry: Inhalation

Medical Conditions Possibly Aggravated: Pulmonary function may be reduced by inhalation of respirable crystalline silica.

Carcinogen Information: NPT? Yes IARC Monographs? Yes OSHA Regulated? No

FIRST AID AND MEDICAL EMERGENCY PROCEDURES **********

Eye Contact: Wash immediately with water.

Skin Contact:

Inhalation: Remove to fresh air.

Ingestion: Seek medical attention as needed.

OCCUPATIONAL EXPOSURE CONTROL MEASURES **********

Engineering Controls (Ventilation, etc.): Use adequate ventilation and dust collection. Use explosion-proof equipment for dusty conditions.

Work Practices (Handling and Storage, etc.): Use Dustless system for handling, storage and cleanup so that airborne dust does not exceed the PEL. Avoid breakage of bagged material or spills of bulk material. Prevent accumulation of dust.

Eye Protection: Wear protective shield (safety glasses) when exposed to dust particles.

Skin Protection: Optional

Respiratory Protection: Use only NIOSH/MSHA approved equipment (see 29CFR 1910,134)

SPILL, LEAK AND DISPOSAL INFORMATION **********

Procedures to follow if material is released or spilled: Use dustless methods (vacuum) and place into closable container for disposal. Do not dry sweep. Wear protective equipment as needed.

Waste Disposal Method(s): Dispose in accordance with Federal, State and Local Regulations.

ADDITIONAL OR MISCELLANEOUS INFORMATION **********

None

FOOTNOTES **********

None

ABBREVIATIONS **********

NA = Not Applicable
NE = Not Established
GT = Greater Than
LT = Less Than
UK = Unknown (No applicable information was found)

This document has been prepared solely for the intent of compliance with the provisions of Subpart 2 of Part 1910 of Title 29 of the Code of Federal Regulations, paragraph 1910.1200.

Southern Precision makes no warranties, expressed or implied, including the implied warranty of merchantability, any implied warranty of fitness for a particular purpose and any implied warranties otherwise arising from course of dealing or trade.

SARA TITLE III SECTION 313
AND 40 CFR PART 372

TOXIC CHEMICAL NOTIFICATION SHEET

RAW SILICA SAND

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986.

Cas No.	Chemical Name	% By Weight
None required per Sara Title III Section 313		

This toxic chemical notification must not be detached from the Material Safety Data Sheet. Any copying or redistribution of the MSDS must include a copy of this sheet as an attachment.

Material Safety Data Sheet

("Essentially Similar" to Form OSHA 20)

BAY STATE ABRASIVES — DRESSER

SECTION I

NAME AND ADDRESS:
BAY STATE ABRASIVES
DIVISION OF DRESSER INDUSTRIES
12 UNION STREET
WESTBORO, MA 01581

EMERGENCY TELEPHONE NUMBER:
(617) 366-4431

FOR: 30 X 2 X 12 T-1
X1A143 Q5 BL5-R

CHEMICAL NAME AND SYNONYMS:

Resinoid Aluminum Oxide Abrasive Products

TRADE NAME AND SYNONYMS:

Resin Bonded Aluminum Oxide Abrasive Products, "A" Abrasive Wheels

CHEMICAL FAMILY:

Oxide
Resin
Cresol

FORMULA:

Aluminum Oxide,(Sometimes up to 40% Zirconia is substituted for alumina).
Cured Phenolic and other cured resins.
Cresol isomers added as conditioning agents.

SECTION II - HAZARDOUS INGREDIENTS

INGREDIENT	CAS#	%	TLV
Aluminum Oxide	1344-28-1	+50%	10 mg/cu.M
Zirconium Oxide	409-21-2		5 mg/cu.M
Cured resin	NA	+ 4%	10 mg/cu.M
Cresol Isomers	1319-77-3	less than .5%	22 mg/cu.M*
May contain one or more of the following			
Graphite	7782-45-5	+1%	15 mg/cu.M
Sulfur	7704-34-9	+1%	10 mg/cu.M
SARAN	75-35-5	+1%	20 mg/cu.M*
Aluminum Powder	7429-90-5	+1%	10 mg/cu.M
Copper Powder	7440-50-8	+1%	1 mg/cu.M
Barytes	7727-43-7	+1%	10 mg/cu.M
Cryolite	15096-52-3	+1%	2.5 mg/cu.M
Pyrite (FeS)	NA	+1%	2 mg/cu.M
Lime	1305-78-8	+1%	2 mg/cu.M
Wollastonite	1344-95-2	+1%	10 mg/cu.M
Glass Mesh	NA	+1%	10 mg/cu.M
DPR Rubber	78-79-5	+1%	NA

*Listed by NTP as a carcinogen.

SECTION III - PHYSICAL DATA

BOILING POINT (Deg F): NA
VAPOR PRESSURE (mm HG): NA
VAPOR DENSITY (Air = 1): NA
SOLUBILITY IN WATER: Not soluble
SPECIFIC GRAVITY (H2O = 1): Varies
PERCENT VOLATILES BY VOLUME (%): 0
EVAPORATION RATE (_____=1): NA
APPEARANCE AND ODOR: Solid, various gray and brown colors, odorless

MATERIAL SAFETY DATA SHEET

section I

Manufacturers Name	Emergency Telephone No.
Hudson Abrasives Co.	713-977-0037
Address 8606 Windswept, Houston, TX 77063	
Chemical Name & Synonyms Phenolic Resin Bonded Abrasive Products	Trade Name & Synonyms Resinoid bonded grinding wheels
Chemical Family oxides, carbides, polymers	Formula dependent on wheel specification

section II - Hazardous Ingredients

ingredient	cas#	wt%	TLV_3	Carcin. (y/n)
Aluminum Oxide	1344-28-1	45+	10 mg/m	n
Zirconium Oxide	409-21-2	45+	5 mg/m	n
Silicon Carbide	7440-67-21	45+	10 mg/m	n
Cured Resin	na	4+	10 mg/m	n
cryolite	15096-52-3	1+	2.5 mg/m	n
Pyrite	na	1+	2 mg/m	n
Lime	1305-78-8	1+	2 mg/m	n
Glass mesh	na	1+	10 mg/m	n
Flourspar	1344-95-2	1+	10 mg/m	n
Carbon Black	1333-86-4	1+	3.5 mg/m	n
Furfural	98-00-1	1+	5 ppm	n

section III - Physical Data

Boiling Point (°F)	na	Specific Gravity	Varies
Vapor Pressure (mm hg.	NA	Volatile (% by volume)	NA
Vapor Density	NA	Evaporation Rate	NA
Solubility in Water	Slight		
Appearance and Color	Brownish color, rough surface, no appreciable oder		

section IV - Fire & Explosion Hazard Data

Flash Point	NA	Flammable Limits	NA	Lel Uel
Extinguishing Media	Normal extinguishing may be used			
Special Fire Fighting Procedures	Normal fire fighting procedures may be used			
Unusual Fire and Explosion Hazards	none			

section V - Health Hazard Data

Threshold limit value	To be treated as a nuisance dust 10 mg/m
Effects of overexposure	normal to over exposure to nuisance dust
Emergency and first aid procedures	Remove to fresh air and call Physician if necessary

section VI - Reactivity Data

Stability	unstable		Conditions to avoid	Avoid strong alkali Store in dry area
	stable	X		
Incompatability(materials to avoid)			strong alkali	
Hazardous decomposition products			none known	
Hazardous polymerization	may occur		Conditions to avoid	
	will not occur	X		

section VII - Spill or Leak Procedures

Steps to be taken in case material is released or spilled Ventilate the area and collect the material as normal non-hazardous material.
Waste disposal method Landfill - according to local, state, and federal regulations.

section VIII - Special Protection Information

Respiratory protection	MSHA or NOISH approved dust respirator may be required		
Ventilation	local exhaust	recommended	special
	mechanical	recommended	other
Protective gloves recommended		eye protection should be worn	
Other protective equipment	if deemed necessary		

section IX - Special Precautions

Precautions to be taken in handling and storing Store in dry , near normal room temp. conditions
Other precautions avoid dropping or bumping wheels

CARBEN
SEAL COAL BLENDED WITH BENTONITE

Product Name:	Item Code:
SEA COAL #4 200M	SEACOAL 50

Supplier: Bentonite Performance Minerals
410 17th Street, Suite 800
Denver, CO 80202
Phone: (303) 571-8240
Fax: (303) 571-8280

Manufacturer: Bentonite Performance Minerals
410 17th Street, Suite 800
Denver, CO 80202
Phone: (303) 571-8240
Fax: (303) 571-8280

Emergency Number Chemtrec: (800) 424-9300

BENTONITE PERFORMANCE MINERALS

MATERIAL SAFETY DATA SHEET

CARBEN™ SEACOAL

Revision Date: March 22, 2002

1. PRODUCT COMPANY AND IDENTIFICATION

Product Trade Name:	CARBEN™
Generic Description:	Sea Coal CAS# 68409-95-0 blended with Wyoming and/or Southern Bentonite, Sodium/Calcium montmorillonite CAS# 1302-78-9 Other minor additives may include cellulose, cereal, gilsonite, lignite and soda ash.
Supplier:	Bentonite Performance Minerals 410 17th Street, Suite 405 Denver, Colorado 80202-4447
Telephone:	(303) 571-8240
Fax Number:	(303) 571-8280
Chemtrec Emergency Number:	(800) 424-9300

2. COMPOSITION/INFORMATION ON THE COMPONENTS

MATERIAL OR COMPONENT			ACGIH-TLV-TWA	OSHA PEL-TWA
Sea Coal	(50-100%)	CAS# 68409-95-0		
respirable fraction <5% silica			2 mg/m³	2.4 mg/m³
Coal Tar pitch		CAS#65996-93-2	not applicable	not applicable
Wyoming and/or calcium Bentonite, Sodium/Calcium Montmorillonite				
	(0-50%)	CAS # 1302-78-9	not applicable	not applicable
Crystalline Silica:				
Quartz	(0-5%)	CAS#14808-60-7	0.05 mg/m³	(10mg/m³)/(%SiO_2 +2)
Cristobalite	(0-1%)	CAS#14464-46-1	0.05 mg/m³	1/2x(10mg/m³)/(%SiO_2 +2)
Tridymite	(0-1%)	CAS#15468-32-3	0.05 mg/m³	1/2x(10mg/m³)/(%SiO_2 +2)

Bentonite is added to pulverized Sea Coal to reduce combustibility of the product.
The OSHA PEL-TWA are from Table Z-3 Mineral Dusts.
More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARD IDENTIFICATION

Hazard Overview:

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation

DANGER! – CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease. This product contains quartz, cristobalite and tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH specified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

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4. FIRST AID MEASURES

Inhalation	If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.
Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physicians	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	350 F
Flash Point/Range (C):	177 C
Flash Point Method:	Not determined
Autoignition Temperature (F):	Not determined
Autoignition Temperature (C):	Not determined
Flammability Limits in Air-Lower (%):	Not determined
Flammability Limits in Air-Upper (%):	Not determined
Fire Extinguishing Media	Foam, nitrogen, carbon dioxide, water, ammonium biphosphate powder. Use media applicable to surrounding area.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Self-contained breathing apparatus and full protective outwear are recommended because coal fire may produce toxic fumes.
Unusual Fire and Explosion Hazards	Explosion hazard exists if methane liberated by the coal is confined. Due to its small particle size, CARBEN™ may form explosive dusts when suspended in air. Avoid allowing the material to become airborne. Caution should be exercised when applying water to large coal fires as steam may occur. Prevent re-ignition of extinguished fires by spreading and/or dousing with water. Keep away from sources of ignition.
NFPA Ratings:	Health 2, Flammability 1, Reactivity 1
HMIS Ratings:	Flammability 1, Reactivity 1, Health 2*

BENTONITE PERFORMANCE MINERALS

MATERIAL SAFETY DATA SHEET

CARBEN™
Revision Date: March 22, 2002

6. ACCIDENTAL RELEASE MEASURES

Released or Spilled	Remove all heat and ignition sources. If uncontaminated, collect using dustless method and hold for disposal. If contaminated, use appropriate method for the nature of the contamination and consider possible toxic or fire hazards associated with contaminating substances and hold for disposal. Material is slippery when wet.
Personal Precautionary Measures:	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures:	None known.
Procedure for Cleaning/Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite and tridymite, which may become airborne without a visible dust cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH specified, European Standard EN 149, or equivalent respirator when using this product. Material is slippery when wet.
Storage Information	Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.
Respiratory Protection	Wear a NIOSH specified, European Standard EN 149, or equivalent respirator when using this product.
Hand Protection	Normal work gloves.
Skin Protection	Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothes.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known

BENTONITE PERFORMANCE MINERALS

MATERIAL SAFETY DATA SHEET

CARBEN™

Revision Date: March 22, 2002

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Color	gray to black
Odor	Odorless
pH	7 to 10 in 6% slurry
Specific Gravity (H_2O = 1)	1.7 to 2.65
Density at 20C (lb/gallon)	Not determined
Bulk Density at 20 C (uncompacted)	44 to 58 lb/ft^3
Boiling Point/Range (F):	Not determined
Boiling Point/Range (C):	Not determined
Freezing Point/Range (F):	Not determined
Freezing Point/Range (C):	Not determined
Vapor Pressure at 20C (mm Hg)	Not determined
Vapor Density (Air = 1)	Not determined
Percent Volatiles:	Not determined
Evaporation Rate (Butyl Acetate=1)	Not determined
Solubility in Water (g/100ml)	Insoluble
Solubility in Solvents (g/ml)	Not determined
Solubility in Sea Water (g/ml)	Insoluble
VOCs (lb/gallon)	Not determined
Viscosity, Dynamic at 20C (centipoise)	Not determined
Viscosity, Kinematic at 20C (centistoke)	Not determined
Partition Coefficient/n-Octanol/water	Not determined
Molecular weight (g/mole)	Not determined

10. STABILITY AND REACTIVITY

Stability Data:	CARBEN™ may exhibit spontaneous heating and combustion when exposed to oxidizers. Precipitation and high humidity may accelerate the heating process. Spontaneous combustion can be avoided by excluding air and oxidizers or mechanically assisting heat release from the coal component before any portion of the lot reaches 200 F. CARBEN™ is an oxygen scavenger and will deplete the oxygen concentration when stored in a closed container.
Hazardous Polymerization	Will not occur.
Incompatibility (Materials to Avoid)	Strong oxidizing agents, hydrofluoric acid, other acids and alkalis.
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to crystallize to tridymite (870C) or cristobalite (1470C). Products of combustion include carbon monoxide, carbon dioxide and sulfur dioxide.
Additional Guidelines	Not applicable

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CARBEN™

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11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity subsection below).
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known.
Aggravated medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This
disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 – carcinogenic to humans) and has determined
that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A – possible carcinogen to humans).
Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (2A).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin and other internal
organs) and kidney disease.

BENTONITE PERFORMANCE MINERALS

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Other Information
For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pp 761-768 (1997).

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	International Agency for Research on Cancer (IARC) Group 1 Carcinogen (Carcinogenic to Humans)
Genotoxicity:	Not determined
Reproductive/Developmental Toxicity	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Air/Soil)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not determined

Ecotoxicological Information

Acute Fish Toxicity:	TLM96: 10000 ppm (Oncorhynchus mykiss) for bentonite, sea coal not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL

Disposal Method	Bury in a licensed landfill according to federal, state and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

BENTONITE PERFORMANCE MINERALS

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14. TRANSPORTATION INFORMATION

Land Transportation	
DOT	Not restricted
Canadian TDG	Not restricted
ADR	Not restricted
Air Transportation	
ICAO/IATA	Not restricted
Sea Transportation	
IMDG	Not restricted
Other Shipping Information	
Labels:	None

15. REGULATORY INFORMATION

US Regulations	
US TSCA Inventory	All components are listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311/312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA(313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-To-Know Law	One or more components listed.
NJ Right-To-Know Law	One or more components listed.
PA Right-To-Know Law	One or more components listed.
Canadian Regulations	
Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials (crystalline silica)

BENTONITE PERFORMANCE MINERALS

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CARBEN™

Revision Date: March 22, 2002

16. OTHER INFORMATION

Abbreviations

®: Registered Trademark of Halliburton Energy Services Inc.
™: Trademark of Halliburton Energy Services Inc.
N/A: Denotes no applicable information found or available
CAS#: Chemical Abstracts Service Number
ACGIH: American Conference of Governmental Industrial Hygienists
OSHA: Occupational Safety and Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
NTP: National Toxicology Program
IARC: International Agency for Research on Cancer
R: Risk
S: Safety
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
BOD: Biological Oxygen Demand
KoC: Soil Organic Carbon Partition Coefficient

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MSDS Data Revised: March 22, 2002

BENTONITE PERFORMANCE MINERALS
410 17th Street, Suite 405
Denver, CO 80202-4447
Telephone (303) 571-8240
Facsimile (303) 571-8280

U.S. SILICA COMPANY

Material Safety Data Sheet

F 50 OTTOWA

Considered hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200)

Product Name: Silica Sand and Ground Silica
Product Description: Crystalline Silica

1. Identification of the substance/preparation and of the company/undertaking

1.1. Identification of the substance or preparation

Product Name/Trade Names:
Sand and Ground Silica Sand (flour) sold under various names: ASTM TESTING SANDS • GLASS SAND • FLINT SILICA • DM-SERIES • F-SERIES • FOUNDRY SANDS • FJ-SERIES • H-SERIES • L-SERIES • N-SERIES • NJ SERIES • OK-SERIES • P-SERIES • T-SERIES • HYDRAULIC FRACING SANDS • MIN-U-SIL® Fine Ground Silica • MYSTIC WHITE® • #1 DRY • #1 SPECIAL • PENN SAND® • Q-ROK® • SIL-CO-SIL® Ground Silica •MICROSIL® •Supersil® • MASON SAND • GS SERIES • PER-SPEC

Chemical Name or Synonym:
Silicon Dioxide (SiO_2). Sand, Silica Sand, Quartz, Crystalline Silica, Flint, Ground Silica (flour).

White or tan sand or ground silica with no odor.

1.2. Use of the Substance / Preparation

Main Applications (non-exhaustive list): abrasives, brick, ceramics, foundry castings, glass, grout, hydraulic frac (proppant) sand, mortar, paint and coatings, silicate chemistry, silicone rubber, thermoset plastics.

1.3. Company / Producer

U.S. Silica Company
8490 Progress Drive, Suite 300
Frederick, MD 21701
U.S.A.

Phone: 800-243-7500
Emergency Phone: 301-682-0600
Fax: 301-682-0690

2. Hazards Identification

2.1. EMERGENCY OVERVIEW:

The U. S. Silica Company material is a white or tan sand, or ground sand. It is not flammable, combustible or explosive. It does not cause burns or severe skin or eye irritation. A single exposure will not result in serious adverse health effects. Crystalline silica (quartz) is not known to be an environmental hazard.

Crystalline silica (quartz) is incompatible with hydrofluoric acid, fluorine, chlorine trifluoride or oxygen difluoride.

2.2. OSHA REGULATORY STATUS

This material is considered hazardous under the OSHA Hazard Communications Standard (29 CFR 1910.1200).

2.3. POTENTIAL HEALTH EFFECTS:

2.3.1. Inhalation:

a. Silicosis: Respirable crystalline silica (quartz) can cause silicosis, a fibrosis (scarring) of the lungs.

Silicosis may be progressive; it may lead to disability and death.

b. Lung Cancer: Crystalline silica (quartz) inhaled from occupational sources is classified as carcinogenic to humans.

c. Tuberculosis: Silicosis increases the risk of tuberculosis.

d. Autoimmune and Chronic Kidney Diseases: Some studies show excess numbers of cases of scleroderma, connective tissue disorders, lupus, rheumatoid arthritis, chronic kidney diseases and end-stage kidney disease in workers exposed to respirable crystalline silica.

e. Non-Malignant Respiratory Diseases (other than silicosis): Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to respirable crystalline silica.

2.3.2. Eye Contact:

Crystalline silica (quartz) may cause abrasion of the cornea.

2.3.3. Skin Contact:

Not applicable.

2.3.4. Ingestion:

Not applicable.

2.3.5. Chronic Effects:

The adverse health effects -- silicosis, lung cancer, autoimmune and chronic kidney diseases, tuberculosis, and non-malignant respiratory diseases-- are chronic effects.

2.3.6. Signs and Symptoms of Exposure:

Generally, there are no signs or symptoms of exposure to crystalline silica (quartz).

2.3.7. Medical Conditions Generally Aggravated by Exposure:

The condition of individuals with lung disease (e.g., bronchitis, emphysema, chronic obstructive pulmonary disease) can be aggravated by exposure.

See Section 11, Toxicological Information, for additional detail on potential adverse health effects.

3. Composition / Information on Ingredients

Component / CAS #		%
Crystalline Silica (quartz)	14808-60-7	98.7 - 99.9
Aluminum Oxide	1344-28-1	<1.1
Iron Oxide	1309-37-1	<0.1
Titanium Oxide	13463-67-7	<0.1

4. First Aid Measures

4.1. Eye Exposure:
Wash immediately with plenty of water. If irritation persists, seek medical attention.

4.2. Skin Exposure:
Not applicable

4.3. Inhalation:
No specific first-aid is necessary since the adverse health effects associated with exposure to crystalline silica (quartz) result from chronic exposures. If there is a gross inhalation of crystalline silica (quartz), remove the person immediately to fresh air, give artificial respiration as needed, seek medical attention as needed.

4.4. Ingestion:
Not applicable

5. Fire Fighting Measures

5.1. Fire Hazard Data:

Autoignition: Not Applicable

Flash Point: Not Applicable

Flammability Limits (vol / vol%): **Lower:** Not Applicable **Upper:** Not Applicable

Extinguishing Media:
Product is not flammable, combustible or explosive. Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures:
Use self contained breathing apparatus with full face mask.

Unusual Fire and Explosion Hazards:
None

6. Accidental Release Measures

6.1. Personal precautions:

Avoid dust formation. In case of dust exposure, wear protective equipment specified in Section 8 of this Safety Data Sheet.

Environmental precautions: No specific precautions. Discard any product, residue, disposable container or liner in compliance with regulatory requirements.

Methods for cleaning up: Avoid dry sweeping. Use water spraying / flushing or ventilated vacuum cleaning system. Use closed containers.

7. Handling and Storage

7.1. Handling

Micro Air

Avoid dust formation. Do not breathe dust. Use adequate exhaust ventilation and dust collection. Keep airborne dust concentrations below permissible national exposure limits. Do not rely on your sight to determine if dust is in the air. Respirable crystalline silica dust may be in the air without a visible dust cloud. In case of insufficient ventilation , wear a respirator approved for silica dust when using, handling, storing or disposing of this product or bag. See Section 8, for further information on respirators. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with EN standards. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing that has become dusty.

The OSHA Hazard Communication Standard, 29 CFR Sections 1910.1200, 1915.1200, 1917.28, 1918.90, 1926.59 and 1928.21, and state and local worker or community "right-to-know" laws and regulations should be strictly followed.

DO NOT USE U.S. SILICA COMPANY MATERIALS FOR SAND BLASTING

7.2. Storage

Ensure trapping of dust produced during loading and unloading. Keep containers closed and store bags as to avoid accidental bursting.

7.3. Specific uses

Apply safe handling recommendations in Section 7.1.

8. Exposure Controls / Personal Protection

8.1. Local Exhaust Ventilation:

Use sufficient local exhaust ventilation to reduce the level of respirable crystalline silica to below the OSHA PEL. See ACGIH "Industrial Ventilation, A Manual of Recommended Practice" (latest edition).

8.2. Respiratory Protection:

If it is not possible to reduce airborne exposure levels to below the OSHA PEL with ventilation, use the table below to assist you in selecting respirators that will reduce personal exposures to below the OSHA PEL. This table is part of the NIOSH Respirator Selection Logic, 2004, Chapter

III, Table 1, "Particulate Respirators". The full document can be found at www.cdc.gov/niosh/npptl/topics/respirators; the user of this MSDS is directed to that site for information concerning respirator selection and use. The assigned protection factor (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, so that if the workplace concentration of a particulate was 150 ug/m^3, then a respirator with an APF of 10 should reduce the concentration of particulate to 15 ug/m^3.

Assigned protection factor [1]	Type of Respirator (Use only NIOSH-certified respirators)
10	Any air-purifying elastomeric half-mask respirator equipped with appropriate type of particulate filter. [2] Appropriate filtering facepiece respirator. [2,3] Any air-purifying full facepiece respirator equipped with appropriate type of particulate filter. [2] Any negative pressure (demand) supplied-air respirator equipped with a half-mask.
25	Any powered air-purifying respirator equipped with a hood or helmet and a high efficiency (HEPA) filter. Any continuous flow supplied-air respirator equipped with a hood or helmet.
50	Any air-purifying full facepiece respirator equipped with N-100, R-100, or P-100 filter(s). Any powered air-purifying respirator equipped with a tight-fitting facepiece (half or full facepiece) and a high-efficiency filter. Any negative pressure (demand) supplied-air respirator equipped with a full facepiece. Any continuous flow supplied-air respirator equipped with a tight-fitting facepiece (half or full facepiece). Any negative pressure (demand) self-contained respirator equipped with a full facepiece.
1,000	Any pressure-demand supplied-air respirator equipped with a half-mask.

1. The protection offered by a given respirator is contingent upon (1) the respirator user adhering to complete program requirements (such as the ones required by OSHA in 29CFR1910.134), (2) the use of NIOSH-certified respirators in their approved configuration, and (3) individual fit testing to rule out those respirators that cannot achieve a good fit on individual workers.
2. Appropriate means that the filter medium will provide protection against the particulate in question.
3. An APF of 10 can only be achieved if the respirator is qualitatively or quantitatively fit tested on individual workers.

8.3. Exposure controls

8.3.1. Occupational exposure controls / guidelines

Component	CAS No.	Percentage (by wt.)	OSHA PEL		ACGHI TLV		NISOSH REL		
			TWA	STEL	TWA	STEL	TWA	STEL	Unit
Crystalline Silica (quartz)	14808-60-7	99.0 – 99.9%	$\frac{10}{\%\ SiO_2 + 2}$	None	0.025	None	0.05	None	mg / m^3

If crystalline silica (quartz) is heated to more than 870°C, it can change to a form of crystalline silica known as tridimite; if crystalline silica (quartz) is heated to more than1470°C it can change to a form of crystalline silica known as cristobalite. It OSHA PEL for crystalline silica as tridimite or cristobalite is one-half of the OSHA PEL for crystalline silica (quartz). N 2678°F

Engineering Controls:
Ventilation must be adequate to maintain the ambient workplace atmosphere below the exposure limit(s) outlined in Section 8.1 of this Safety Data Sheet.

Respiratory Protection
In case of exposure to dust, and in any case if such exposure is above regulatory limits (see above), wear a personal respirator as outlined in Section 8.2 above.

Eye / Face Protection:
If eye contact while using product may be anticipated, wear appropriate safety glasses with side shields or chemical goggles as described by European Standard EN 166.

Skin Protection
Wear chemical resistant gloves (such as latex or neoprene) and protective clothing to minimize skin contact. Substance may have drying effect on skin. Maintain good industrial hygiene. Protection recommended for workers suffering from dermatitis or sensitive skin.

8.3.2. Environmental Exposure Controls

No special requirements. There is no reported ecotoxicity for silica, a naturally occurring substance abundantly present in nature.

9. Physical and Chemical Properties

9.1. General Information

Physical State:	White or tan sand: granular, crushed or ground to a powder.
Odor:	None

9.2. Important Health, Safety and Environmental Information

pH:	6 - 8
Specific Gravity:	2.65 g/cc
Melting Point:	3110°F/1710°C
Freezing Point	Not Applicable
Boiling Point:	4046°F/2230°C
Flashpoint:	Not Applicable
Flammability:	Not Applicable
Explosive properties:	Not Applicable
Oxidizing properties:	contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires.
Vapor Pressure:	None
Relative Density:	Not Applicable
Solubility:	Silica will dissolve in hydrofluoric acid and produce a corrosive gas, silicon tetrafluoride
Water Solubility:	Insoluble
Percent Volatiles by Volume:	Not Applicable
Viscosity:	Not Applicable
Vapor density:	Not Applicable
Molecular Weight:	60.08
Evaporation rate:	Not Applicable

10. Stability and Reactivity

10.1. Chemical Stability:
Stable

10.2. Conditions to Avoid:
Contact with powerful oxidizing agents such as fluorine, chlorine trifluoride, and oxygen difluoride may cause fires

10.3. Materials / Chemicals to Be Avoided:
Contact with powerful oxidizing agents, such as fluorine, chlorine trifluoride and oxygen difluoride, may cause fires.

10.4. Hazardous Decomposition Products:
Silica will dissolve in hydrofluoric acid and produce the corrosive gas silicon tetrafluoride (SiF_4).

10.5. Hazardous Polymerization:
Will not occur.

11. Toxicological Information

The method of exposure to crystalline silica that can lead to the adverse health effects described below is inhalation.

A. SILICOSIS

The major concern is silicosis, caused by the inhalation and retention of respirable crystalline silica dust. Silicosis can exist in several forms, chronic (or ordinary), accelerated, or acute. Chronic or Ordinary Silicosis (often referred to as Simple Silicosis) is the most common form of silicosis, and can occur after many years of exposure to relatively low levels of airborne respirable crystalline silica dust. It is further defined as either simple or complicated silicosis. Simple silicosis is characterized by lung lesions (shown as radiographic opacities) less than 1 centimeter in diameter, primarily in the upper lung zones. Often, simple silicosis is not associated with symptoms, detectable changes in lung function or disability. Simple silicosis may be progressive and may develop into complicated silicosis or progressive massive fibrosis (PMF). Complicated silicosis or PMF is characterized by lung lesions (shown as radiographic opacities) greater than 1 centimeter in diameter. Although there may be no symptoms associated with complicated silicosis or PMF, the symptoms, if present, are shortness of breath, wheezing, cough and sputum production. Complicated silicosis or PMF may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease (cor pumonale). Accelerated Silicosis can occur with exposure to high concentrations of respirable crystalline silica over a relatively short period; the lung lesions can appear within five (5) years of initial exposure. Progression can be rapid. Accelerated silicosis is similar to chronic or ordinary silicosis, except that lung lesions appear earlier and progression is more rapid.

Acute Silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

B. CANCER

IARC - The International Agency for Research on Cancer ("IARC") concluded that there was "*sufficient evidence* in humans for the carcinogenicity of crystalline silica in the forms of quartz or cristobalite from occupational sources", and that there is "*sufficient evidence* in experimental animals for the carcinogenicity of quartz and cristobalite." The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is *carcinogenic to humans* (*Group 1*)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." For further information on the IARC

evaluation, see IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Volume 68,"Silica, Some Silicates..." (1997).

The EU Scientific Committee for Occupational Exposure Limits (SCOEL) concluded in June 2002 (SCOEL Sum Doc. 94-final): "The main effect in humans of inhalation of respirable silica dust is silicosis. There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore preventing the onset of silicosis will also reduce the cancer risk."

C. AUTOIMMUNE DISEASES

Several studies have reported excess cases of several autoimmune disorders, -- scleroderma, systemic lupus erythematosus, rheumatoid arthritis -- among silica-exposed workers. For a review of the subject, the following may be consulted: "Occupational Exposure to Crystalline Silica and Autoimmune Disease", Environmental Health Perspectives, Volume 107, Supplement 5, pp. 793-802 (1999); "Occupational Scleroderma", Current Opinion in Rheumatology, Volume 11, pp. 490-494 (1999).

D. TUBERCULOSIS

Individuals with silicosis are at increased risk to develop pulmonary tuberculosis, if exposed to persons with tuberculosis. The following may be consulted for further information: Occupational Lung Disorders, Third Edition, Chapter 12, entitled "Silicosis and Related Diseases", Parkes, W. Raymond (1994); "Risk of pulmonary tuberculosis relative to silicosis and exposure to silica dust in South African gold miners," Occup Environ Med., Volume 55, pp.496-502 (1998).

E. KIDNEY DISEASE

Several studies have reported excess cases of kidney diseases, including end stage renal disease, among silica-exposed workers. For additional information on the subject, the following may be consulted: "Kidney Disease and Silicosis", Nephron, Volume 85, pp. 14-19 (2000).

F. NON-MALIGNANT RESPIRATORY DISEASES

The reader is referred to Section 3.5 of the NIOSH Special Hazard Review cited below, for information concerning the association between exposure to crystalline silica and chronic bronchitis, emphysema and small airways disease. There are studies that disclose an association between dusts found in various mining occupations and non-malignant respiratory diseases, particularly among smokers. It is unclear whether the observed associations exist only with underlying silicosis, only among smokers, or result from exposure to mineral dusts generally (independent of the presence or absence of crystalline silica, or the level of crystalline silica in the dust).

Sources of information:

The ***NIOSH Hazard Review - Occupational Effects of Occupational Exposure to Respirable Crystalline Silica*** published in April 2002 summarizes and discusses the medical and epidemiological literature on the health risks and diseases associated with occupational exposures to respirable crystalline silica. The *NIOSH Hazard Review* should be consulted for additional information, and citations to published studies on health risks and diseases associated with occupational exposure to respirable crystalline silica. The *NIOSH Hazard Review* is available from NIOSH - Publications Dissemination, 4676 Columbia Parkway, Cincinnati, OH 45226, or through the NIOSH web site, www.cdc.gov/niosh/topics/silica, then click on the link "NIOSH Hazard Review: Health Effects of Occupational Exposure to Respirable Crystalline Silica".

12. Ecological Information

12.1. Ecotoxicological Information:
Crystalline silica (quartz) is not known to be ecotoxic; i.e., there are no data that suggests that crystalline silica (quartz) is toxic to birds, fish, invertebrates, microorganisms or plants.

13. Disposal Considerations

13.1. Waste Disposal Method:
Discard any product, residue, disposable container or liner in full compliance with national regulations.

13.2. Container Handling and Disposal:
Dispose of container and unused contents in accordance with national regulations.

14. Transportation Information

Shipping Name:

ADR/RID/IMO/ICAO /US DOT	**Proper Shipping Name**	Not Regulated
	Hazard Class	Not Regulated
	ID Number	Not Regulated
	Packaging Group	Not Regulated

Crystalline silica (quartz) is not a hazardous material for purposes of transportation under the U. S. Department of Transportation Table of Hazardous Materials, 49 CFR §172.101.

15. Regulatory Information

Silica sand has no harmonized classification & labeling under Directives 67/548/EEC and 1999/45/EC. Because the respirable fraction is high (10% and more) in ground silica (flour), the preparation is self-classified as Xn (harmful). In such case, the following risk and safety phrases are applicable.

Risk Phrases:
R 48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Safety Phrases:
S 22: Do not breathe dust
S 38: In case of insufficient ventilation, wear suitable respiratory equipment.

UNITED STATES (FEDERAL AND STATE)

TSCA No.: Crystalline silica (quartz) appears on the EPA TSCA inventory under the CAS No. 14808-60-7.

RCRA: Crystalline silica (quartz) is not classified as a hazardous waste under the Resource Conservation and Recovery Act, or its regulations, 40 CFR §261 et seq.

CERCLA: Crystalline silica (quartz) is not classified as a hazardous substance under regulations of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 40 CFR §302.

Emergency Planning and Community Right to Know Act (SARA Title III): Crystalline silica (quartz) is not an extremely hazardous substance under Section 302 and is not a toxic chemical subject to the requirements of Section 313.

Clean Air Act: Crystalline silica (quartz) mined and processed by U.S. Silica Company is not processed with or does not contain any Class I or Class II ozone depleting substances.

FDA: Silica is included in the list of substances that may be included in coatings used in food contact surfaces, 21 CFR §175.300(b)(3)(xxvi).

NTP: Respirable crystalline silica, primarily quartz dusts occurring in industrial and occupational settings, is classified as Known to be a Human Carcinogen.

OSHA Carcinogen: Crystalline silica (quartz) is not listed.

California Proposition 65: Crystalline silica (airborne particles of respirable size) is classified as a substance known to the State of California to be a carcinogen.

California Inhalation Reference Exposure Level (REL): California established a chronic REL of 3 µg for silica (crystalline, respirable). A chronic REL is an airborne level of a substance at or below which no adverse health effects are anticipated in individuals indefinitely exposed to the substance at that level.

Massachusetts Toxic Use Reduction Act: Silica, crystalline (respirable size, <10 microns) is "toxic" for purposes of the Massachusetts Toxic Use Reduction Act.

Pennsylvania Worker and Community Right to Know Act: Quartz is a hazardous substance under the Act, but it is not a special hazardous substance or an environmental hazardous substance.

CANADA

Domestic Substances List: U. S. Silica Company products, as naturally occurring substances, are on the Canadian DSL.

WHMIS Classification: D2A

OTHER

EINECS No.: 238-878-4

EEC Label (Risk/Safety Phrases): R 48/20, S22, S38

CLP Label (Hazard Class/Hazard Statement/Precaution Statements):
STOT RE 1/ H372/ P260, P285, P501

IARC: Crystalline silica (quartz) is classified in IARC Group 1.

Australian Inventory of Chemical Substances (AICS): All of the components of this product are listed on the AICS inventory or exempt from notification requirements.

Japan Ministry of International Trade and Industry (MITI): All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law Registry Number 1-548.

Korea Existing Chemicals Inventory (KECI) (set up under the Toxic Chemical Control Law): Listed on the ECL with registry number 9212-5667.

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed for PICCS.

National, state, provincial or local emergency planning, community right-to-know or other laws, regulations or ordinances may be applicable--consult applicable national, state, provincial or local laws.

16. Other Information

16.1 Hazardous Material Information System (HMIS):

Health	*
Flammability	0
Reactivity	0
Protective Equipment	E

* For further information on health effects, see Sections 2, 8 and 11 of this MSDS.

16.2 National Fire Protection Association (NFPA):

Health	0
Flammability	0
Reactivity	0

16.3 Web Sites with Information about Effects of Crystalline Silica Exposure:

The U. S. Silica Company web site will provide updated links to OSHA and NIOSH web sites addressing crystalline silica issues: www.u-s-silica.com, click on "Info Center", then click on "Health & Safety".

U. S. Silica Company Disclaimer

The information and recommendations contained herein are based upon data believed to be up-to-date and correct. However, no guarantee or warranty of any kind, express or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects that may be caused by purchase, resale, use or exposure to our silica. Customers and users of silica must comply with all applicable health and safety laws, regulations, and orders. In particular, they are under an obligation to carry out a risk assessment for the particular work places and to take adequate risk management measures in accordance with the national implementation legislation of EU Directives 89/391 and 98/24.

ISSUE DATE: August 15, 1985

MATERIAL SAFETY DATA SHEET

To the Purchaser: This MSDS contains important environmental, health and toxicology information for your employees who have ordered this product. Please be sure this information is given to them. If you resell this product, a copy of the MSDS should be given to the buyer.

MANUFACTURER'S NAME	PHONE NO:
Ferro Corporation, Abrasives Division	716/825-7900
ADDRESS (Number, Street, City, State, & Zip Code) 661 Willet Road, Buffalo, NY 14218	

SECTION I

LABEL NAME & SYNONYMS	TRADE NAME & SYNONYMS
Silicon Carbide	Electrocarb
CHEMICAL FAMILY: Carbide	FORMULA/CHEMICAL NAME: SiC

SECTION II

OSHA POTENTIAL HAZARDOUS SUBSTANCE COMPOSITION	CAS #	%	SPEC.	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONC.	LC_{50} HOURS
Silicon Carbide	000409-21-2	100	NA	<5000 mg/kg	NA	NA	NA

ADDITIONAL INFORMATION

INFORMATION FOR MIXTURES IS BASED ON CONSTITUENT MSDS WHICH ARE AVAILABLE UPON REQUEST. (Minus Proprietary Trade Names)
N/A

SECTION IV PHYSICAL HAZARD DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1) Apparent	3.2
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	0%
VAPOR DENSITY (AIR =1)	NA	EVAPORATION RATE (BUTYL ACETATE=1)	N/A
SOLUBILITY IN WATER	not soluble	Melting Point:	Sublimes 2600°C
APPEARANCE & ODOR	black-odorless		

SECTION IV FIRE & EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	NA	FLAMMABLE LIMITS	Lel NA	Uel NA
EXTINGUISHING MEDIA	NA			
SPECIAL FIRE FIGHTING PROCEDURES	None required			
UNUSUAL FIRE & EXPLOSION HAZARDS AND OTHER PHYSICAL HAZARDS (See below for data on reactivity)	None			

SECTION V REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	None
INCOMPATIBILITY (Materials to Avoid)	None		
HAZARDOUS DECOMPOSITION PRODUCTS	None		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VI HEALTH HAZARD DATA

PRIMARY ROUTES OF ENTRY: Nasal

PUBLISHED EXPOSURE LIMITS: None

LISTED AS A CARCINOGEN? Yes [ ] No [X]

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Lung irritation may be evidenced by shortness of breath.

EFFECTS OF OVEREXPOSURE (Include any medical conditions that are generally recognized as being aggravated by exposure)

Prolonged exposure of dust may lead to pulmonary problems.

EMERGENCY AND FIRST AID PROCEDURES

Remove person from the dusty area.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Uncontaminated material may be scooped up for use.
If contaminated scoop or vacuum into a receptacle for disposal.

WASTE DISPOSAL METHOD

Use a sanitary landfill in accord with local, state and federal regulation.

PROTECTIVE MEASURES FOR REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT

Wipe off with damp cloth.

SECTION VIII RECOMMENDED CONTROL MEASURES

RESPIRATORY PROTECTION (Specify Type) U.S.Bureau of Mines approved for dusts and pneumoconiosis.

VENTILATION	LOCAL EXHAUST	Normal dust collector	SPECIAL
	MECHANICAL (General)	NA	Not necessary

PROTECTIVE GLOVES: Not necessary EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT

Not necessary

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING (Including appropriate hygenic practices)

Not necessary

Judgements as to the suitability of information herein or the purchaser's purposes are necessarily the purchaser's responsibility. Reasonable care has been taken in the preparation of this information, but FERRO EXTENDS NO WARRANTIES, MAKES NO REPRESENTATIONS AND ASSUMES NO RESPONSIBLILITY AS TO ACCURACY OR SUITABILITY OF THIS INFORMATION FOR ANY PURCHASER'S USE OR FOR ANY CONSEQUENCE OF ITS USE.

Section 1 (General Information)

MABCO
542 Collins Blvd.
Orrville, OH 44667

Emergency Telephone: 800-535-5053
Information Calls: 330-683-2200
Fax Number: 330-683-8200

Prepared By: Timothy Sheehan

Date Prepared: 03/13/2002

Section 2 (Hazardous Ingredients/Identity)

HAZARDOUS INGREDIENTS (CHEMICAL/COMMON NAMES)	OSHA PEL	ACGIH PEL	CAS#
SODIUM SILICATE (Water Glass)	This material has no OSHA PEL or ACGIH TLV. The manufacturer recommends a limit of 5 mg/m3.		

HMIS DATA: Health 1 Flammability 0 Reactivity 0

Section 3 (Physical and Chemical Characteristics)

Boiling Point: 212 F (IBP) Density: 1.35 – 1.50 g/cc Vapor Pressure (mm Hg): Nil @ 68 F
Solubility in Water: Liquid portion completely miscible. Vapor Density: Nil.
Reactivity in Water: Not reactive.
Appearance and Odor: Slightly cloudy to slightly milky white liquid, nil odor.
Melting Point: N/A. This material is a liquid.
Total VOC For This Mixture: None.

Section 4 (Fire and Explosion Data)

Flash Point: N/A Method Used: (TCC)
Flammable Limits In Air (% by volume)
LEL (lower explosion limit): N/A UEL (upper explosion limit): N/A
Auto-ignition Temperature: Not determined for this mixture.
Extinguisher Media: Not applicable.
Special Fire Fighting Procedures: Material is not flammable, nor will it support combustion.
Unusual Fire and Explosion Hazards: This product is not flammable or explosive. Un-vented containers may rupture due to pressure at high temperatures due to water evaporation. Move containers to cool area or keep cool with water stream. Do not cut, weld, reuse or otherwise modify empty containers. Send them to an approved reconditioner for recycling.

Section 5 (Physical Hazards/Reactivity Data)

Stability: Stable under normal storage conditions. Do not allow material to freeze. Freezing will render the product unusable.
Incompatibility (Materials to Avoid): Avoid contact with acids.
Conditions to Avoid: Stable under normal storage conditions.
Hazardous Polymerization: Will not occur.
Hazardous Decomposition Products: Oxides of carbon..

Section 6 (Health Hazards)

Acute Hazards: Eye and skin irritation.
Chronic Hazards: Skin irritation.
Signs and Symptoms of Overexposure: Dry skin, dermatitis.
Medical Conditions Generally Aggravated by Overexposure: Preexisting dermal conditions.
Agencies that list any of These Ingredients as Carcinogenic: None.

EMERGENCY and FIRST AID PROCEDURES

Inhalation: Not an acute inhalation hazard. If large amount of mist or spray is inhaled, move victim to fresh air. Consult a physician.
Eyes: Flush with copious amounts of fresh water. Seek medical attention.
Skin: Wash with mild soap and water. Remove contaminated clothing.
Ingestion: Product is alkaline (basic). If ingested seek immediate medical attention.

Section 7 (Special Precautions/Spill or Leak Procedures)

Precautions to be taken in Handling and Storage: Keep containers and transfer vessels sealed when not in use to prevent the evaporation of the liquid portion.
Other Precautions: Keep this material away from accidental contact with acids, both organic and inorganic.
Steps to be taken for Spills or Leaks: Do not flush to sewer or watercourse without approval. This product is alkaline (pH approximately 10.5 – 11). Absorb small spills with inert material such as sand. Contain larger spills with dikes or absorbents. Place unusable material into lidded containers for disposal.
Waste Disposal Methods: Dispose of in accordance with all Local, Regional, State, and Federal regulations.

Section 8 (Special Protection Information)

Respiratory Protection: NIOSH approved for mists.
Ventilation Recommendations: Local exhaust recommended. Use mechanical ventilation if TLVs for mists are expected to be exceeded.
Protective Equipment: Use personal protective equipment as required to keep exposure below recommended limits. Such equipment may include, but is not limited to, vinyl/rubber gloves, aprons, and chemical splash goggles.
Work/Hygienic Practices: Use good personal hygiene practices.

REGULATORY INFORMATION

SARA 311/312: Acute Health Hazard. Sodium Silicate Solution, 90% maximum by weight.
SARA 313: Not Applicable.

Ben Haugh

AMERICAN TALC COMPANY
MATERIAL SAFETY DATA SHEET
PIONEER TALC

EFFECTIVE DATE: March 21, 2007 **PREVIOUS ISSUE**: October 6, 2006

REGULATORY COMPLIANCE:

- British Legislation, CHIP
- EC-directive 93/112/EC & 91/155/EC
- EC 67/548 (R51) & (R53)
- Canadian WHMIS
- US OSHA Hazard Communication Standard 29 CFR 1900.1200
- US OSHA Communication Standard 29 CFR 1910.1001

1. IDENTIFICATION OF THE SUBSTANCE AND THE COMPANY

PRODUCT NAME: PIONEER TALC
MANUFACTURER'S NAME: AMERICAN TALC COMPANY
ADDRESS: I-10 Exit 129, Allamore, TX 79855 USA **TELEPHONE NO**: (432) 283-2330

2. COMPOSITION/ INFORMATION ON INGREDIENTS

CHEMICAL NAME: Talc **PRODUCTS NAMES**: 767, MB-92, 1599, 2606, 2620, 2655BW, 2655NC, 2655, 2661 2664, 2720, 2871, 2882, 2893, 4304, 4306, 4317, 4319, 4320, 4392, 4388, 4404, 4411, 4416, 2899-L, 2899-D, 4319-C, AM-99, AM-88, T-40, T-80

****ANALYSIS OF AMERICAN TALC PRODUCTS BY TEM, SEM, PLM, AND EDX HAVE VERIFIED THERE ARE NO ASBESTIFORM MINERALS PRESENT.**

CHEMICAL FAMILY: Magnesium Silicate **FORMULA**: $Mg_3Si_4O_{10}(OH)_2$
CAS NO.: 14807-96-6
Pioneer talc is a naturally occurring mineral, which may contain varying amounts of the following minerals:
Chlorite: CAS # 1318-59-8, 0-2% Calcite: CAS # 13397-26-7,0-2%
Crystalline Silica (Quartz) SiO_2 CAS # 14808-60-7, 0.1-2.0%

3. HAZARDS IDENTIFICATION

- **Talc** is not listed as a carcinogen by OSHA, NTP or IARC. However Pioneer talc contains crystalline silica at levels greater than 0.1% but less than 2 %. These levels are 'typical' and may change slightly with different lots
- **CARCINOGENICITY:** This product contains crystalline silica. Repeated, prolonged inhalation of dust may cause delayed lung injury, which may result in silicosis or pneumoconiosis. The International Agency For Research On Cancer in its publication, "IARC Monographs On the Evaluation Of The Carcinogenic Risk To Humans-Silica, Some Silicates, Coal Dust and Para-aramid Fibrils"-Volume 68, 1997 has concluded that there is sufficient evidence of the carcinogenicity of crystalline silica in humans, and has, therefore, classified crystalline silica in, Group 1, Carcinogenic to Humans. The National Toxicology Program's ("NTP's") Ninth Annual Report on Carcinogens 2000, lists crystalline silica (respirable) as a substance which is known to be a human carcinogen. In humans, a number of studies have found an association between lung cancer and exposure to dust containing respirable crystalline silica. While the IARC working group concluded there was sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or crystobalite, it noted that carcinogenicity in human was not detected in all circumstances studied.
- **Note**: The state of California requires the following statements:
  "Airborne particles of respirable size of crystalline silica are known to the State of California to cause cancer"
- **CRYSTALLINE SILICA (QUARTZ) SiO_2 CAS NO. 14808-60-7**

4. FIRST AID MEASURES

No special procedures are required. Some eye, mucous membrane and skin sensitivity may occur with allergic individuals. First aid consists of washing away dust. In case of discomfort by dust, move to a ventilated area and consult a physician.
Eyes: Wash eyes with large amount of water or saline solution. If irritation or redness develops, get medical attention.
Ingestion: Give large quantities of water to induce vomiting, keep head lower than hips to prevent aspiration. Get medical help.

5. FIRE-FIGHTING MEASURES

Talc is not flammable.

6. ACCIDENTAL RELEASE MEASURES

Talc waste is not reactive, flammable or biodegradable. Use conventional means; e.g. sweeping, vacuum, etc. Use caution on wet floor, as it may be slippery.

7. HANDLING AND STORAGE

Avoid dust formation. Keep container tightly closed.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

OSHA PEL	ACGIH TLV
Table Z-3	RESPIRABLE DUST (TWA-8 Hours Period)
20 mppcf (2 mg/cu. meter)	2 mg/cu. meter

Quartz: (Respirable) 0.1 mg/cu. meter/% SiO2 (Respirable) 0.05 mg/cu. meter
The exposure limits of TALC are shown in Z-3-Mineral Dust, published by OSHA (29 CFR 1910.1000) USA.

RESPIRATORY PROTECTION: NIOSH approved duct respirator should by used when level exceeds TLV.
VENTILATION: Normal air circulation, use adequate ventilation for low TLV
LOCAL EXHAUST: Collect excessive dust at point of generation
PROTECTIVE GLOVES & EYE PROTECTION: Impermeable gloves and Eye protective glasses are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

DECOMPOSTION POINT: ~1000° C (1830° F) **SPECIFIC GRAVITY (WATER=1)**: 2..5-2..8
SOLUBILITY IN WATER: Insoluble **% VOLATILE BY VOL**: Non-Volatile
HARDNESS: 1 MOHS **APPEARANCE**: White to Off-white powder
ODOR: Odorless **EVAPORATION RATE (BUTYL ACET.=1)**: N/A

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable **CONDITIONS TO AVOID**: None
MATERIALS TO AVOID: Strong acids and alkalis
HAZARDOUS DECOMPOSITION PRODUCTS: None

11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS (ACUTE & CHRONIC): May cause eye and skin irritation. Ingestion may cause gastrointestinal irritation, nausea and diarrhea.
Long-term exposure to high amount of talc without the approval dust mask may lead to chronic cough and dyspepsia.

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects: No known effect on environment expected under normal use.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Use normal solid waste, disposal methods to comply with Federal and local laws.

14 TRANSPORT INFORMATION

Not classified as dangerous material by DOT. NO special precautions are required.

15. REGULATORY INFORMATION

Canadian WHMIS: D2A
CANADIAN DOMESTIC SUBSTANCES LIST: As a naturally occurring substance, talc is considered to be on the Canadian DSL.
CERCLA: 40 CFR Par 302, Table 302.4 Talc is not listed. Notification of the spill is not required.
EPA-TCLP: 40 CFR Part 261-24, appendix II—Table 1, No noticeable amount of Toxic substances leaches out.
RCRA: Talc is not classified as a hazardous waste under Section 3001 of RCRA, and under regulation 40 CFR Part 261.4 (b)(7).
SARA TITLE III: This product is not subject to SARA Title III
TSCA CHEMICAL SUBSTANCES INVENTORY: Talc is listed, CAS # 14807-96-6
Conformance of Talc to FDA regulations: Please note that talc meets the FDA criteria covering the safe use of talc in articles intended for food contact use.

21 CFR 73.1550	Color Additive
21 CFR 175.300(b)(3)(xxvi)	Resinous and Polymeric Coatings
21 CFR 182.70 & 21 CFR 182.90	Food Contact Surface Component

Talc meets Food Chemical Codex (FCC) specifications and can be used as a direct or indirect food additive.

16. OTHER INFORMATION

NPCA/CPMA HMIS Ratings:
HEALTH: 1 **FLAMMABILITY**: 0
REACTIVITY: 0 **PERSONAL PROTECTION**: E

17. LEGAL DISCLAIMER

While the information contained in this MSDS is believed to be reliable, no guarantee is made as to its accuracy or completeness. The conditions of use, handling, storage, and disposal, and the suitability of the product are assumed by the user. We expressly disclaim all warranties of every kind and nature, express or implied, including the warranties of merchantability and fitness for a particular purpose.

DATE OF ISSUE: October 6, 2006

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: SUPER 3000* MIX 26
Internal ID: 5522

MSDS No: PREMIER / 5522
Revision: 8/90
Date: August, 1990

National Paint and Coatings Association

Hazardous Material Identification System

HEALTH HAZARD	2*
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	0

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: SUPER 3000* MIX 26

Description: SUPER 3000* MIX 26 MORTAR is an air-setting, premium quality, super duty refractory mortar mix to which has been added ethylene glycol for winter protection.

CAS: mixture

*SUPER 3000 is a registered trademark of Premier Refractories and Chemicals, Inc.

Manufacturer: PREMIER REFRACTORIES AND CHEMICALS **Phone:** 215/337-1100

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	**CAS Number:**	**Percent:**	**Exposure Limits:**
Aluminosilicate	1302-93-8	>50	See TLV for Mixture
Clay	Non-assigned	5-25	See TLV for Mixture
Sodium Silicate	1344-09-8	5-25	See TLV for Mixture
Quartz (SiO_2)	14808-60-7	1-10	Total Dust: TWA = 30mg/m^3 divided by (%SiO_2 + 2) Respirable= 0.1mg/m^3
Fused Glass (SiO_2)	60676-86-0	1-10	Respirable= 0.1mg/m^3
Ethylene Glycol	107-21-1	0-1	OSHA Ceiling = 50 PPM, 125 mg/m^3.
Water	7732-18-5	1-10	See TLV for Mixture

The TLV:TWA calculated for this product is 1.1 mg/m^3 respirable dust.The TLV:TWA for total dust is 3.5 mg/m^3.

The TLV:TWA for the product is calculated using the general formula given in ACGIH Adopted Appendix C, Subpart A2, Threshold Limit Values for Mixtures of Mineral Dust.

Some of the above ingredients may be integral mineralogical constituents contained in

PREMIER REFRACTORIES AND CHEMICALS, INC.
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INGREDIENTS AND HAZARDS continued from page 1

the matrix of the raw materials.

Please be aware that the product in its current state is moist and dust free.

SECTION III. PHYSICAL DATA

Appearance & Odor: Light gray mixture of fine material in a trowelable mortar consistency. No detectable odor.

Boiling point: Not Applicable
Vapor pressure: Not Applicable
Water solubility (%): 1-3
Vapor density (air=1): Not Applicable
pH: 10-11.5 (10% Aqueous Slurry)
Evaporation rate: Not Applicable
Specific gravity (H_2O=1): 1.5 (94 lbs/ft^3)
Melting point: >2000°F
% volatile by volume: 1-3 (H_2O)

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point (method): Not Applicable

NFPA Fire Hazard Symbol Codes: Flammability: 0 **Health:** 1 **Reactivity:** 0 **Special:** 0

Extinguishing Media: This refractory product is non-combustible. Use extinguishing media appropriate to the surrounding area.

Unusual fire or explosion hazards: None

Special fire-fighting procedures: None

This product contains less than 1% ethylene glycol which when initially heated can give off small amounts of acrid smoke and fumes.

SECTION V. REACTIVITY DATA

Material is stable under all normal conditions of storage. Hazardous polymerization will not occur .

Chemical incompatibilities: Product will react with acids generating heat and steam.

Hazardous decomposition Products: This product contains 0.5% ethylene glycol which will give off small amounts of acrid smoke and fumes during initial burn-in of the refractory.

This material is stable under normal conditions storage. It does contain an air-setting bond. Store in sealed containers.

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: SUPER 3000* MIX 26
Internal ID: 5522

MSDS No: PREMIER / 5522
Revision: 8/90
Date: August, 1990

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: The alkali (sodium silicate) component in this product is caustic to the eyes and can cause irritation to the skin on repeated or prolonged contact. Some of the Health Hazard Information applies to dried material and any dust that may result therefrom. Dust from the product contains crystalline silica and a dust mask must be used where the TLV is exceeded.

Medical conditions which may be aggravated by contact: Pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Primary entry route(s): Inhalation

Acute effects: Eye and skin irritant. Transitory upper respiratory physical irritation.

Chronic effect(s): Excessive inhalation above (PEL) of crystalline silica (free silica) over long periods of time may cause a disabling lung disease (silicosis) which reduces breathing capacity, and lead to increased susceptibility to other lung disease. On the basis of initial experimental tests in animals and limited epidemilogical studies in human populations, the International Agency for Research on Cancer (IARC) has concluded that there is limited evidence for the carcinogenicity of crystalline silica to humans. IARC has classified crystalline silica as a "Probable Human Carcinogen", Group 2A. IARC has convened a special task force to review the carcinogenicity of silica.

Signs & symptoms of overexposure:

Eye contact: Caustic irritation and inflammation.

Skin contact: Irritation from repeated or prolonged contact.

Inhalation: Upper respiratory irritation.

First aid:

Eye contact: Flush eyes thoroughly with water for 15 minutes. If irritation persists, seek medical attention.

Skin contact: Wash with mild soap and water,

Inhalation: Remove to fresh air.

Ethylene Glycol CAS# 107-21-1 is under study, with quality assessment in progress by NTP. It is a suspected carcinogen.

MSDS 5522 continues on page 4

PREMIER REFRACTORIES AND CHEMICALS, INC.
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KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: SUPER 3000* MIX 26
Internal ID: 5522

MSDS No: PREMIER / 5522
Revision: 8/90
Date: August, 1990

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Spill / Leak procedures: Carefully scoop up material into a suitable container. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

Waste management / Disposal: Product is non-biodegradable, and does not possess characteristics of a hazardous waste. Dispose of in accordance with local, state, and federal regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Personal protective equipment:

Other: The use of eye protection, gloves, and long sleeve clothing is recommended.

Workplace considerations:

Ventilation: Provide adequate general ventilation and local ventilation to control mist and/or dust levels to no more than the TLV.

SECTION IX. SPECIAL PRECAUTIONS

Other precautions:
SARA TITLE III INFORMATION
This product contains 0-1% Ethylene Glycol CAS# 107-21-1 reportable under SARA TITLE III, Section 313.

All substances contained in this product are listed on Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

REMOVAL AFTER SERVICE PRECAUTIONS
Because of the possible presence of crystalline silica in used refractory debris, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. Following are recommended precautions to be taken during removal:
1. EMPLOYEES SHOULD BE APPRISED OF THE HAZARDS AND PROPER CONDITIONS AND PRECAUTIONS FOR SAFE USE OR EXPOSURE.
2. Approved respirators, in accordance with requirements of 29 CFR 1910.134, should be used for dust levels above 0.05 mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by the use of dust control equipment or water spray.
4.Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA/ AVOID BREATHING DUST/ DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

PREMIER REFRACTORIES AND CHEMICALS, INC.
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SPECIAL PRECAUTIONS continued from page 4

DOT Class: Not regulated

Prepared/revised by: A.G. Nighswander

August 28, 1990

Although reasonable care has been taken in the preparation of the information contained herein, Premier Refractories and Chemicals, Inc. extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information to purchaser's intended purposes or for consequences of its use.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: SUPER CASTABLE 32*
Internal ID: 5392

MSDS No: PREMIER / 5392
Revision: 8/90, 2/90
Date: August, 1990

National Paint and Coatings Association

Hazardous Material Identification System

HEALTH HAZARD	2*
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	0

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: SUPER CASTABLE 32*

Description: Super Castable 32* is a specifically formulated hydraulic setting castable refractory mix with a 3000°F service limit.

CAS: mixture

*SUPER CASTABLE 32 is a registered trademark of Premier Refractories and chemicals, Inc.

Manufacturer: PREMIER REFRACTORIES AND CHEMICALS **Phone:** 215/337-1100

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	CAS Number:	Percent:	Exposure Limits:
Aluminosilicate	1302-93-8	>50	See TLV for Mixture
Alumina	1344-28-1	1-10	See TLV for Mixture
Quartz (SiO_2)	14808-60-7	1-10	Total Dust 8HrTWA= 30 mg/m^3 divided by ($\%SiO_2$ + 2). Respirable= 0.1mg/m^3
Cristobalite (SiO_2)	14464-46-1	10-15	0.05mg/m^3 respirable
Silica, Fused (SiO_2)	60676-86-0	1-10	0.1 mg/m^3 respirable
Cement, Calcium Aluminate	12042-68-1	1-25	See TLV for Mixture

The TLV:TWA calculated for this product is 0.24 mg/m^3 respirable dust.

The TLV:TWA for the product is calculated using the general formula given in ACGIH Adopted Appendix C, Subpart A2, Threshold Limit Values for Mixtures of Mineral Dust.

Some of the above ingredients are integral mineralogical constituents contained within the matrix of the raw materials.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: SUPER CASTABLE 32*
Internal ID: 5392

MSDS No: PREMIER / 5392
Revision: 8/90, 2/90
Date: August, 1990

SECTION III. PHYSICAL DATA

Appearance & Odor: Light brown, granular to fine material with no detectable odor.

Boiling point: Not Applicable
Vapor pressure: Not Applicable
Water solubility (%): slight
Vapor density (air=1): Not Applicable
pH: 11.5 (10% Aqueous Slurry)

Evaporation rate: Not Applicable
Specific gravity (H_2O=1): 2-2.2
Melting point: >1500°C
% volatile by volume: nil

SECTION IV. FIRE AND EXPLOSION DATA

NFPA Fire Hazard Symbol Codes: Flammability: 0 **Health:** 0 **Reactivity:** 0 **Special:** 0

Extinguishing Media: This refractory product is non-combustible. Use extinguishing media appropriate to the surrounding area.

Unusual fire or explosion hazards: None

Special fire-fighting procedures: None

SECTION V. REACTIVITY DATA

Material is stable under all normal conditions of storage. Hazardous polymerization will not occur .

Hazardous decomposition Products: None

This material is stable under normal conditions of dry storage. It does contain cement so moisture can cause premature consolidation.

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: The cement component in this product is caustic to the eyes and can cause irritation to the skin on repeated or prolonged contact. Dust from the product contains crystalline silica and a dust mask must be used where the TLV is exceeded.

Medical conditions which may be aggravated by contact: Pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Target organs: Lungs, respiratory tract.

Primary entry route(s): Inhalation

Acute effects: Transitory upper respiratory physical irritation.

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Product: SUPER CASTABLE 32*
Internal ID: 5392

MSDS No: PREMIER / 5392
Revision: 8/90, 2/90
Date: August, 1990

HEALTH HAZARD INFORMATION continued from page 2

Chronic effect(s): Excessive inhalation above (PEL) of crystalline silica (free silica) over long periods of time may cause a disabling lung disease (silicosis) which reduces breathing capacity, and lead to increased susceptibility to other lung disease. On the basis of initial experimental tests in animals and limited epidemilogical studies in human populations, the International Agency for Research on Cancer (IARC) has concluded that there is limited evidence for the carcinogenicity of crystalline silica to humans. IARC has classified crystalline silica as a "Probable Human Carcinogen", Group 2A. IARC has convened a special task force to review the carcinogenicity of silica.

Signs & symptoms of overexposure:

Eye contact: Caustic irritation and inflammation.

Skin contact: Irritation from repeated or prolonged contact.

Inhalation: Upper respiratory irritation from dehydration action of cement on mucous membranes.

First aid:

Eye contact: Flush eyes thoroughly with water for 15 minutes. If irritation persists, seek medical attention.

Skin contact: Wash with mild soap and water,

Inhalation: Remove to fresh air.

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Spill / Leak procedures: Carefully scoop up material into a suitable container. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

Waste management / Disposal: Product is non-biodegradable, and does not possess characteristics of a hazardous waste per EPA TCLP method.
Dispose of in accordance with local, state, and federal regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Personal protective equipment:

Other: The use of eye protection, gloves, and long sleeve clothing is recommended.

PREMIER REFRACTORIES AND CHEMICALS, INC.
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KING OF PRUSSIA, PA. 19406
Phone: Health and Safety 215/337-1100

Product: SUPER CASTABLE 32*
Internal ID: 5392

MSDS No: PREMIER / 5392
Revision: 8/90, 2/90
Date: August, 1990

SPECIAL PROTECTION INFORMATION continued from page 3

Workplace considerations:

Ventilation: Provide adequate general ventilation and local ventilation to control mist and/or dust levels to no more than the TLV.

SECTION IX. SPECIAL PRECAUTIONS

Special handling / storage: Store in dry area.This product contains cement, which will result in premature consolidation if exposted to moisture during storage.

Other precautions:
SARA TITLE III INFORMATION
This product does not contain any substances reportable under SARA TITLE III Sections 302, 304, and 313.

All substances contained in this product are listed on Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

REMOVAL AFTER SERVICE PRECAUTIONS
Because of the possible presence of crystalline silica in used refractory debris, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. Following are recommended precautions to be taken during removal:
1. EMPLOYEES SHOULD BE APPRISED OF THE HAZARDS AND PROPER CONDITIONS AND PRECAUTIONS FOR SAFE USE OR EXPOSURE.
2. Approved respirators, in accordance with requirements of 29 CFR 1910.134, should be used for dust levels above 0.05 mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by the use of dust control equipment or water spray.
4.Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing crystalline silica, the following warning should be posted: FREE SILICA WORK AREA/ AVOID BREATHING DUST/ DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

DOT Class: Not regulated

Prepared/revised by: A.G. Nighswander

August 3, 1990

Although reasonable care has been taken in the preparation of the information contained herein, Premier Refractories and Chemicals, Inc. extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information to purchaser's intended purposes or for consequences of its use.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: SVENSKA SILICA

Internal ID: 5623SV
MSDS No: 5623SV
Revision: 11/92
Date: 11/88

National Paint and Coatings Association

Hazardous Material Identification System

HEALTH HAZARD	2 - See "Chronic Effects" in Section VI.
FLAMMABILITY HAZARD	0 - Minimal
REACTIVITY HAZARD	0 - Minimal
PERSONAL PROTECTION	B - Glasses, gloves and long sleeve clothing.

SECTION I. MATERIAL IDENTIFICATION

Trade/Material Name: SVENSKA SILICA

Description: SVENSKA SILICA is a dry, silica based, vibratable refractory mix. The product is a unique, high purity silica, premixed with either boric acid, boron oxide, or without chemical bond, to customer's specification. The products are used in lining coreless induction furnaces, and also used in melting of gray iron, ductile iron and malleable iron and can be utilized in the melting of ni-hard, ni-resist, and chrome-iron alloys.

CAS#: Mixture

Distributor: Premier Refractories and Chemicals, Inc. **Phone:** 215/337-1100

Manufacturer: Forshammars Bergverk Goteberg Sweden

SECTION II. INGREDIENTS AND HAZARDS

Ingredient Name:	CAS Number:	Percent:	Exposure Limits:
Silica (Quartz)(1)	14808-60-7	98-100	ACGIH & OSHA TLV/PEL:TWA Total Dust - 30 mg/m^3 divided by (%SiO_2 + 2); Respirable Quartz - 0.10 mg/m^3.
Boron Oxide (B_2O_3)	1303-86-2	0-1.0	ACGIH TLV:TWA Total Dust - 10 mg/m^3. OSHA Final Limits for total dust - 10 mg/m^3.
Boric Acid (H_3BO_3)	10043-35-3	0-1.8	None Established

(1) Quartz is a polymorph of crystalline silica. Identified by IARC as a "Probable Human Carcinogen", Group 2A. Respirable quartz listed by NTP in their 1991 Annual Report on Carcinogens.

The TLV:TWA calculated for respirable dust generated from this product is 0.10mg/m$_3$. The TLV was calculated using the general formula given in ACGIH Appendix C, Subpart A2, Threshold Limit Values for Mixtures of Mineral Dust.

Material Safety Data Sheet

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: SVENSKA SILICA

Internal ID: 5623SV
MSDS No: 5623SV
Revision: 11/92
Date: 11/88

SECTION III. PHYSICAL DATA

Appearance and Odor: Gray, odorless, mixture of granular to fine particles.

Boiling Point: Not Applicable
Specific Gravity: 2.1 (130 lbs/ft^3)
pH (10% Aqueous Slurry): 4-6
Melting Point: >1300°C (2372°F)
Water Solubility (%): 0-2
% volatile by volume: 0

SECTION IV. FIRE AND EXPLOSION DATA

Extinguishing Media: This refractory product is not combustible.

Unusual fire or explosion hazards: None

Hazardous decomposition Products: None

SECTION V. REACTIVITY DATA

Stability: This refractory product is stable under all normal conditions of storage. Hazardous polymerization will not occur.

Chemical incompatibilities: None

SECTION VI. HEALTH HAZARD INFORMATION

Summary of risks: The product contains crystalline silica. A particulate dust mask must be worn for "total dust" exposure above the PEL/TLV TWA of 0.30mg/m^3, and for "respirable" dust exposure above the PEL/TLV TWA of 0.10mg/m^3. See "chronic effects" for more information on crystalline silica.

Medical conditions which may be aggravated by contact: Pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Target organs: Lungs

Primary entry route: Inhalation

Acute Effects: Transitory upper respiratory irritation.

Chronic Effects: Dust generated from this from this product during installation or after-service tear-out may contain crystalline silica. The excessive inhalation above (PEL/TLV) for crystalline silica over long periods of time may cause a disablinglung disease (silicosis) which reduces breathing capacity, and may lead to increased susceptibility to other lung disease. The International Agency for Research on Cancer (IARC) has concluded that there is sufficient evidence on the carcinogenicity of crystalline silica to humans for it to be classified as a "Probable Human Carcinogen", Group 2A. The National Toxicology Program (NTP) has listed respirable crystalline silica in their Sixth Annual Report on Carcinogens.

PREMIER REFRACTORIES AND CHEMICALS, INC.
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KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: SVENSKA SILICA

Internal ID: 5623SV
MSDS No: 5623SV
Revision: 11/92
Date: 11/88

HEALTH HAZARD INFORMATION continued from page 2

Signs & symptoms of overexposure:

Eye contact: Physical Irritation.

Skin contact: Irritation from repeated or prolonged contact.

Inhalation: Upper respiratory irritation.

Ingestion: No data available.

First aid:

Eye contact: Flush eyes, including under the eyelids, with large amounts of water. If irritation persists, seek medical attention.

Skin contact: Wash with mild soap and water.

Inhalation: Remove to fresh air.

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Spill / Leak procedures: Spilled product is not a hazard to the environment. Carefully clean-up material into a suitable container, being careful to avoid creating dusty conditions. Clean-up personnel should wear approved respiratory protection, gloves, and goggles to prevent irritation from contact and/or inhalation.

Waste management / Disposal: This product does not exhibit any characteristics of a hazardous waste. The product is suitable for industrial landfill disposal. Follow all local, state and federal regulations for proper disposal.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Personal protective equipment: The use of safety glasses, gloves, and long sleeve clothing is recommended.

Ventilation: If airborne contaminants are generated when the material is handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria. Provide adequate general ventilation and local ventilation to control dust level below the PEL/TLV.

PREMIER REFRACTORIES AND CHEMICALS, INC.
901 EAST EIGHTH AVENUE, P.O.BOX 1569
KING OF PRUSSIA, PA 19406
Phone: Health, Safety and MSDS Info 215/337-1100

Product: SVENSKA SILICA

Internal ID: 5623SV
MSDS No: 5623SV
Revision: 11/92
Date: 11/88

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

REMOVAL AFTER SERVICE PRECAUTIONS:
Because of the possible presence of crystalline silica in used refractory debris, particular care should be exercised during tear-out to minimize the generation of dust. Adherence to proper methods of dust suppression and control is imperative. The following precautions should be taken during tear-out.

1. EMPLOYEES SHOULD BE APPRISED OF THE HAZARDS AND PROPER CONDITIONS AND PRECAUTIONS FOR SAFE USE OR EXPOSURE.
2. Approve respirators, in accordance with 29 CFR 1910.134, should be used for dust levels above 0 05 mg/m^3 respirable crystalline silica.
3. Dust generation should be minimized by the use of dust control equipment or water spray.
4. Wear protective clothing and vacuum clean prior to removing clothing.
5. Where there is a possibility of exposure to dust containing respirable crystalline silica, the following warning should be posted: FREE SILICA WORK AREA / AVOID BREATHING DUST / DUST MAY CAUSE DELAYED LUNG INJURY (SILICOSIS).

SARA TITLE III INFORMATION:
This product does not contain any substances reportable under SARA TITLE III Sections 302, 304 and 313.

TSCA INVENTORY:
All substances contained in this product are listed on the Chemical Substance Inventory of the Toxic Substances Control Act (TSCA).

Other Lists: Boric Acid CAS# 10043-35-3 is listed on the Canadian Ingredient Disclosure List. Boron Oxide CAS# 1303-86-2 is on the Massachusetts, New Jersey, Pennsylvania and Canadian Lists.

DOT Class: Not Regulated

Data Source Code(s): 1,7,31,55,85,87

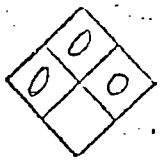
Prepared/revised by: A.G.Nighswander
November 13, 1992

Although reasonable care has been taken in the preparation of the information contained herein, Premier Refractories and Chemicals, Inc. extends no warranties, makes no representation and assumes no responsibility as to the accuracy or suitability of such information for application to purchaser's intended purposes or for consequences of its use.

MATERIAL SAFETY DATA SHEET

(Approved by U. S. Department of Labor. "Essentially Similar" to Form LSB-OOS-4)

NFPA 704 DESIGNATION



Form FSMG-72-1

N/A is not applicable

FOR METAL CASTING SUPPLIES

SECTION 1 – SOURCE AND NOMENCLATURE

MANUFACTURERS NAME	EMERGENCY TELEPHONE NO.
The Hill & Griffith Co.	Area Code 513 Number 921-1075
ADDRESS (NUMBER, STREET, CITY, STATE, ZIP CODE)	**CODE NO., TRADE NAME, SYNONYMS**
1262 State Avenue Cincinnati, Ohio 45204	Western Bentonite

CHEMICAL NAME AND SYNONYMS	CHEMICAL FAMILY	MOLECULAR FORMULA
Bentonite Colloidal Clay	Hydrous Aluminum Silicates	Complex

INTENDED USES (CHECK APPROPRIATE ONES):

Binders (Curing)	Binders (Non-Curing)	Additives	Partings	Facings	Metal Additives
				X	

Castables and Exothermics | Others

SECTION 2 – HAZARDOUS INGREDIENTS

MATERIAL OR INGREDIENT IN PRODUCT: A – (AS IN CONTAINER BEFORE USE):	ESTABLISHED OSHA STANDARD TLV (UNITS) ETC.	LD_{50} ORAL	LD_{50} SKIN	LC_{50} INHALATION	SPECIES TESTED
None Present					
B – ONAL (ONLY DURING USE):					
None Present					

REMARKS: (CAN BE USED TO STATE THAT ENTIRE PRODUCT IS NON-HAZARDOUS BY OSHA DEFINITION):

SECTION 3 – PHYSICAL DATA

	ENTIRE PRODUCT	OR INGREDIENT (NAME)
Boiling Point (°F.)	N/A	
Melting Point (°F.) (Give Method)	N/A	
Specific Gravity (Water = 1)	less than 1	
Solubility in Water (Product) (Give Units)	Moderate (3%)	
Appearance (Product)	Cream to light grey	
Odor (Product)	Earthy	

Vapor Pressure (mmHg)	N/A
Vapor Density (Air = 1)	N/A
Evaporation Rate (= 1)	N/A
Volatile ____ % Vol. ____ % Wt.	nil @ 70°F
Other:	

SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE EXPLOSIVE LIMITS Name:	LOWER	UPPER
N/A °F. ____ °C.		N/A	N/A

FIRE EXTINGUISHING MEDIA: None required

SPECIAL FIRE FIGHTING PROCEDURES: None required

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION 5 – PRODUCT HEALTH HAZARD DATA

OXIC DEGREE (LEVEL OF PRODUCT): N/A

IRRITANT-SKIN, EYE, RESPIRATORY: Possible irritant to eye, skin, & respiratory.

RINCIPAL OUTES OF BSORBTION	NAME ROUTE	NAME TOXIC INGREDIENTS
	Respiratory	N/A

OSSIBLE SYMPTOMS OF OVEREXPOSURE: (CHEMICAL NAME AND CORRESPONDING SYMPTOMS)

No cases relating to overexposure have been recorded.

HRONIC EFFECTS: Unknown

MERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove from area.
Skin Contact: _____
Eye Contact: Flush with water.
Ingestion: _____
Other: _____

SECTION 6 – REACTIVITY DATA

TABILITY (CHECK ONE) CONDITIONS TO AVOID:

Stable x
Unstable

NCOMPATABILITY (MATERIALS TO AVOID): None

AZARDOUS DECOMPOSITION PRODUCTS: None

AZARDOUS POLYMERIZATION (CHECK ONE): Will Not Occur x Might Occur _____
ONDITIONS TO AVOID:

None

SECTION 7 – SPILL OR LEAK PROCEDURES

TEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Avoid breathing dust. Remove spillage from area with mechanical means. Dry sweep floor area.

ASTE DISPOSAL METHOD:

Land fill.

SECTION 8 – SPECIAL PROTECTION INFORMATION

ENTILATION REQUIREMENTS:		PROTECTIVE EQUIPMENT (SPECIFY TYPES):	
Local Exhaust	----------	Eye	Dust goggles or face shield recommended.
Mechanical Exhaust	Desirable in immediate use area.	Gloves	Not required.
Special	None required.	Respiratory	Dust respirator.
Other Protective Equipment	None required.		

SECTION 9 – SPECIAL PRECAUTIONS

RECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Protect against container damage. Avoid spillage that will cause dust formation.

THER PRECAUTIONS:

Treat product as a nuisance dust.

The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this data sheet are ma without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your own laborat ori to use. Our responsibility for claims arising from breach of warranty, negligence, or otherwise is limited to the purchase price of the eri Freedom to use any patent owned by anyone is not to be inferred from any statement contained herein. WITH REGARD TO THE MATERIA SELLER MAKES NO WARRANTY OF ANY KIND WHATEVER, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHAN ABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY SELLER.

ATE: 8/16/84 SIGNATURE: Victor S. LaFay VICTOR S. LaFAY TITLE: STAFF CHEMIST

ATTACHMENT C

Production Volumes

BarryCraft

JEFFERSON COUNTY DEPARIMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2011

Synthetic Minor Operatin Permit 4-01-0040-02
Facility Number 0040

Electric Industion Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-00408602 Emission Unit 002

GRAY IRON

Gray Iron charged	687	Tons
Gray Iron Casting Produced	515	Tons
Hours of Operation	1235	Hours
Process Ratio	.56	Tons
Control Equipment	None	

DUCTILE IRON

Ductile Iron Charged	8.10	Tons
Ductile Iron Castings Produced	5.3	Tons
Hours of Operation	12	Hours
Process Ratio	.68	Tons/Hour
Control Equipment	None	

ALUMINUM

Aluminum Charged	23	Tons
Aluminum Castings Produced	16.1	Tons
Hours of Operation	239	Hours
Process Ratio	.10	Tons/Hour
Control Equipment	None	

Barry Craft

EMISSION UNIT 003

Cleaning Table (Pangborn) With Fabric Filter System

Hours of Operation	111 Hours / YEAR
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM (Aerology) Dust Collector.

Average Tons of Sand Used Per day	21 Tons
Hours of Operation	307 Hours/ Year
Control Equipment	11,000 SCFM Aercology Dust Collector

EMISSION UNIT 006

San Muller (Simpson 3F) with a 1137 DSCFM Cartridge type dust collector (Micro-Air)

Average Tons of Sand Mixed Per Day	23 Tons
Hours of Operation	630 Hours / YEAR
Control Equipment	1137 DSCFM Cartridge Type Dust Collecto (Micro-Air)
Natural Gas Used	1,446,600 Cu. Ft.
#2 Gas Used (Diesel)	774 Gallons
LPG Gas for Inplant Vehicles	2489 Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.
VP Manufacturing

REG/dbm

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

QUALITY CONSTRUCTION CASTINGS

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2010

Synthetic Minor Operating Permit 4-01-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	626 Tons
Gray Iron Castings Produced	470 Tons
Hours of Operation	1195 Hours
Process Ratio	.53 Tons/ Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	17 Tons
Ductile Iron Castings Produced	11 Tons
Hours of Operation	21 Hours
Process Ratio	.81 Tons/ Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	39.56 Tons
Aluminum Castings Produced	27.7 Tons
Hours of Operation	358 Hours
Process Ratio	.11 Tons/ Hour
Control Equipment	None

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809
www.barrycraft.com • barryfoundry@aol.com

BarryCraft

QUALITY CONSTRUCTION CASTINGS

EMISSION UNIT 003

Cleaning Table (Pangborn) With Fabric Filter System

Hours of Operation	101 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM (Aerocology) Dust Collector.

Average Tons of Sand Used Per Day	20 Tons
Hours of Operation	288 Hours/ Yr.
Control Equipment	11,000 SCFM Aercology Dust Collector

EMISSION UNIT 006

Sand Muller (Simpson 3F) with a 1137 DSCFM Cartridge type dust collector (Micro-Air)

Average Tons of Sand Mixed Per Day	22 Tons
Hours of Operation	575 Hours
Control Equipment	1,137 DSCFM Cartridge Type Dust Collect (Micro-Air)

Natural Gas Used	1,481,900 Cu. Ft.
#2 Gas Used	864 Gallons
LPG Gas for Inplant Vehicles	2,180 Gallons

Respectfully Submitted

Robert E. Gurley, Jr.

Robert E. Gurley, Jr.
VP Manufacturing

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(205) 841-8725 • WATS 1-800-524-1809
www.barrycraft.com • barryfoundry@aol.com

Barry Craft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2009

Synthetic Minor Operating Permit 4-01-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	756 Tons
Gray Iron Castings Produced	567 Tons
Hours Of Operation	1,377 Tons
Process Ratio	.41 Tons/ Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	17 Tons
Ductile Iron Castings Produced	11 Tons
Hours of Operation	15 Hours
Process Ratio	1.10 Tons/ Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	24 Tons
Aluminum Castings Produced	18 Tons
Hours of Operation	180 Hours
Process Ratio	.14 Tons/ Hour
Control Equipment	None

Barry Craft

EMISSION UNIT 003

Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	112 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM (Aerocology) Dust Collector.

Average Tons of Sand Used Per Day	20 Tons
Hours of Operation	355 Hours
Control Equipment	11,000 SCFM Aerocology Dust Collector

EMISSION UNIT 006

Sand Muller (Simpson 3F) with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air

Average Tons of Sand Mixed Per Day	20 Tons
Hours of Operation	525 Hours
Control Equipment	1,137 DSCRM Cartfidge T Dust Collector (Micro-Air)
Natural Gas Used	1,419,900 Cu. Ft.
#2 Gas Used	885 Gallons
LPG Gas For Inplant Vehicles	2,496 Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.

Robert E. Gurley, Jr.
VP Manufacturing

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(205) 841-8725 • WATS 1-800-524-1809

Barry Craft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2008

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	936 Tons
Gray Iron Castings Produced	702 Tons
Hours of Operation	1,486 Hours
Process Ratio	.63 Tons/ Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	51 Tons
Ductile Iron Castings Produced	34 Tons
Hours of Operation	59 Hours
Process Ratio	.86 Tons/ Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	27 Tons
Aluminum Castings Produced	20 Tons
Hours of Operation	165 Hours
Process Ratio	.17
Control Equipment	None

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EMISSION UNIT 003
Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	89 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM (Aerocology) Dust Collector.

Average Tons of Sand Used Per Day	19 Tons
Hours of Operation	468 Hours
Control Equipment	11,000 SCFM Aerocology Dust Collect

EMISSION UNIT 006

Sand Muller (Simpson 3F) with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Mixed Per Day	19 Tons
Hours of Operation	552 Hours
Control Equipment	1,137 DSCFM Cartridge type Dust Collector (Micro-Air)

Natural Gas Used	1,291,000	Cu. Ft.
#2 Fuel Used	1,150	Gallons
LPG Gas for Inplant Vehicles	2,710	Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.
VP Manufacturing

dbm/ REG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

From: Holmes, Corey S <cholmes@adem.state.al.us>
To: 'barryfoundry@aol.com' <barryfoundry@aol.com>
Cc: Stallworth, Clethes <CS@adem.state.al.us>; Travis, Sharon E <STravis@adem.state.al.us>
Subject: Barry Foundry
Date: Wed, 29 Apr 2009 11:05 am
Attachments: Barry_Foundry_Notice_of_Inspection.pdf (122K)

Attached is a Notice of Inspection for the inspection performed on April 14, 2009. Please "Reply All" to confirm the document has been received. Thanks.

Corey S. Holmes

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2007

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	844 Tons
Gray Iron Castings Produced	633 Tons
Hours of Operation	1,376 Hours
Process Rate	.61 Tons/ Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	123 Tons
Ductile Iron Castings Produced	80 Tons
Hours of Operation	101 Hours
Process Rate	.65 Tons/ Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	30 Tons
Aluminum Castings Produced	22 Tons
Hours of Operation	180 Hours
Process Rate	.17 Tons/ Hour
Control Equipment	None

BarryCraft

EMISSION UNIT 003

(Pangborn) Cleaning Table with Fabric Filter System

Hours of Operation	101 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM (Aerocology) Dust Collector.

Average Tons of Sand Used Per Day	18 Tons/ Day
Hours of Operation	448 Hours
Control Equipment	11,000 SCFM Aerocology Dust Collector

EMISSION UNIT 006

(Simpson) Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Mixed Per Day	18 Tons/ Day
Hours of Operation	559 Hours
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Natural Gas Used	1,642,100 Cu. Ft.
#2 Fuel Used	920 Gallons
LPG Gas For Inplant Vehicles	2,560 Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.

Robert E. Gurley, Jr.
VP Manufacturing

dbm/REG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
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JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE, SOUTH • P.O. BOX 2648 • BIRMINGHAM, AL 35202-2648 • 205.933.9110 • WWW.JCDH.ORG

Environmental Health Services
Wayne Studyvin, P.E., M.S.C.E., Director
Frank Phillips, P.E., Assistant Director

February 4, 2008

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2007 Emissions Calculations Summary for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the ~~2006~~ 2007 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Corey Masuca, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

CM/ds

Enclosure: 2007 Emissions Calculations Summary

File:EXCEL\CALCS\BARRY\BARRY 2007 PM 2.5 Added .XLS

AQ1195 JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM

EMISSIONS INQUIRY - PLANT/STACK

ACTION: C (C,N,P,T,?)

PLANT ID: 0300010 STACK ID: APPL YR: 2007 PRINTER #: P201

PLANT/STACK: BARRY PATTERN AND FOUNDRY COMPANY, INC.

POLLUTANT	ACTUAL EMISSION LBS/HR	TONS/YR
VOC		0.773
TSP		1.487
SO2		0.020
PM_5-FIL		0.878
PM10		1.354
NOX		0.430
LEAD		0.000
CO		0.230

2007

AQ1168 JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM

EMISSIONS INQUIRY - PLANT/STACK

ACTION: C (Q,N,P,T,?)

PLANT ID: 000040 STACK ID: APPL YR: 2007 PRINTER #: P201

PLANT/STACK: BARRY PATTERN AND FOUNDRY COMPANY, INC.

POLLUTANT	ACTUAL EMISSION LBS/HR	TONS/YR
VOC		0.773
TSP		1.487
SO2		0.020
PM25-FIL		0.878
PM10		1.354
NOX		0.480
LEAD		0.020
CO		0.230

2007

Work Sheets for

2006

2006

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. BOX 2648
BIRMINGHAM, AL. 35202

Attn: MR. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2006

SYNTHETIC MINOR OPERATING PERMIT 4-07-0040-02
FACILITY NUMBER 0040

ELECTRIC INDUCTION FURNACE PERMIT
4-07-0040-8601 EMISSION UNIT 004
4-07-0040-8602 EMISSION UNIT 002

GRAY IRON

GRAY IRON CHARGED	870 TONS
GRAY IRON CASTINGS PRODUCED	653 TONS
HOURS OF OPERATION	1606 HOURS
PROCESS RATE	.54 TONS/HOUR
CONTROL EQUIPMENT	NONE

02/21/2010 01:34 FAX

2006

DUCTILE IRON

DUCTILE IRON CHARGED	33 TONS
DUCTILE IRON CASTINGS PRODUCED	22 TONS
HOURS OF OPERATION	38 HOURS
PROCESS RATE	.87 TONS/HOUR
CONTROL EQUIPMENT	NONE

ALUMINUM

ALUMINUM CHARGED	33 TONS
ALUMINUM CASTINGS PRODUCED	25 TONS
HOURS OF OPERATION	217 HOURS
PROCESS RATE	.15 TONS/HOUR
CONTROL EQUIPMENT	NONE

EMISSION UNIT 003

(PANGBORN) CLEANING TABLE WITH FABRIC FILTER SYSTEM

HOURS OF OPERATION	126 HOURS
FLOW RATE	1,750 CFM
CONTROL EQUIPMENT	FABRIC FILTER

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM Dust Collector (Aerocology)

Average Tons of Sand Used per Day	21 TONS/DAY
Hours of Operation	401 HOURS
Control Equipment	11,000 SCFM AEROCOLOGY DUST COLLECTOR

02/21/2010 01:34 FAX

2006

EMISSION UNIT 006

(SIMPSON) Sand Muller With a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Mixed per Day	21 TONS/DAY
Hours of Operation	602 HOURS/YEAR
Control Equipment	1137 DSCFM CARTRIDGE TYPE DUST COLLECTOR (MICRO-AIR)
Natural Gas Used	1,726,~~400~~ cu.ft.
#2 Fuel Used	954 GALLONS
LPG Gas for Inplant Vehicles	2244 GALLONS

Respectfully Submitted,

Robert E. Gurley Jr.
VP. Mfg.

02/21/2010 01:34 FAX

BarryCraft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2005

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Industion Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	1,013 Tons
Gray Iron Castings Produced	760 Tons
Hours of Operation	1,590 Hours
Process Rate	.64 Tons/Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	35 Tons
Ductile Iron Castings Produced	23 Tons
Hours of Operation	41 Hours
Process Rate	.85 Tons/Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	25 Tons
Aluminum Castings Produced	18 Tons
Hours of Operation	195 Hours
Process Rate	.13 Tons/Hour
Control Equipment	None

BarryCraft

EMISSION UNIT 003

(Pangborn) Cleaning Table With Fabric Filter System

Hours of Operation	171 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM Dust Collector (Aerocology).

Average Tons of Sand Used Per Day	23 Tons/ Day
Hours of Operation	318 Hours
Control Equipment	11,000 SCFM Aercology Dust Collector

New Filters and Door Gaskets Installed 2/03/05 by Southern Environmental Air Co.

EMISSION UNIT 006

(Simpson) Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Mixed per Day	23 Tons
Hours of Operation	400 Hours / Year
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)
Natural Gas Used	1,678,100 Cubic Feet
#2 Fuel Used	896 Gallons
LPG Gas for Inplant Vehicles	1,994 Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.
VP MANUFACTURING

dbm/ REG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2004

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	914 Tons
Gray Iron Castings Produced	686 Tons
Hours of Operation	1,482 Hours
Process Rate	.62 T/H
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	41 Tons
Ductile Iron Castings Produced	27 Tons
Hours of Operation	47 Hours
Process Rate	.87 T/H
Control Equipment	None

ALUMINUM

Aluminum Charged	41 Tons
Aluminum Castings Produced	30 Tons
Hours of Operation	255 Hours
Process Rate	.12 T/H
Control Equipment	None

BarryCraft

EMISSION UNIT 003

(Pangborn) Cleaning Table with Fabric Filter System

Hours of Operation	131 Hours
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, And Foundry area all connected to a 11,000 SCFM Dust Collector (Aerocology)

Average Tons of Sand Used Per Day	20 Tons
Hours of Operation	276 Hours
Control Equipment	11,000 SFM Aerocology Dust Collector

EMISSION UNIT 006

Simpson Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Mixed per day	20 Tons
Hours of Operation	350 Hours
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Natural Gas Used	1,886,200 Cubic Feet
#2 Fuel Used	834 Gallons
LPG Gas for Inplant Vehicles	1,696 Gallons

Respectfully Submitted,

Robert E. Gurley Jr

Robert E. Gurley, Jr.
VP Manufacturing

dBm/REG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

Work Sheets

for 2003

2003

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. BOX 2648
BIRMINGHAM, ALABAMA 35202

ATTENTION: MR. DAVID SCHILSON

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2003

SYNTHETIC MINOR OPERATING PERMIT 4-07-0040-02
FACILITY NUMBER 0040

ELECTRIC INDUCTION FURNACE PERMIT
4-07-0040-8601 EMISSION UNIT 004
4-07-0040-8602 EMISSION UNIT 002

GRAY IRON

GRAY IRON CHARGED	852 TONS
GRAY IRON (CASTINGS) PRODUCED	639 TONS
HOURS OF OPERATION	1,065 HOURS
PROCESS RATE	.80 T/H
CONTROL EQUIPMENT	NONE

2003

DUCTILE IRON

DUCTILE IRON CHARGED	54 TONS
DUCTILE IRON (CASTINGS) PRODUCED	36 TONS
HOURS OF OPERATION	62 HOURS
PROCESS RATE	.87 T/H
CONTROL EQUIPMENT	NONE

ALUMINUM

ALUMINUM CHARGED	26 TONS
ALUMINUM (CASTINGS) PRODUCED	19 TONS
HOURS OF OPERATION	161 HOURS
PROCESS RATE	.16 T/H
CONTROL EQUIPMENT	NONE

EMISSION UNIT 003
(PANGBORN) CLEANING TABLE WITH FABRIC FILTER SYSTEM

HOURS OF OPERATION	121 HOURS
FLOW RATE	1750 CFM
CONTROL EQUIPMENT	FABRIC FILTER

800 008
02/21/2010 01:33 FAX

EMISSION UNIT 005

A SAND STORAGE SILO, A SAND ELEVATOR, A SHAKER SCREEN, AND FOUNDRY AREA ALL CONNECTED TO A 11,000 SCFM DUST COLLECTOR (AERCOLOGY)

AVERAGE TONS OF SAND USED PER DAY	20 TONS
HOURS OF OPERATION	227 HOURS
CONTROL EQUIPMENT	11,000 SCFM DUST COLLECTOR

EMISSION UNIT 006

SIMPSON SAND MULLER WITH A 1137 DSCFM CARTRIDGE TYPE DUST COLLECTOR (MICRO-AIR)

AVERAGE TONS OF SAND MIXED PER DAY	20 TONS
HOURS OF OPERATION	320 HOURS
CONTROL EQUIPMENT	1137 DSCFM CARTRIDGE COLLECTOR (MICRO-AIR)
NATURAL GAS USED	1,181,300 Cu.Ft
#2 FUEL USED	620 GALLONS
LPG GAS FOR INPLANT VEHICLES	1763 GALLONS

Respectfully submitted,
Robert E Gurley Jr
VP Manufacturing

02/21/2010 01:33 FAX

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, Alabama 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO,, INC.
PRODUCTION DATA 2002

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	857 Tons
Gray Iron (Castings) Produced	643 Tons
Hours Of Operation	1,140 Hours
Process Rate	.75 T/H
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	24 Tons
Ductile Iron (Castings) Produced	16 Tons
Hours of Operation	28 Hours
Process Rate	.85 T/H
Control Equipment	None

ALUMINUM

Aluminum Charged	26 Tons
Aluminum (Castings) Produced	19 Tons
Hours of Operation	188
Process Rate	.14 T/H
Control Equipment	None

Barry Craft

EMISSION UNIT 003

(Pangborn) Cleaning Table With Fabric Filter System

Hours of Operation	138
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry area all connected to a 11,000 SCFM Dust Collector (Aercology)

Average Tons of Sand Used Per Day	22
Hours of Operation	250
Control Equipment	11,000 SCFM Aercology Dust Collector

EMISSION UNIT 006

Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Per Day	22
Hours of Operation	385
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Natural Gas Used	1,348,700 Cu. Ft.
#FUEL	575 Gallons
LPG Gas for Inplant Vehicles	1,560 Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.
VP Manufacturing

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

BarryCraft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, Alabama 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2001

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	828 Tons
Gray Iron (Castings) Produced	629 Tons
Hours of Operation	1,010 Hours
Process Rate	.82 T/H
Control Equipment	None

DUCTILE IRON

Ductile Iron Charges	106 Tons
Ductile Iron (Castings) Produced	70 Tons
Hours of Operation	122 Hours
Process Rate	.87 Tons/ Hr.
Control Equipment	None

ALUMINUM

Aluminum Charged	34 Tons
Aluminum (Castings) Produced	26 Tons
Hours of Operation	314 Hours
Process Rate	.11 Tons/ Hr.
Control Equipment	None

Barry Craft

EMISSION UNIT 003
(Pangborn) Cleaning Table With Fabric Filter System

Hours of Operation	222
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005
A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM Dust Collector (Aercology)

Average Tons of Sand Used Per Day	21 Tons
Hours of Operation	320 Hours
Control Equipment	11,000 SCFM Aercology Duct Collector

EMISSION UNIT 006

Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Per Day	21 Tons
Hours of Operation	473 Hours
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Natural Gas Used	1,622,400 Cu. Ft.
#2 Fuel	753 Gallons
LPG Gas for Inplant Vehicles	2280 Gallons

Respectfully Submitted,

Robert E. Gurley Jr

Robert E. Gurley, Jr.
Vice-President Manufacturing

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, Alabama 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2000

Syntheric Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit 4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	1,072 Tons
Gray Iron (Castings) Produced	805 Tons
Hours of Operation	1,345 Hours
Process Rate	.80 T/H
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	27 Tons
Ductile iron (Castings) Produced	18 Tons
Hours of Operation	32 Hours
Process Rate	.84 T/H
Control Equipment	None

ALUMINUM

Aluminum Charged	44 Tons
Aluminum (Castings) Produced	34 Tons
Hours of Operation	347
Process Rate	.13 T/H
Control Equipment	None

(Continued)

Barry Craft

EMISSION UNIT 003
Cleaning Lable (Pangborn) with Fabric Filter System

Hours of Operation	384
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005
A Sand Storage Silo, a Sand Elevator, a Shaker Screen, and Foundry Area all connected to a 11,000 SCFM Dust Collector (AERCOLOGY)

Average Tons of Sand Used Per Day	21 Tons
Hours of Operation	357 Hours
Control Equipment	11,000 SCFM Aercology Dust Collector

EMISSION UNIT 006
Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Per Day	21 Tons
Hours of Operation	491 Hours
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Natural Gas Used	1,641,610	Cu. Ft.
#2 Fuel	800	Gallons
LPG Gas for Inplant Vehicles	2395	Gallons

Respectfully Submitted,

Robert E. Gurley Jr

Robert E. Gurley, Jr.
Vice-President Manufacturing

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

Barry Craft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
Environmental Health Services
Air and Solid Waste Division
P.O. Box 2648
Birmingham, Alabama 35202-2648

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1999

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit 4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	1260 Tons
Gray Iron (Castings) Produced	949 Tons
Hours of Operation	1576 Hours
Process Rate	.80 T/H
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	98 Tons
Ductile iron (Castings) Produced	67 Tons
Hours of Operation	113 Hours
Process Rate	.87 T/H
Control Equipment	None

ALUMINUM

Quantity Charged	22 Tons
Aluminum (Castings) Produced	17 Tons
Hours of Operation	176 Hours
Process Rate	.13 T/H
Control Equipment	None

Barry Craft

EMISSION UNIT 003

Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	384
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Shakeout area all connected to a 11,000 SCFM Dust Collector (AERCOLOGY)

Average Tons of Sand Used per Day	22
House of Operation	486
Control Equipment	11,000 SCFM Dust Collector

EMISSION UNIT 006

Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Used Per Day	22
Hours of Operation	622
Natural Gas Used	1,787,100 Cu. Ft.
#2 Fuel	850 Gallons
LPG Gas for Inplant Vehicles	2,304

Respectfully,

Robert E Gurley Jr

Robert E. Gurley, Jr.
Vice-President MFG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

1998

COPY

Jefferson County Health Department
P.O. Box 2648
Birmingham, Alabama 35202

Attention: Mr. David Schilson

Barry Pattern and ~~Foundry~~ Co., Inc.
PRODUCTION DATA 1998

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit 4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

Gray Iron

Gray Iron Charged	-	1217 Tons
Gray Iron (Castings) Produced	-	913 Tons
~~Gray Iron (Castings)~~	-	~~1515~~
Hours of operation	-	1515
Process Rate	-	.80 T/H
Control Equipment	-	None

1504

003

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1998

Ductile Iron

Ductile Iron Charged	-	45 TONS
Ductile Iron (Castings) Produced	-	31 TONS
Hours of Operation	-	59 HOURS
Process Rate	-	.76 T/H
Control Equipment	-	None

68% ?

Aluminum

Quantity Charged	-	40 TONS
Quantity (Castings) Produced	-	30 TONS
Hours of Operation	-	298 HOURS
Process Rate	-	.13 T/H
Control Equipment	-	None

75% ?

Emission Unit 003

Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	-	368
Flow Rate	-	1750 CFM
Control Equipment	-	Fabric Filter

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1998

Emission Unit 005

A Sand Storage Silo, a Sand Elevator, A Shaker Screen, and Foundry Shakeout areas all connected to a 11,000 SCFM Dust Collector

Average Tons of Sand Used per Day - 23
Hours of Operation - 395
Control Equipment - 11,000 SCFM Dust Collector

Emission Unit 006

Sand Muller with a 1137 ~~DSCFM~~ DSCFM Cartridge Type Dust Collector

Average Tons of Sand Used per Day - 23
Hours of Operation - 624

Natural Gas Used - 1,716,000 cu.ft.

#2 Fuel - 800 gallons

LPG Gas for Inplant Vehicles - 2,392 gallons

Robert E. Lusby Jr
VP Mfg

005

02/21/2010 01:33 FAX

DUE NLT 2/10

Jefferson County Health Department
P.O. Box 2648
Birmingham, Alabama 35202

Attn: Mr. Davd Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1997

Synthetic Minor Operating Permit Number 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit 4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	1068 Tons
Gray Iron (Castings) Produced	801 Tons
Hours of Operation	1924
Process Rate	.56 T/H
Control Equipment	None

Ductile Iron

Ductile Iron Charged	104 Tons
Ductile Iron (Castings) Produced	71 Tons
Hours of Operation	166
Process Rate	.63 T/H
Control Equipment	None

ALUMINUM

Quantity Charged	45 Tons
Quantity (Castings) Produced	34 Tons
Hours of Operation	248
Process Rate	.18 T/H
Control Equipment	None

(continued)

Barry Craft

Emission Unit 003

Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	552
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

Emission Unit 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Shakeout area all connected to a 11,000 SCFM Dust Collector

Average Tons of Sand Used per Day	25
Hours of Operation	426
Control Equipment	11,000 SCFM Dust Collector

Emission Unit 006

Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector

Average Tons of Sand Used per Day	25
Hours of Operation	515
Natural Gas Used	2,181,000 cu. ft.
#2 Fuel	810 Gallons
LPG Gas for Inplant Vehicles	2,952 Gallons

Robert E. Gurley Jr.

Robert E. Gurley, Jr.
Vice-President MFG.

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1650

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 23, 1997

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 1996 Emission Calculations for the Barry Pattern and Foundry Company for your reference. The calculations were based on the 1996 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

David R. Wootton
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure: 1996 Emission Calculations

File:EXCEL\CALCS\BARRY\BARRY96.XLS

003

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BarryCraft

Jefferson County Health Department
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. Dave Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1996

GRAY IRON -Electric Induction Furnace Permit 4-07-0040-8601
4-07-0040-8602

Quantity charged	-	1518 Tons
Iron (castings) produced	-	1138 Tons
Hours of Operation	-	2005
Process Rate	-	.76 T/HR.
Control Equipment	-	None

ALUMINUM

Quantity charged	-	30 Tons
Quantity (castings) produced	-	23 Tons
Hours of Operation	-	285
Process Rate	-	.10 T/HR.
Control Equipment	-	None

Cleaning Table (Pangborn) with Fabric Filter System

Hour of Operation	-	732
Control Equipment	-	Fabric Filter
Flow Rate	-	1750 SCFM

Tons of Sand recycled daily	-	27
Natural Gas used	-	2,264,900 cu. ft.
#2 Fuel	-	850 Gallons
LPG Gas for Inplant Vehicles	-	3,144 Gallons

Robert E. Gurley, Jr.
Vice-President Mfg.

002
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Barry Pattern & Foundry Company, Inc.
Facility No. 40

1996 Emission Calculations

January 23, 1996

1. Two (2) Induction Furnaces (Furnaces Operate Alternately)
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	1518	Tons	
Iron Produced	=	1138	Tons	
Hours of Operation	=	2005	Hours	
Process Rate (P)	=	0.76	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor = 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 1518 T / Yr X T / 2000 lb
= 0.17 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

Raw Emission Factor = 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 1518 T / Yr X T / 2000 lb
= 0.16 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

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1996 Emission Calculations
Barry Pattern Foundry Co.,Inc.

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions
1.34 lb/T X 1518 T/yr X T/ 2000 lb
= 1.02 T/yr

Potential Emissions
1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead
Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions
0.0425 lb/T X 1518 T / Yr X T / 2000 lb
= 0.03 T/yr

Potential Emissions
0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

1996 Emission Calculations
Barry Pattern Foundry Co., Inc.

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
Casting Shakeout	3.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**12.00**	**lb/T**	

Raw Emission Factor = 12.0 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 3.00 lb/T

Actual Emissions
3.00 lb/T X 1518 T / Yr X T / 2000 lb
= 2.28 T/yr

Potential Emissions
3.00 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 28.91 T/yr

Allowable Emissions
3.00 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 28.91 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
Casting Shakeout	2.24	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**10.00**	**lb/T**	

Raw Factor = 10.00 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.50 lb/T

Actual Emissions
2.50 lb/T X 1518 T / Yr X T / 2000 lb = 1.90 T/yr

Potential Emissions
2.50 lb/T X 9636 T / Yr X T / 2000 lb = 24.09 T/yr
X 2 Furnaces

3. **Sand Handling System**

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Sand Preparation	0.13	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
Binder Mixing	0.30	lb/T	(PEDCO)	1981
Sand Reclamation	1.50	lb/T	(PEDCO)	1981
TOTAL	**2.00**	**lb/Ton of Sand**		

Raw Factor = 2.00 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.50 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions
0.50 lb/T X 1138 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.85 T/yr

Potential Emissions
0.50 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 14.45 T/yr

Allowable Emissions
0.50 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 14.45 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions
0.85 T/Yr X 0.83 = 0.71 T/yr

Potential Emissions
14.45 T/Yr X 0.83 = 12.00 T/yr

4. **Two (2) Aluminum Crucible Furnaces**

Quantity Charged	=	30	Tons
Quantity Cast	=	23	Tons
Hours of Operation	=	285	Hours
Process Rate (P)	=	0.11	T/Hr
Control Equipment	=	None	

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 23 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 285 Hr
X 2 Furnaces = 1.27 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 0.89 lb/Hr
2 Furnaces = 7.79 T/yr

5. **Cleaning Table with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation	=	732	Hours
Control Equipment	=	Fabric Filter	
Flow Rate	=	1750	SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 732 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.11 T/yr

Potential Emissions
0.11 T/Yr X 8760 Hr / 732 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.11 T/yr

Potential Emissions = 1.31 T/yr

6. Natural Gas Combusted

Hours of Operation	=	2005	Hours
Heat Input	=	2.26E+09	BTU/yr
	=	2.26E+06	Ft^3/yr
	=	1.13E+06	BTU/hr

Emission Factors — Airs; SCC 1-05-001-06
Space Heaters

Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.11	T/yr
CO	=	0.02	T/yr
VOC	=	0.01	T/yr

7. No. 2 Fuel Oil

Fuel Combusted	=	850	Gallons

Emission Factors — AIRS; SCC 2-02-001-02

Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.20	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

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8. LPG

Fuel Combusted	=	3144	Gallons
Emission Factors	AIRS; SCC 2-02-010-01		
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.22	T/yr
CO	=	0.20	T/yr
VOC	=	0.13	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
1996 Emission Summary
Tons Per Year

January 23, 1997

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.09	1.08	1.08
004	Electric Induction Furnace	0.09	1.08	1.08
	Add'l Foundry Operations	2.28	28.91	28.91
	Sand Handling System	0.85	14.45	14.45
	Aluminum Furnaces	0.02	1.27	7.79
003	Fabric Filter System	0.11	1.31	1.31
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**3.46**	**48.12**	**54.63**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.08	1.04	N/A
004	Electric Induction Furnace	0.08	1.04	N/A
	Add'l Foundry Operations	1.90	24.09	N/A
	Sand Handling System	0.71	12.00	N/A
	Aluminum Furnaces	0.02	1.27	N/A
003	Fabric Filter System	0.11	1.31	N/A
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**2.93**	**40.75**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.00	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.11	N/A	N/A
	No. 2 Fuel Oil	0.20	N/A	N/A
	LP Gas	0.22	N/A	N/A
	TOTAL	**0.53**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.02	N/A	N/A
	No. 2 Fuel Oil	0.04	N/A	N/A
	LP Gas	0.20	N/A	N/A
	TOTAL	**0.27**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.51	6.46	N/A
004	Electric Induction Furnace	0.51	6.46	N/A
	Natural Gas	0.01	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.13	N/A	N/A
	TOTAL	**1.17**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.02	0.20	N/A
004	Electric Induction Furnace	0.02	0.20	N/A
	TOTAL	**0.03**	**0.41**	

EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)

PLANT ID: [000040] STACK ID: [ ] APPL YEAR: [96] PRINTER #: [A206]

PLANT/STACK: [BARRY PATTERN AND FOUNDRY COMPANY, INC.]

POLLUTANT	ACTUAL EMISSION LBS/HR	ACTUAL EMISSION TONS/YR	ALLOWABLE EMISSION LBS/HR	ALLOWABLE EMISSION TONS/YR	POTENTIAL TONS/YR	PEAK SEASON LBS/DAY
[VOC]	[ ]	[1.170]	[ ]	[ ]	[12.920]	[ ]
[TSP]	[ ]	[3.460]	[ ]	[54.620]	[48.100]	[ ]
[SO2]	[ ]	[0.010]	[ ]	[ ]	[ ]	[ ]
[PM10]	[ ]	[2.820]	[ ]	[ ]	[40.750]	[ ]
[NOX]	[ ]	[0.530]	[ ]	[ ]	[ ]	[ ]
[LEAD]	[ ]	[0.040]	[ ]	[ ]	[0.400]	[ ]
[CO]	[ ]	[0.270]	[ ]	[ ]	[ ]	[ ]
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PRODUCTION FIGURES
1995

CAST IRON	1309 TONS
DUCTILE IRON	105 TONS
ALUMINUM	31 TONS

NO EMISSION RECORDS YET

001

02/21/2010 01:35 FAX

BarryCraft

Jefferson County Health Department
P.O. Box ~~2646~~ 2648
Birmingham, AL. 35202

Attn: Mr. Dave Schilson

BARRY PATTERN & FOUNDRY CO., INC.

PRODUCTION DATA 1994

GRAY IRON

Quantity charged	-	1,677 Tons
Iron (castings) produced	-	1,340 Tons
Hours of Operation	-	1,590
Process Rate	-	1.05 T/HR.
Control Equipment	-	None

ALUMINUM

Quantity charged	-	47 Tons
Quantity cast	-	38 Tons
Hours of Operation	-	430
Process Rate	-	.11 T/HR.
Control Equipment	-	None

Tons Sand Recucled Daily	-	34
Natural Gas Used	-	2,312,300 Cu. Ft.
#2 Fuel	-	1,300 Gallons
L.P.G. Gas for Inplant Vehicles	-	3,540 Gallons

Robert E. Gurley, Jr.

Robert E. Gurley, Jr., Vice-President Mfg.

Barry Craft

Jefferson County Health Department
P.O. Box 2646
Birmingham, AL. 35202

Attn: Mr. Dave Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATE 1993

GRAY IRON

Tons Melted	-	1,280
Tons Castings	-	1,125
Hours Furnace	-	1,200

ALUMINUM

Tons Melted	-	38
Tons Castings	-	34
Hours Furnace	-	380

Tons Sand Recycled Daily	-	30 Tons
Paint Gallons	-	0
Thinner Gallons	-	0
Natural Gas	-	2,080,100 Cu. Ft.
#2 Fuel	-	1,360 Gallons
L.P.G. Gas for Inplant Vehicles	-	3,705 Gallons

Robert E. Gurley Jr.

Robert E. Gurley Jr., Vice-President Mfg.

Barry Craft

Jefferson County Health Department
P.O. Box 2646
Birmingham, AL. 35202

Attn: Mr. Dave Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1992

GRAY IRON

Tons Melted -	950
Tons Castings -	800
Hours Furnace -	1000

ALUMINUM

Tons Melted -	35
Tons Castings -	31
Hours Furnace -	630

Tons Sand Recycled Daily	-	30 Tons
Paint Gallons	-	0 (No paint or thinner
Thinner Gallons	-	0 used as of 3/01/92)
Natural Gas	-	7,500 Cu. Ft.
#2 Fuel	-	500 Gallons
L.P.G. Gas for Inplant Vehicles	-	1000 Gallons

Robert E. Gurley, Jr. Vice-President Mfg.

Barry Craft

Jefferson County Health Department
P.O. Box 2646
Birmingham, AL. 35202

Attn: Mr. Dave Schilson

Dave,

Usage figures for 1992 decreased due to lack of work. This required an overall downward scale of "normal" melting practices. Four day work weeks and three molding lines supplied the demand of customer orders. We expect to resume more normal work loads as the economy and industry find firmer ground on which to stand.

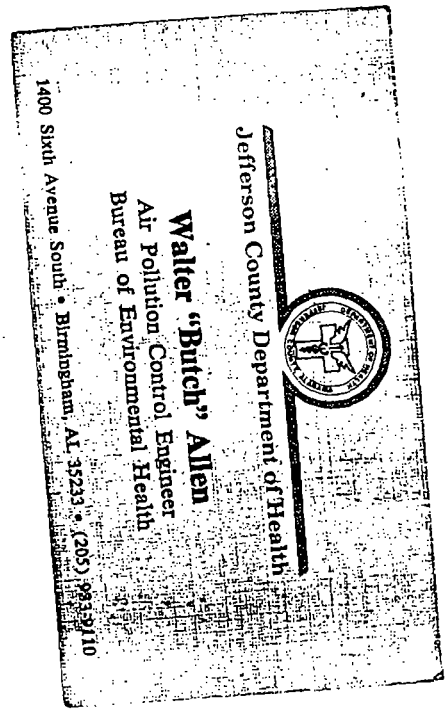
In our operation, mold weights vary regularly thus effecting the sand to metal ratio. Even with this, 1992 usage and production figures are still below what we had expected. This situation, we hope, will be temporary.

Respectfully,

Robert E. Gurley, Jr.

Robert E. Gurley, Jr., Vice- President Mfg.

Barry Craft



Jefferson County Health Department
P.O. Box 2646
Birmingham, Alabama 35202

Attn: Mr. Ralph Fulton

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1990 1991

GRAY IRON

Tons Melted	-	~~1250~~ 1000
Tons Castings	-	~~1060~~ 850
Hours Furnace	-	~~1500~~ 1200

ALUMINUM

Tons Melted	-	~~50~~ 40
Tons Castings	-	~~45~~ 35
Hours Furnace	-	850 650

Tons Sand Recycled Daily		~~5000~~ 32 Tons
Paint Gallons	-	~~400~~ 320
Thinner Gallons	-	160 ~~200~~ Trichloroethane 1.1.1.
Natural Gas	-	7,500 Cu. Ft.
#2 Fuel	-	500 Gallons
L.P.G. Gas for Inplant Vehicles	-	1000 Gallons

Jack Barry, President

"Originals under J"

JSB/dbm

BarryCraft

Jefferson County Health Department
P.O. Box 2646
Birmingham, Alabama 35202

Attn: Mr. Ralph Fulton

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1990

GRAY IRON

Tons Melted	-	1250
Tons Castings	-	1060
Hours Furnace	-	1500

ALUMINUM

Tons Melted	-	50
Tons Castings	-	45
Hours Furnace	-	850

Tons Sand	-	50	
Paint Gallons	-	400	
Thinner Gallons	-	200	Trichloroethane 1.1.1.
Natural Gas	-	7,500	Cu. Ft.
#2 Fuel	-	500	Gallons
L.P.G. Gas for Inplant Vehicles	-	1000	Gallons

Jack Barry, President

JSB/dbm

ATTACHMENT D

Waste Analyses

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 · BIRMINGHAM, ALABAMA 35266 · 205-823-6200 · FAX 205-823-9066

FAX TRANSMITTAL

FAX TO Bob Dudley, Jr./Barry-Craft DATE 10-14-03

FAX FROM Sherri McCrary TIME ____ am ____ pm ____ (C.T)

TOTAL PAGES 10 (INCLUDING COVER PAGE)

COMMENTS Here is your analysis report, along with a copy of your chain of custody form. Each page of the report represents each different analyte that the material was tested for. — Please call if you have questions.

IF YOU DO NOT RECEIVE ALL OF THE PAGES, OR IF MESSAGE IS ILLEGIBLE, PLEASE CALL 205-823-6200.

CONFIDENTIALITY NOTICE: Unless otherwise indicated, the information contained in this facsimile communication is confidential information intended for use of the individual named above. If the reader of this communication is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is prohibited. If you have received this communication in error, please immediately notify the sender by telephone and return original message to the above address via the U.S. Postal Service at our expense. Preliminary data reported here will be verified before final report is issued. Samples are disposed of in 30 days or unless otherwise instructed by the protocol or special instructions in writing. Thank you.

ANALYTICAL SYSTEMS, INC.
ENVIRONMENTAL TESTING LABORATORY
P.O. BOX 19667 439 INDUSTRIAL LANE
B'HAM, AL 35219 B'HAM, AL 35211
PHONE (205) 940-7724 FAX (205) 940-7726

CHAIN OF CUSTODY ANALYSIS REQUEST

SEND REPORT TO:
Bob E. Gurley
3333 35th Ave N.
Birmingham, AL. 35207

CLIENT:	PROJECT:	SAMPLERS:
Barry Pattern & Foundry Co., Inc		BEG

DATE DELIVERED:
METHOD OF DELIVERY:

LAB ID	FIELD ID	DATE/TIME COLLECTED	SAMPLE DESCRIPTION	TCLP Metals	ANALYSIS REQUESTED			
16627	Langston	2/18/98 0900	Sand					
16628	Micro-Air							
16629	Aerology							
16630	Return Sand							

Indicate preservative:(a)Volatiles-HCL,(b)Metals-HNO3, (c)H2SO4 Sulfuric Acid, (d)CN-NaOH, (r)refrigerated at 4 degrees C. Indicate bottle type: (g) Glass, (p) Plastic , (voc) VOC Vial

Relinquished by:	Date/Time	Received in Laboratory by:	Date/Time	Remarks:
(signed) Robert E. Gurley Jr		(signed) Tony Baker	2/18/98	
(print)		(print)	1115	
Relinquished by:	Date/Time	Received by:	Date/Time	Special Handling:
(signed)		(signed)		
(print)		(print)		Invoice #

P.04 2059407726 ANALYTICAL SYSTEMS INC

SAFETY ENVIRONMENTAL LABORATORIES, INC.
P.O. BOX 681076 (35268) * 3033 LORNA ROAD * BIRMINGHAM, AL 35216
PHONE (205) 823-6200 * FAX (205) 823-9066

CHAIN OF CUSTODY FORM

CLIENT: BARRY PATTERN AND FOUNDRY CO. INC ADDRESS: 3333-35TH AV. N.
BIRMINGHAM, AL, 35207

PHONE # (205) 841-8725 FAX #: (205) 841-1972

JOB NAME / PURCHASE ORDER: #1891

ANALYSIS REQUESTED: CIRCLE ONE ASBESTOS BULK (PLM) ASBESTOS AIR (PCM) LEAD (Pb)* ARSENIC (As) OTHER RCRA *

*IF LEAD, PLEASE SPECIFY: 1) AIR 2) PAINT (3) TCLP 4) DUST WIPES - SPECIFY WIPE BRAND _____ 5) SOIL 6) WATER

TURN AROUND TIME REQUESTED: RUSH / SAME DAY 1-2 DAY (3-5 DAY) OTHER _____

SAMPLE #	LABORATORY ID#	SAMPLE DESCRIPTION / LOCATION	CONDITION OF SAMPLE
PANGBORN		SHOT BLAST COLLECTION - CLEANING MACHINE	* ARSENIC
MICRO-AIR		SAND MIXER DUST COLLECTION	BARIUM
AERCOLOGY		SAND SYSTEM RETURN DUST COLLECTION	CADMIUM
RETURN SAND		FROM SHAKEOUT PROCESS	CHROMIUM
MOLDING SAND		FROM MOLDING LINE	LEAD
			MERCURY
			SELENIUM
			SILVER

SAMPLED BY: Robert E Hurley Jr
SIGNATURE / DATE
Randolph Taylor

SENT BY: Robert E Hurley Jr 9/23/03
SIGNATURE / DATE

RECEIVED BY: 9-23-03 2:45 Sherri McCary
SIGNATURE / DATE / TIME

ANALYZED BY:
SIGNATURE / DATE

**NOTE: ALL INFORMATION MUST BE COMPLETED

SELCORP 2058239066 10/14/2003 15:06

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 • BIRMINGHAM, ALABAMA 35266-1076 • 205-823-6200 • FAX 205-823-9066

RCRA METALS ANALYSIS REPORT
ANALYTE - ARSENIC (As)

9-23-03 BE

DATE SAMPLED:	NOT PROVIDED	CLIENT:	BARRY PATTERN & FOUNDRY CO., INC. BIRMINGHAM, AL
DATE RECEIVED:	09/23/03	PROJECT:	JOB # 1891
DATE ANALYZED:	10/08 - 10/10/03	ANALYZED BY:	DAVE SMITH
		QA/QC BY:	DAVE SMITH, CHEMIST
DATE REPORTED:	10/14/03		
		METHODOLOGY:	
		EXTRACTION:	EPA 1311
LAB ID#:	03090495	DIGESTION:	EPA 3050 (MODIFIED)
		ANALYSIS:	EPA 200.7 (MODIFIED)
		REGULATORY LIMIT:	5.0 mg/L
APPROVED BY:		DETECTION LIMIT:	0.6 mg/L
LAB MANAGER DESIGNEE			

Rebecca J. Hicks

Safety Environmental Laboratories, Inc. is accredited by the American Industrial Hygiene Association (AIHA) lab ID# 100766.
This report shall not be reproduced except in full, without the written approval of the laboratory.
Sample results are not corrected for contamination based on the field blank or other analytical blank.

SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	<0.60	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.60	SAND MIXER DUST COLLECTION
AERCOLOGY	<0.60	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	<0.60	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.60	FROM MOLDING LINE

IF YOU WANT YOUR NUMBER REMOVED FROM OUR DATABASE, CALL TOLL-FREE AT 800-390-[illegible]

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 • BIRMINGHAM, ALABAMA 35266-1076 • 205-823-6200 • FAX 205-823-9066

RCRA METALS ANALYSIS REPORT
ANALYTE - BARIUM (Ba)

DATE SAMPLED:	NOT PROVIDED	CLIENT:	BARRY PATTERN & FOUNDRY CO., INC. BIRMINGHAM, AL
DATE RECEIVED:	09/23/03	PROJECT:	JOB # 1891
DATE ANALYZED:	10/08 - 10/10/03	ANALYZED BY:	DAVE SMITH
		QA/QC BY:	DAVE SMITH, CHEMIST
DATE REPORTED:	10/14/03		
		METHODOLOGY:	
		EXTRACTION:	EPA 1311
LAB ID#:	03090495	DIGESTION:	EPA 3050 (MODIFIED)
		ANALYSIS:	EPA 200.7 (MODIFIED)
		REGULATORY LIMIT:	100.0 mg/L
APPROVED BY:		DETECTION LIMIT:	0.10 mg/L
LAB MANAGER DESIGNEE			

Rebecca J Hicks

Rebecca J. Hicks

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SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	0.44	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.10	SAND MIXER DUST COLLECTION
AERCOLOGY	0.19	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	0.35	FROM SHAKEOUT PROCESS
MOLDING SAND	0.22	FROM MOLDING LINE

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 • BIRMINGHAM, ALABAMA 35266-1076 • 205-823-6200 • FAX 205-823-9066

RCRA METALS ANALYSIS REPORT
ANALYTE - CADMIUM (Cd)

DATE SAMPLED: NOT PROVIDED
DATE RECEIVED: 09/23/03
DATE ANALYZED: 10/08 - 10/10/03
DATE REPORTED: 10/14/03
LAB ID#: 03090495

CLIENT: BARRY PATTERN & FOUNDRY CO., INC.
BIRMINGHAM, AL
PROJECT: JOB # 1891

ANALYZED BY: DAVE SMITH
QA/QC BY: DAVE SMITH, CHEMIST

METHODOLOGY:
EXTRACTION: EPA 1311
DIGESTION: EPA 3050 (MODIFIED)
ANALYSIS: EPA 213.1

REGULATORY LIMIT: 1.0 mg/L
DETECTION LIMIT: 0.02 mg/L

APPROVED BY:
LAB MANAGER DESIGNEE

Rebecca J. Hicks

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SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	<0.02	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.02	SAND MIXER DUST COLLECTION
AERCOLOGY	<0.02	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	<0.02	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.02	FROM MOLDING LINE

SAFETY ENVIRONMENTAL LABORATORIES, INC.

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RCRA METALS ANALYSIS REPORT
ANALYTE - CHROMIUM (Cr)

DATE SAMPLED: NOT PROVIDED
DATE RECEIVED: 09/23/03
DATE ANALYZED: 10/08 - 10/10/03
DATE REPORTED: 10/14/03
LAB ID#: 03090495

CLIENT: BARRY PATTERN & FOUNDRY CO., INC.
BIRMINGHAM, AL
PROJECT: JOB # 1891

ANALYZED BY: DAVE SMITH
QA/QC BY: DAVE SMITH, CHEMIST

METHODOLOGY:
EXTRACTION: EPA 1311
DIGESTION: EPA 3050 (MODIFIED)
ANALYSIS: EPA 218.1

REGULATORY LIMIT: 5.0 mg/L
DETECTION LIMIT: 0.03 mg/L

APPROVED BY:
LAB MANAGER DESIGNEE

Rebecca J. Hicks

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Sample results are not corrected for contamination based on the field blank or other analytical blank.

SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	0.20	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.03	SAND MIXER DUST COLLECTION
AERCOLOGY	<0.03	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	<0.03	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.03	FROM MOLDING LINE

SAFETY ENVIRONMENTAL LABORATORIES, INC.

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RCRA METALS ANALYSIS REPORT
ANALYTE - LEAD (Pb)

DATE SAMPLED: NOT PROVIDED
DATE RECEIVED: 09/23/03
DATE ANALYZED: 10/08 - 10/10/03
DATE REPORTED: 10/14/03
LAB ID#: 03090495

CLIENT: BARRY PATTERN & FOUNDRY CO., INC.
BIRMINGHAM, AL
PROJECT: JOB # 1891

ANALYZED BY: DAVE SMITH
QA/QC BY: DAVE SMITH, CHEMIST

METHODOLOGY:
EXTRACTION: EPA 1311
DIGESTION: EPA 3050 (MODIFIED)
ANALYSIS: EPA 239.1

REGULATORY LIMIT: 5.0 mg/L
REPORTING LIMIT: 0.1 mg/L

APPROVED BY:
LAB MANAGER DESIGNEE

Rebecca J. Hicks

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Sample results are not corrected for contamination based on the field blank or other analytical blank.

SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	<0.10	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.10	SAND MIXER DUST COLLECTION
AERCOLOGY	<0.10	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	<0.10	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.10	FROM MOLDING LINE

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 • BIRMINGHAM, ALABAMA 35266-1076 • 205-823-6200 • FAX 205-823-9066

RCRA METALS ANALYSIS REPORT
ANALYTE - MERCURY (Hg)

DATE SAMPLED:	NOT PROVIDED	CLIENT:	BARRY PATTERN & FOUNDRY CO., INC. BIRMINGHAM, AL
DATE RECEIVED:	09/23/03	PROJECT:	JOB # 1891
DATE ANALYZED:	10/08 - 10/10/03	ANALYZED BY:	DAVE SMITH
		QA/QC BY:	DAVE SMITH, CHEMIST
DATE REPORTED:	10/14/03		
		METHODOLOGY:	
		EXTRACTION:	EPA 1311
LAB ID#:	03090495	DIGESTION:	EPA 245.1 (MODIFIED)
		ANALYSIS:	EPA 245.1 (MODIFIED)
		REGULATORY LIMIT:	0.2 mg/L
APPROVED BY:		DETECTION LIMIT:	0.0002 mg/L
LAB MANAGER DESIGNEE			

Rebecca J. Hicks

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SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	<0.0002	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.0002	SAND MIXER DUST COLLECTION
AERCOLOGY	<0.0002	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	<0.0002	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.0002	FROM MOLDING LINE

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 • BIRMINGHAM, ALABAMA 35266-1076 • 205-823-6200 • FAX 205-823-9066

RCRA METALS ANALYSIS REPORT
ANALYTE - SELENIUM (Se)

DATE SAMPLED:	NOT PROVIDED	CLIENT:	BARRY PATTERN & FOUNDRY CO., INC. BIRMINGHAM, AL
DATE RECEIVED:	09/23/03	PROJECT:	JOB # 1891
DATE ANALYZED:	10/08 - 10/10/03	ANALYZED BY:	DAVE SMITH
		QA/QC BY:	DAVE SMITH, CHEMIST
DATE REPORTED:	10/14/03		
		METHODOLOGY:	
		EXTRACTION:	EPA 1311
LAB ID#:	03090495	DIGESTION:	EPA 3050 (MODIFIED)
		ANALYSIS:	EPA 200.7 (MODIFIED)
		REGULATORY LIMIT:	1.0 mg/L
		DETECTION LIMIT:	0.60 mg/L

APPROVED BY:
LAB MANAGER DESIGNEE

Rebecca J Hicks

Rebecca J. Hicks

Safety Environmental Laboratories, Inc. is accredited by the American Industrial Hygiene Association (AIHA) lab ID# 100766.
This report shall not be reproduced except in full, without the written approval of the laboratory.
Sample results are not corrected for contamination based on the field blank or other analytical blank.

SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	<0.60	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.60	SAND MIXER DUST COLLECTION
AERCOLOGY	0.77	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	0.71	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.60	FROM MOLDING LINE

SAFETY ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 661076 • BIRMINGHAM, ALABAMA 35266-1076 • 205-823-6200 • FAX 205-823-9066

RCRA METALS ANALYSIS REPORT
ANALYTE - SILVER (Ag)

DATE SAMPLED: NOT PROVIDED
DATE RECEIVED: 09/23/03
DATE ANALYZED: 10/08 - 10/10/03
DATE REPORTED: 10/14/03
LAB ID#: 03090495

CLIENT: BARRY PATTERN & FOUNDRY CO., INC.
BIRMINGHAM, AL
PROJECT: JOB # 1891

ANALYZED BY: DAVE SMITH
QA/QC BY: DAVE SMITH, CHEMIST

METHODOLOGY:
EXTRACTION: EPA 1311
DIGESTION: EPA 3050 (MODIFIED)
ANALYSIS: EPA 272.1

REGULATORY LIMIT: 5.0 mg/L
DETECTION LIMIT: 0.05 mg/L

APPROVED BY:
LAB MANAGER DESIGNEE

Rebecca J Hicks

Rebecca J. Hicks

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Sample results are not corrected for contamination based on the field blank or other analytical blank.

SAMPLE #	CONC (mg/L)	SAMPLE LOCATION
PANGBORN	<0.05	SHOT BLAST COLECTION - CLEANING MACHINE
MICRO-AIR	<0.05	SAND MIXER DUST COLLECTION
AERCOLOGY	<0.05	SAND SYSTEM RETURN DUST COLLECTION
RETURN SAND	<0.05	FROM SHAKEOUT PROCESS
MOLDING SAND	<0.05	FROM MOLDING LINE

Analytical Systems, Inc.
439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205)940-7724 Fax(205)940-7726

Laboratory Report

Client	: Barry Pattern & Foundry Co., Inc. 3333 35th Ave. North Birmingham, Alabama 35207	**Report Date**	: 20-Feb-98
		ASI Project #	: 3722
		Date Received	: 16-Feb-98
Client Project #	: N/A	**Sample Matrix**	: Sand
Sample Date	: 2/16/98	**Lab ID**	: See Below
Sampler	: BEG	**Sample ID**	: See Below

Sample ID	Lab ID	Parameter	Results	Units	Detection Limit	Method	Analyst	Date/Time Analyzed
Pangborn	16627	Arsenic	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0845
		Barium	ND	mg/L	1.0	EPA 6010	JLB	02/20/98/1015
		Cadmium	ND	mg/L	0.1	EPA 6010	JDB	02/19/98/1615
		Chromium	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0932
		Lead	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0943
		Mercury	ND	mg/L	0.02	EPA 7470	JLB	02/20/98/0819
		Selenium	ND	mg/L	0.1	EPA 6010	JLB	02/20/98/0904
		Silver	ND	mg/L	0.5	EPA 6010	JDB	02/19/98/1545
Micro-Air	16628	Arsenic	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0845
		Barium	ND	mg/L	1.0	EPA 6010	JLB	02/20/98/1015
		Cadmium	ND	mg/L	0.1	EPA 6010	JDB	02/19/98/1615
		Chromium	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0932
		Lead	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0943
		Mercury	ND	mg/L	0.02	EPA 7470	JLB	02/20/98/0819
		Selenium	ND	mg/L	0.1	EPA 6010	JLB	02/20/98/0904
		Silver	ND	mg/L	0.5	EPA 6010	JDB	02/19/98/1545

ND = Concentration is less than detection limit

Method Reference:

EPA Methods for the Chemical Analysis of Water and Wastes. March, 1983

Standard Methods for the Examination of Water and Wastewater. 19th Edition, 1995.

Test Methods for Evaluating Solid Waste. November, 1986, SW-846, 3rd Edition.

Approved By: John L. Baker Date: 2/20/98

Analytical Systems, Inc.
439 Industrial Lane P.O. Box 19667
Birmingham, Alabama 35219
(205)940-7734 Fax(205)940-7726

Laboratory Report

Client : Barry Pattern & Foundry Co., Inc.
3333 35th Ave. North
Birmingham, Alabama 35207
Client Project # : N/A
Sample Date : 2/16/98
Sampler : BEG

Report Date : 20-Feb-98
ASI Project # : 3722
Date Received : 16-Feb-98
Sample Matrix : Sand
Lab ID : See Below
Sample ID : See Below

Sample ID	Lab ID	Parameter	Results	Units	Detection Limit	Method	Analyst	Date/Time Analyzed
Aercology	16629	Arsenic	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0845
		Barium	ND	mg/L	1.0	EPA 6010	JLB	02/20/98/1015
		Cadmium	ND	mg/L	0.1	EPA 6010	JDB	02/19/98/1615
		Chromium	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0932
		Lead	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0943
		Mercury	ND	mg/L	0.02	EPA 7470	JLB	02/20/98/0819
		Selenium	ND	mg/L	0.1	EPA 6010	JLB	02/20/98/0904
		Silver	ND	mg/L	0.5	EPA 6010	JDB	02/19/98/1545
Return Sand	16630	Arsenic	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0845
		Barium	ND	mg/L	1.0	EPA 6010	JLB	02/20/98/1015
		Cadmium	ND	mg/L	0.1	EPA 6010	JDB	02/19/98/1615
		Chromium	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0932
		Lead	ND	mg/L	0.5	EPA 6010	JLB	02/20/98/0943
		Mercury	ND	mg/L	0.02	EPA 7470	JLB	02/20/98/0819
		Selenium	ND	mg/L	0.1	EPA 6010	JLB	02/20/98/0904
		Silver	ND	mg/L	0.5	EPA 6010	JDB	02/19/98/1545

ATTACHMENT E

Waste Disposal Tickets

BARRY PATTERN & FOUNDRY CO., INC.

QUALITY CONSTRUCTION CASTINGS • FOUNDED 1923

3333 - 35TH Ave. No., Birmingham, Alabama 35207 Phone (205) 841-8725

No. 50576

SUPERIOR BANK
WARRIOR, ALABAMA

DATE 4-12-12

PAY $550.00

TO THE ORDER OF

* Jefferson County Department of Health
Attn: Environmental Health
P.O. Box 2648
Birmingham, Alabama 35202

BARRY PATTERN AND FOUNDRY CO., INC.

COPY NOT-NEGOTIABLE

AUTHORIZED SIGNATURE

Invoice 110120041 Synthetic Minor
Permit #40

ENTRY DATE	DEPT. REF.	VOUCHER NUMBER	INVOICE DATE	% DISC.	DISCOUNT DATE	DISCOUNT & RETURNS	INVOICE AMOUNT	NET BALANCE	
	Licenses and Taxes								

BARRY PATTERN AND FOUNDRY CO., INC.
BIRMINGHAM, ALABAMA

Date	Description		Amount
04/05/2012	Annual Compliance Verif - Synthetic Minor		550.00
	2012 Annual Compliance Verif - Synthetic Mino		
	BARRY PATTERN AND FOUNDRY COMPANY, INC. 3333 35th AVE N Birmingham, AL 35207		
	Permit # 40	110120041	550.00
Invoice Date	**Reference**	**Invoice No.**	**Balance Due**

PREVENT · PROMOTE · PROTECT
JCDH
JEFFERSON COUNTY, AL DEPARTMENT OF HEALTH

Fee Payment is Due May 1, 2012. Failure to make payment within 30 days of this due date shall constitute cause for revocation of your permit.
If you have any questions, please call (205) 930-1239.

PURCHASE ORDER

Barry Pattern & Foundry Co Inc.
3333 35th Ave. North
Birmingham, Alabama 35207

3041

NO. 3041
DATE 3-21-2012
F.O.B.
VIA
TERMS

TO: SAFETY-KLEEN SYSTEMS, INC
5360 LEGACY DRIVE
BLDG. 2, SUITE 100
PLANO, TEXAS 75024
(800) 669-5740 (205) 744-9170

BIRMINGHAM CONTACTS —
~~SHIP TO:~~ SAFETY-KLEEN SYSTEMS, INC
4180 HOKEAV.
DOLOMITE, AL. 35061 (205) 578-5074
DREW HOTCHKISS
C (205) 504-3415 ~~fax~~ (205) 744-9177

PLEASE SHIP THE FOLLOWING: DATE REQUIRED:

	QUANTITY	STOCK NUMBER	DESCRIPTION	PRICE	PER	AMOUNT
1	CUSTOMER # 109079		PICK UP USED OIL FOR RECYCLING			
2	APPROX. 130 GALLONS					
3	HALOGEN/CHLOR-D-TECT TEST RESULT PASS : PPM < 1000					
4						
5						
6	APPLICABLE INPO FOR ADEM					
7	USEPA ID# ALN930902002					
8	NO EPID Number - Safety-Kleen considers us CESQG small quantity producer					
9						

IMPORTANT
OUR ORDER NUMBER MUST APPEAR ON INVOICES AND PACKAGES. ACKNOWLEDGE IF UNABLE TO SHIP ON TIME.

ORDERED BY Bob Bailey

TOPS FORM 3821 ORIGINAL MADE IN U.S.A.

Safety-Kleen Systems, Inc.

5360 Legacy Drive.
Building 2, Suite 100
Plano, Texas 75024
800-669-5740
205-744-9170

REFERENCE NBR.
57488056

CUSTOMER# 109079 BARRY FOUNDRY
3333 35th Ave N
Birmingham AL 35207-2927
PHONE 205-841-8725

SRVC WEEK: 2012-11
SRVC DATE: 03/21/12 08:59

BILL TO CUSTOMER# 0000402288

BILL TO ADDRESS:
BARRY FOUNDRY
3333 35th Ave N
Birmingham AL 35207-2927

PURCHASE ORDER#

TAX EXEMPTION NBR

PRODUCT/SERVICES

SERVICE/ PRODUCT		QTY	UNIT PRICE	TAX	TOTAL CHARGE
40535173/ 66674	USED OIL SRV PREQUAL CRED SERVICE TERM 24 WEEK HALOGEN / CHLOR-D-TECT TEST RESULT PASS: PPM < 1000	130.000	-0.1000	0.00	-13.00
	TOTAL SERVICE/PRODUCTS		-0.1000	0.00	0.00
			TOTAL CHARGE		0.00
			CREDITS		-13.00
			TOTAL DUE		-13.00

UNPAID BALANCE THIS RECEIPT 0.00

Used oil in drums for non-auto generators classified as high risk.
Used oil certification form is required for all customers (initial sign-up and when status changes).

GENERATOR STATUS
CESQG: Vehicle

Customer certifies that (i) the above-named materials are properly classified, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and (ii) no material change has occurred either in the characteristics of the waste/material or in the process generating the waste/material. Customer agrees to pay the above charges and to be bound by the terms and conditions (1) set forth in (a) the General Terms and Conditions provided separately to Customer or (b) any SK agreement signed by Customer and SK, and (2) incorporated herein by reference. Unless otherwise indicated in the payment received section, SK is authorized to charge Customer's account for this transaction. Customer certifies that the individual signing this Service Acknowledgement is duly authorized to sign and bind Customer. The following provision is applicable to Safety-Kleen's parts cleaner and paint gun cleaner services: Customer agrees that it will not introduce any substance into the solvent or aqueous cleaning solution, including without limitation any hazardous waste or hazardous waste constituent, except to the extent such introduction is incidental to the normal use of the machine. Customer further agrees that it will not clean parts/paint guns that have been contaminated with or otherwise introduce polychlorinated biphenyls (PCB's), herbicides, pesticides, dioxins or listed hazardous waste into the solvent or aqueous cleaning solution. Safety-Kleen has the capacity and is permitted to accept, store, and/or reclaim the spent parts washer solvent; paint thinners, solvents and paints generated by customer; or dry cleaning filter cartridges, powder, and still residues containing perchloroethylene, petroleum naphtha, or triflurotrichloroethane dry cleaning solvents. Safety-Kleen and customer agree that this agreement is intended to satisfy the requirements of 40 CFR 262.20(e). IN THE EVENT OF AN EMERGENCY CALL 24 HR EMERGENCY # 1-800-468-1760 (Safety-Kleen Contract # 94138)

CUSTOMER / GENERATOR :bob

TRANSPORTER :wfinney

MER#/GENERATOR: 109079 BARRY FOUNDRY
3333 35th Ave N
Birmingham AL 35207-2927 SRVC DA
PHONE 205-841-8725

ATOR USEPA ID. GENERATOR STATE
EST#: FORM CD: NR SK SHIP# 206743221
PORTER 1 TXR000050930
PORTER 2

T DESCRIPTION (INCLUDING PROPER SHIPPING NAME, HAZARD CLASS, AN

OIL
USDOT HAZARDOUS MATERIAL)
AL WASTE CODES NONE
WASTE CODES
CONT 1 TYPE TT WT/VOL G SKDOT 1001
#: 120321290932 QTY: 130 PROFILE: 040535173

NATED FACILITY NAME/ADDRESS:
TY-KLEEN SYSTEMS, INC.
LARKIN STREET
MITE AL 35061

ITY USEPA ID NO ALD983191537
ITY STATE ID NO

oil in drums for non-auto generators classified as high risk.
oil certification form is required for all customers (initial
up and when status changes).

ATOR STATUS
: Vehicle

mer certifies that (i) the above-named materials are properly
ified, packaged, marked and labeled, and are in proper conditior
ransportation according to the applicable regulations of the
tment of Transportation and (ii) no material change has occurrec
r in the characteristics of the waste/material or in the process
ating the waste/material. Customer agrees to pay the above
es and to be bound by the terms and conditions (1) set forth in
he General Terms and Conditions provided separately to Customer
) any SK agreement signed by Customer and SK, and (2)
porated herein by reference. Unless otherwise indicated in the
nt received section, SK is authorized to charge Customer's
nt for this transaction. Customer certifies that the individual
ng this Service Acknowledgement is duly authorized to sign and
Customer. The following provision is applicable to Safety-Kleen'
cleaner and paint gun cleaner services: Customer agrees that i
not introduce any substance into the solvent or aqueous cleaning
ion, including without limitation any hazardous waste or
dous waste constituent, except to the extent such introduction i
lental to the normal use of the machine. Customer further agrees
it will not clean parts/paint guns that have been contaminated
or otherwise introduce polychlorinated biphenyls (PCB's),
cides, pesticides, dioxins or listed hazardous waste into the
nt or aqueous cleaning solution. Safety-Kleen has the capacity
s permitted to accept, store, and/or reclaim the spent parts
r solvent; paint thinners, solvents and paints generated by
mer; or dry cleaning filter cartridges, powder, and still
lues containing perchloroethylene, petroleum naphtha, or
urotrichloroethane dry cleaning solvents. Safety-Kleen and
mer agree that this agreement is intended to satisfy the
irements of 40 CFR 262.20(e). IN THE EVENT OF AN EMERGENCY CALL 2
IERGENCY # 1-800-468-1760 (Safety-Kleen Contract # 94138)

CUSTOMER / GENERATOR :bob

TRANSPORTER :wfinney

LAST PAGE

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-324-2474

Invoice Number: 112531
Invoice Date: Mar 5, 2009
Page: 1

Sold To: Lee, Ronnie

Ship to: BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		3/15/09

Date / Description	Item	Quantity	Unit Price	Extension
03/04/09: TRUCK RENTAL	B-1	9.00	75.00	675.00
03/04/09: BROWN DUMP	B-1	7.00	65.00	455.00
03/04/09: TRUCK RENTAL	B-8	8.00	75.00	600.00
03/04/09: BROWN DUMP	B-8	6.00	65.00	390.00

Check No:

PAID 3/5/2009 Mail

Total Invoice Amount	2,120.00
Payment/Credit Applied	
TOTAL	2,120.00

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062

Phone: 324-2470
Fax: 324-2474

Date _____ 20__

Hauling for _____

Address _____

Job Site _____

Truck No. _____ Driver _____

Time Started _____ A.M. P.M.

Lunch _____

Time Stopped _____ A.M. P.M.

Hours worked _____ Date _____

_____

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By _____
(Lessee to sign and return one copy)

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062

Phone: 324-24
Fax: 324-24

Date _____ 20__

Hauling for _____

Address _____

Job Site _____

Truck No. _____ Driver _____

Time Started _____ A. P.

Lunch _____

Time Stopped _____ A. P.

Hours worked _____ Date _____

_____

This acknowledges and confirms the leasing of the above equipmer and operator to the Lessee for the services described above. Th operator and equipment shall be under the direct supervision and contr of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to an amounts due or to become due thereon, all right of exemption as t personal property and agrees to pay all costs of collecting, including reasonable attorney's fee.
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By _____
(Lessee to sign and return one copy)

616 7353

588 5800

Accts. payable C.I. Ventura

MOI

BARRY PATTERN & FOUNDRY CO., INC.

QUALITY CONSTRUCTION CASTINGS • FOUNDED 1923

3333 - 35TH Ave. No., Birmingham, Alabama 35207 Phone (205) 841-8725

No. 49739

BarryCraft

SUPERIOR BANK
WARRIOR, ALABAMA

DATE 7-12-11

PAY [illegible] 2800 [illegible]

$ 2800.00

TO THE ORDER OF

* Ronnie Lee

107 Royal Place

Pelham, Alabama 35124

BARRY PATTERN AND FOUNDRY CO., INC.

COPY—NOT NEGOTIABLE

AUTHORIZED SIGNATURE

	ENTRY DATE		DEPT. REF.	VOUCHER NUMBER	INVOICE DATE		% DISC.	DISCOUNT DATE		DISCOUNT & RETURNS		INVOICE AMOUNT		NET BALANCE			

BARRY PATTERN AND FOUNDRY CO., INC.
BIRMINGHAM, ALABAMA

adams DC5812

IN ACCOUNT WITH

Ronnie B. Lee

107 Royal Place

Pelham, Al. 35124

... AND FOUNDRY CO., INC.

COPY—NOT NEGOTIABLE

AUTHORIZED SIGNATURE

	4	loads T & Sh			$280	00

NET BALANCE			

adams DC5812

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-674-8849

Invoice Number: 114232
Invoice Date: Jul 13, 2011
Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	Shipping Method	Ship Date	Due Date
	TRUCK		7/23/11

Quantity	Item	Description	Unit Price	Extension
8.50	B-17	07/12/11: TRUCK RENTAL	75.00	637.50
7.00	TRASH	BROWN DUMP	65.00	455.00

Subtotal	1,092.50
Sales Tax	
Total Invoice Amount	1,092.50
Payment/Credit Applied	
TOTAL	1,092.50

Check/Credit Memo No: 1145

7/13/2011

06/29/2012 22:47 FAX 205 674 8449 DARRELL BROWN TRUCKING 0012/0013

06/29/2012 22:47 FAX 205 674 8449 DARRELL BROWN TRUCKING 0013/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 7-12 20 11

Hauling for Ronnie Lee

Address

Job Site Barry Foundary

Truck No. B-17 Driver Marty Hill

Time Started 7:00 A.M. / P.M.

Lunch No Lunch

Time Stopped 3:30 A.M. / P.M.

Hours worked 8 1/2 Date 7-12-11

(7) Loads Hauled To Brown Dump

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie B. Lee
(Lessee to sign and return one copy)

№ 630785

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-674-8849

Invoice Number: 113703

Invoice Date: Nov 24, 2010

Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		12/4/10

Quantity	Item	Description	Unit Price	Extension
8.50	B-15	11/23/2010: TRUCK RENTAL	75.00	637.50
7.00	B-15	11/23/2010: BROWN DUMP	65.00	455.00

Subtotal	1,092.50
Sales Tax	
Total Invoice Amount	1,092.50
Payment/Credit Applied	
TOTAL	1,092.50

Check/Credit Memo No: 1127

PAID 11/24/2010

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0008/0013

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0009/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 11-23-10 20 ___

Hauling for Ronnie Lee

Address _____

Job Site Barry Foundry

Truck No. B-15 Driver Wes

Time Started 6:30 (A.M.) P.M.

Lunch —

Time Stopped 3:00 A.M. (P.M.)

Hours worked 8½ Date 11-23-10

10 loads of debree from Barry Foundry

1 to Brown dump

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie Lee

(Lessee to sign and return one copy)

No 634843

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0011/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 4-6-10 20 ___

Hauling for Ronnie Lee

Address ___

Job Site Barry Foundry

Truck No. B-14 Driver Wes

Time Started 8:30 (A.M.) P.M.

Lunch ___

Time Stopped 2:15 A.M. (P.M.)

Hours worked 5 3/4 Date 4-6-10

(3) loads of degree from Barry Foundry to Brown dump
(1) load scrap from Barry Foundry to scrap yard

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a *reasonable attorney's fee.*
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie Lee
(Lessee to sign and return one copy)

№ 631940

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 4/6 20 10

Hauling for Ronnie Lee

Address ___

Job Site Barry Foundry

Truck No. B-8 Driver Fred

Time Started 6:30 (A.M.) P.M.

Lunch No

Time Stopped 2:30 A.M. (P.M.)

Hours worked 8 hrs Date 4/6/10

(2) loads to Brown's Dump

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a *reasonable attorney's fee.*
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie Lee
(Lessee to sign and return one copy)

№ 632066

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-674-8849

Invoice Number: 113247

Invoice Date: Apr 6, 2010

Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY
BROWN DUMP

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		4/16/10

Quantity	Item	Description	Unit Price	Extension
8.00	B-8	04/06/2010: BROWN DUMP	65.00	520.00
3.00	B-14	04/06/2010: BROWN DUMP	65.00	195.00

Subtotal	715.00
Sales Tax	
Total Invoice Amount	715.00
Payment/Credit Applied	
TOTAL	715.00

Check/Credit Memo No: 114

PAID 4/6/2010

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0010/0013

Invoice

ARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-324-2474

Invoice Number: 112531

Invoice Date: Mar 5, 2009

Page: 1

Duplicate

Sold To:

Ship to: BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		3/15/09

Date / Description	Item	Quantity	Unit Price	Extension
03/04/09: TRUCK RENTAL	B-1	9.00	75.00	675.00
03/04/09: BROWN DUMP	B-1	7.00	65.00	455.00
03/04/09: TRUCK RENTAL	B-8	8.00	75.00	600.00
3/04/09: BROWN DUMP	B-8	6.00	65.00	390.00

Check No: 1068

PAID 3/5/2009

Total Invoice Amount	2,120.00
Payment/Credit Applied	
TOTAL	2,120.00

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0006/0013

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0007/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 324-2474

Date 3-4 20 09

Hauling for Ronnie Lee

Address

Job Site Baker Foundry

Truck No. B-1 Driver George

Time Started 6:30 A.M. P.M.

Lunch No

Time Stopped 3:30 A.M. P.M.

Hours worked 9 Date 3-4-09

(1) Mill Trash Brown Dump Green T

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By _____
(Lessee to sign and return one copy)

№ 59772

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-324-2474

Invoice Number: 112735

Invoice Date: Jun 9, 2009

Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	Shipping Method	Ship Date	Due Date
	TRUCK		6/19/09

Date / Description	Item	Quantity	Unit Price	Extension
06/09/09: TRUCK RENTAL	B-19	4.75	75.00	356.25
BROWN DUMP	TRASH	4.00	65.00	260.00

Check No: 1082

Total Invoice Amount 616.25

PAID 6/10/2009

Payment/Credit Applied

TOTAL 616.25

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0004/0013

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0005/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 324-2474

Date 6-9-09 20 ___

Hauling for ~~Barry~~ Ronnie Lee

Address _____

Job Site Barry Foundry

Truck No. B-19 Driver AL

Time Started 6:30 A.M. P.M.

Lunch —

Time Stopped 11:15 A.M. P.M.

Hours worked 4 3/4 hrs. Date 6-9-09

(4) Loads of Debris to Brown Dump

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By _____
(Lessee to sign and return one copy)

No 60344

RONNIE B LEE 12-07
107 ROYAL PL
PELHAM, AL 35124-2641

1086

Date 6-30-09

61-118/620
3301

PAY to the order of Brown Trucking $ 250.00

Two Hundred Fifty & 00/100 Dollars

Compass Bank
Birmingham, Alabama

Compass Preferred Client

For _____ Ronnie B. Lee

⑆062001186⑆ 729 6409 01" 1086

7/1/2009

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 324-2474

Date 6-30 20 09

Hauling for Ronnie Lee

Address

Job Site

Truck No. Low Boy Driver Lee Findley

Time Started 10:30 A.M. P.M.

Lunch

Time Stopped 11:30 A.M. P.M.

Hours worked Date

moved backhoe From Berry found
To Bush blvd school

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By
(Lessee to sign and return one copy)

№ 60520

RONNIE B LEE 12-07
107 ROYAL PL
PELHAM, AL 35124-2641

1086

Date 6-30-09

61-118/620
3301

PAY to the order of BROWN TRUCKING $150.00

Two Hundred FIFTY +00/100 Dollars

Compass Bank
Birmingham, Alabama

Compass Preferred Client

For _____ Ronnie B. Lee

⑆062001186⑆ 729 4409 0⑈ 1086

7/1/2009

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0003/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 324-2474

Date 6-30 20 09

Hauling for Ronnie Lee

Address

Job Site

Truck No. Low Boy Driver Lee Findley

Time Started 10:30 (A.M.) P.M.

Lunch

Time Stopped 11:30 (A.M.) P.M.

Hours worked Date

moved backhoe From Berry found
To Bush blackstock

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By
(Lessee to sign and return one copy)

№ 60520

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-324-2474

Invoice Number: 112735
Invoice Date: Jun 9, 2009
Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		6/19/09

Date / Description	Item	Quantity	Unit Price	Extension
06/09/09: TRUCK RENTAL	B-19	4.75	75.00	356.25
BROWN DUMP	TRASH	4.00	65.00	260.00

Check No: 1082

Total Invoice Amount	616.25
Payment/Credit Applied	
TOTAL	616.25

PAID 6/10/2009

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0004/0013

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0005/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 324-2474

Date 6-9-09 20 ___

Hauling for ~~[illegible]~~ RONNIE LEE

Address _____

Job Site BARRY FOUNDRY

Truck No. B-19 Driver BC

Time Started 6:30 A.M. P.M.

Lunch —

Time Stopped 11:15 A.M. P.M.

Hours worked 4¾ HRS. Date 6-9-09

(9) LOADS OF DEBRIS to BROWN DUMP

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By _____
(Lessee to sign and return one copy)

No. 60344

Invoice

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-324-2474

Invoice Number: 112531

Invoice Date: Mar 5, 2009

Duplicate

Sold To:

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	Shipping Method	Ship Date	Due Date
	TRUCK		3/15/09

Date / Description	Item	Quantity	Unit Price	Extension
03/04/09: TRUCK RENTAL	B-1	9.00	75.00	675.00
03/04/09: BROWN DUMP	B-1	7.00	65.00	455.00
03/04/09: TRUCK RENTAL	B-8	8.00	75.00	600.00
03/04/09: BROWN DUMP	B-8	6.00	65.00	390.00

Check No: 1068

Total Invoice Amount 2,120.00

PAID 3/15/2009

Payment/Credit Applied

TOTAL 2,120.00

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING 0006/0013

06/29/2012 22:45 FAX 205 674 8449 DARRELL BROWN TRUCKING ☑0007/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 324-2474

Date 3-4 20 08

Hauling for Rewire Lee

Address

Job Site Baker Foundry

Truck No. B-1 Driver George

Time Started 6:30 A.M. P.M.

Lunch 60

Time Stopped 3:30 A.M. P.M.

Hours worked 9 Date 3-4-08

1 Dump Trash Brown Dump Green

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By _____
(Lessee to sign and return one copy)

№ 59772

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-674-8849

Invoice

Invoice Number: 113703

Invoice Date: Nov 24, 2010

Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		12/4/10

Quantity	Item	Description	Unit Price	Extension
8.50	B-15	11/23/2010: TRUCK RENTAL	75.00	637.50
7.00	B-15	11/23/2010: BROWN DUMP	65.00	455.00

Subtotal	1,092.50
Sales Tax	
Total Invoice Amount	1,092.50
Payment/Credit Applied	
TOTAL	1,092.50

Check/Credit Memo No: 1127

PAID 11/24/2010

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0008/0013

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING ☑0009/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 11-23-10 20 ___

Hauling for Ronnie Lee

Address _____

Job Site Barry Foundry

Truck No. B-15 Driver Wes

Time Started 6:30 (A.M.) P.M.

Lunch —

Time Stopped 3:00 A.M. (P.M.)

Hours worked 8½ Date 11-23-10

(10) loads of debree from Barry Foundry

(1) to Brown dump

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie Lee

(Lessee to sign and return one copy)

No 634843

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-674-8849

Invoice

Invoice Number: 113247

Invoice Date: Apr 6, 2010

Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY
BROWN DUMP

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		4/16/10

Quantity	Item	Description	Unit Price	Extension
8.00	B-8	04/06/2010: BROWN DUMP	65.00	520.00
3.00	B-14	04/06/2010: BROWN DUMP	65.00	195.00

Subtotal	715.00
Sales Tax	
Total Invoice Amount	715.00
Payment/Credit Applied	
TOTAL	715.00

Check/Credit Memo No: 114

PAID 4/6/2010

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0010/0013

06/29/2012 22:46 FAX 205 674 8449 DARRELL BROWN TRUCKING 0011/0013

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 4-6-10 20 ___

Hauling for Ronnie Lee

Address ___

Job Site Barry Foundry

Truck No. B-14 Driver Wes

Time Started 8:30 (A.M.) P.M.

Lunch ___

Time Stopped 2:15 A.M. (P.M.)

Hours worked 5 3/4 Date 4-6-10

(3) loads of degree from Barry Foundry to Brown dump
(1) load scrap from Barry Foundry to scrap yard

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie Lee
(Lessee to sign and return one copy)

No 631940

BROWN TRUCKING, INC.

8669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 4/6 20 10

Hauling for Ronnie Lee

Address ___

Job Site Barry Foundry

Truck No. B-8 Driver Fred

Time Started 6:30 (A.M.) P.M.

Lunch No

Time Stopped 2:30 A.M. (P.M.)

Hours worked 8 hr Date 4/6/10

(8) loads to Brown's Dump

111 JM

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.
WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie Lee
(Lessee to sign and return one copy)

No 632066

DARRELL BROWN TRUCKING INC.
8669 COUNTY LINE ROAD
DORA, AL 35062

Voice: 205-324-2470
Fax: 205-674-8049

Invoice

Invoice Number: 114232

Invoice Date: Jul 13, 2011

Page: 1

Sold To:
LEE, RONNIE
107 ROYAL PLACE
PELHAM, AL 35124-2641

Ship to:
BARRY FOUNDRY

Customer ID	Customer PO	Payment Terms	
LEE, RONNIE		Net 10 Days	
Sales Rep ID	**Shipping Method**	**Ship Date**	**Due Date**
	TRUCK		7/23/11

Quantity	Item	Description	Unit Price	Extension
8.50	B-17	07/12/11: TRUCK RENTAL	75.00	637.50
7.00	TRASH	BROWN DUMP	65.00	455.00

Subtotal	1,092.50
Sales Tax	
Total Invoice Amount	1,092.50
Payment/Credit Applied	
TOTAL	1,092.50

Check/Credit Memo No: 1145

7/13/2011

06/29/2012 22:47 FAX 205 674 8449 DARRELL BROWN TRUCKING 0012/0013

06/29/2012 22:47 FAX 205 674 8449 DARRELL BROWN TRUCKING 0013/0013

BROWN TRUCKING, INC.

3669 County Line Road
Dora, Alabama 35062
Phone: 324-2470
Fax: 674-8849

Date 7-12 20 11

Hauling for Ronnie Lee

Address

Job Site Barry Foundary

Truck No. B-17 Driver Marty Hill

Time Started 7:00 A.M. / P.M.

Lunch No Lunch

Time Stopped 3:30 A.M. / P.M.

Hours worked 8 1/2 Date 7-12-11

(7) Loads Hauled To Brown Dump

This acknowledges and confirms the leasing of the above equipment and operator to the Lessee for the services and described above. The operator and equipment shall be under the direct supervision and control of said Lessee for the duration of this rental.

Lessee agrees to the above terms and hereby: waives as to any amounts due or to become due thereon, all right of exemption as to personal property and agrees to pay all costs of collecting, including a reasonable attorney's fee.

WE CROSS CURBS, LAWNS, SIDEWALKS, DRIVES AND WATER LINES AT OWNER'S RISK.

By Ronnie B. Lee
(Lessee to sign and return one copy)

№ 630785

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

(b) (4)

ATTACHMENT F

List of Directors, Shareholders and Officers

Barry Pattern and Foundry Co., Inc.

BOARD OF DIRECTORS

Jack S. Barry, Sr.

Jack S. Barry, Jr.

Denise Gurley

Debbie McConnell

Donna Bell

Charles Easterling

Bob Gurley

Danny Bell

SHAREHOLDERS

Jack S. Barry, Sr.

Jack S. Barry, Jr.

Denise Gurley

Debbie McConnell

Donna Bell

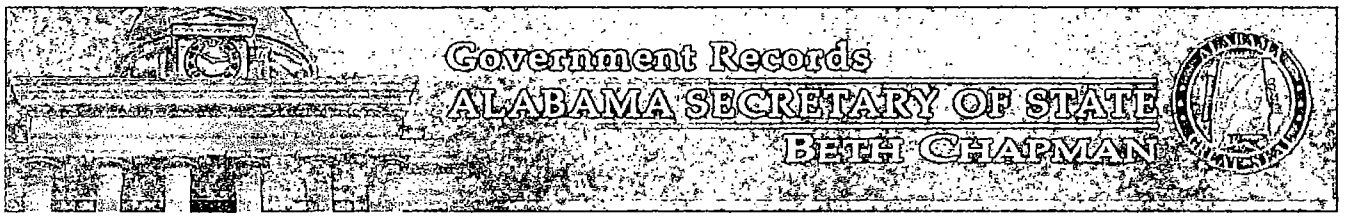
OFFICERS

Name	Office
Jack S. Barry, Sr.	Chief Executive Officer
Denise Gurley	President
Debbie McConnell	Chairman of the Board and Vice President
Donna Bell	Secretary and Treasurer
Charles Easterling	Vice President - Sales
Bob Gurley	Vice President - Manufacturing
Danny Bell	Vice President - Patterns

Corporate address: 3333 35th Avenue North, Birmingham, Alabama 35207-2998

Corporate Telephone: 205-841-8725

Registered Agent: Jack S. Barry, Jr.; 3333 35th Avenue North, Birmingham, Alabama 35207-2998



Business Entity Details

Barry Pattern and Foundry Co., Inc.	
Entity ID Number	168 - 539
Entity Type	Domestic Corporation
Principal Address	BIRMINGHAM, AL
Principal Mailing Address	Not Provided
Status	Exists
Place of Formation	Jefferson County
Formation Date	12-21-1994
Registered Agent Name	BARRY, JACK S JR
Registered Office Street Address	3333 35TH AVE NORTH BIRMINGHAM, AL 35207-2998
Registered Office Mailing Address	Not Provided
Nature of Business	GENERAL FOUNDRY & MANUFACTURING BUSINESS
Capital Authorized	$2,280
Capital Paid In	----
Incorporators	
Incorporator Name	GURLEY, DENISE
Incorporator Street Address	Not Provided
Incorporator Mailing Address	Not Provided
Annual Reports	
Annual Report information is filed and maintained by the Alabama Department of Revenue. If you have questions about any of these filings, please contact Revenue's Business Privilege Tax Division at 334-242-1170 or www.ador.alabama.gov. The Secretary of State's Office cannot answer questions about or make changes to these reports.	
Report Year	1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
Transactions	
Transaction Date Legal Name Changed From	12-30-1994 Barry Pattern and Foundry Co of Alabama, Inc.
Transaction Date Legal Name Merged	12-30-1994 Barry Pattern and Foundry Co., Inc.
Scanned Documents	
Click here to purchase copies.	
Document Date / Type / Pages	12-21-1994 Articles of Formation 14 pgs.
Document Date / Type / Pages	12-30-1994 Merger 8 pgs.

Browse Results New Search

Response of Barry Pattern & Foundry Co., Inc.

Request for Information Pursuant to Section 104 of CERCLA

Volume II

ATTACHMENT G

Environmental Reports

And Correspondence

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE, SOUTH • P.O. BOX 2648 • BIRMINGHAM, AL 35202-2648 • 205.933.9110 • WWW.JCDH.ORG

Environmental Health Services
Wayne Studyvin, P.E., M.S.C.E., Director
Frank Phillips, P.E., Assistant Director

February 4, 2008

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2007 Emissions Calculations Summary for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the ~~2006~~ 2007 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Corey Masuca, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

CM/ds

Enclosure: 2007 Emissions Calculations Summary

File:EXCEL\CALCS\BARRY\BARRY 2007 PM 2.5 Added .XLS

AQ1166 JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM

EMISSIONS INQUIRY - PLANT/STACK

ACTION: C (C,N,P,T,?)

PLANT ID: 000040 STACK ID: APPL YR: 2007 PRINTER #: P201

PLANT/STACK: BARRY PATTERN AND FOUNDRY COMPANY, INC.

POLLUTANT	ACTUAL EMISSION LBS/HR	TONS/YR
VOC		0.773
TSP		1.487
SO2		0.020
PM25-FIL		0.878
PM10		1.354
NOX		0.480
LEAD		0.000
CO		0.230

2007

AQ116S

JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM

EMISSIONS INQUIRY - PLANT/STACK

ACTION: Q (Q,N,P,T,?)

PLANT ID: 000040 STACK ID: APPL YR: 2007 PRINTER #: P201

PLANT/STACK: BARRY PATTERN AND FOUNDRY COMPANY, INC.

POLLUTANT	ACTUAL EMISSION LBS/HR	TONS/YR
VOC		0.773
TSP		1.487
SO2		0.020
PM25-FIL		0.878
PM10		1.354
NOX		0.480
LEAD		0.020
CO		0.230

2007

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE, SOUTH P.O.BOX 2648 BIRMINGHAM, ALABAMA 35202 205/930-1550 FAX 939-3019

Environmental Health Services
Wayne Studyvin, PE, MSCE, Director
Frank Phillips, PE, Assistant Director

February 2, 2007

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2006 Emissions Calculations Summary for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2006 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Corey Masuca, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

CM/ds

Enclosure: 2006 Emissions Calculations Summary

File:EXCEL\CALCS\BARRY\BARRY 2006 PM 2.5 Added .XLS

[ES] JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM [3364296321

EMISSIONS INQUIRY - PLANT/STACK

ION: [Q] (Q,N,P,T,?)

:D: [000040] STACK ID: [ ] APPL YR: [2006] PRINTER #: [P201]

NT/STACK: [BARRY PATTERN AND FOUNDRY COMPANY, INC.]

ACTUAL EMISSION

)LLUTANT	LBS/HR	TONS/YR
)C]	[ ]	[0.690]
3P]	[ ]	[1.354]
)2]	[ ]	[0.020]
M25-FIL]	[ ]	[0.807]
M10]	[ ]	[1.234]
OX]	[ ]	[0.380]
EAD]	[ ]	[0.018]
O]	[ ]	[0.190]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]
]	[ ]	[ ]

16S] JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM [3304290001]

EMISSIONS INQUIRY - PLANT/STACK

ION: [Q] (Q,N,P,T,?)

D: [000040] STACK ID: [ ] APPL YR: [2006] PRINTER #: [P201]

NT/STACK: [BARRY PATTERN AND FOUNDRY COMPANY, INC.]

ACTUAL EMISSION

LLUTANT	LBS/HR	TONS/YR
OC	[ ]	[0.690]
SP	[ ]	[1.354]
O2	[ ]	[0.020]
425-FIL	[ ]	[0.807]
M10	[ ]	[1.234]
OX	[ ]	[0.380]
EAD	[ ]	[0.018]
O	[ ]	[0.190]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]
	[ ]	[ ]

2006

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE, SOUTH P.O.BOX 2648 BIRMINGHAM, ALABAMA 35202 205/930-1550 FAX 939-3019

Environmental Health Services
Wayne Studyvin, PE, MSCE, Director
Frank Phillips, PE, Assistant Director

February 7, 2006

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2005 Emissions Calculations Summary for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2005 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Corey Masuca, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

CM/ds

Enclosure: 2005 Emissions Calculations Summary

File:EXCEL\CALCS\BARRY\BARRY 2005 PM 2.5 Added .XLS

<AQ116S> JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)
PLANT ID: [000040] STACK ID: [ ] APPL YR: [2005] PRINTER #: [P201]
PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC. >

LUTANT	ACTUAL EMISSION LBS/HR	TONS/YR
[CO	<	><0.779 >
[TSP	<	><1.482 >
[SO2	<	><0.010 >
[PM25-FIL	<	><0.844 >
[PM10	<	><1.342 >
[NOX	<	><0.430 >
[LEAD	<	><0.022 >
[CO	<	><0.190 >
[	<	>< >
[	<	>< >
[	<	>< >
[	<	>< >
[	<	>< >
[	<	>< >
[	<	>< >
[	<	>< >
[	<	>< >

Barry Craft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2005

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Industion Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	1,013 Tons
Gray Iron Castings Produced	760 Tons
Hours of Operation	1,590 Hours
Process Rate	.64 Tons/Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	35 Tons
Ductile Iron Castings Produced	23 Tons
Hours of Operation	41 Hours
Process Rate	.85 Tons/Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	25 Tons
Aluminum Castings Produced	18 Tons
Hours of Operation	195 Hours
Process Rate	.13 Tons/Hour
Control Equipment	None

BarryCraft

EMISSION UNIT 003

(Pangborn) Cleaning Table With Fabric Filter System

Hours of Operation	171 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM Dust Collector (Aerocology).

Average Tons of Sand Used Per Day	23 Tons/ Day
Hours of Operation	318 Hours
Control Equipment	11,000 SCFM Aercology Dust Collector

New Filters and Door Gaskets Installed 2/03/05 by Southern Environmental Air Co.

EMISSION UNIT 006

(Simpson) Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Mixed per Day	23 Tons
Hours of Operation	400 Hours / Year
Control Equipment	1137 DSCFM Cartridge Type Dust Collector (Micro-Air)
Natural Gas Used	1,678,100 Cubic Feet
#2 Fuel Used	896 Gallons
LPG Gas for Inplant Vehicles	1,994 Gallons

Respectfully Submitted,

Robert E. Gurley Jr

Robert E. Gurley, Jr.
VP MANUFACTURING

dbm/ REG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

Report 1

FNAME

BARRY PATTERN AND FOUNDRY CO., INC.

FNAME	FADDR	FSIC
BARRY PATTERN AND FOUNDRY CO., INC.	3333 35TH AVENUE NORTH	3543

FCITY	FSTATE	FZIP	FPHONE	FPORC	DUN_BRAD
BIRMINGHAM	AL	35207	(205)841-8725	JEFFERSON	

FACILITY MAILING ADDRESS

FMADDR	FMAIL	FMPOBOX
BARRY PATTERN AND FOUNDRY CO., INC.	3333 35TH AVENUE NORTH	

FMCITY	FMSTATE	FMZIP	ATTN
BIRMINGHAM	AL	35207	MR. ROBERT E. GURLEY, JR.

OWNER / OPERATOR ADDRESS

ONAME	OADDR	OCITY	OSTATE	OZIP
BARRY PATTERN AND FOUNDRY CO., INC.	3333 35TH AVENUE NORTH	BIRMINGHAM	AL	35207

OPHON

(205)841-8725

PRIMARY EMERGENCY CONTACT INFORMATION

C1_NM	C1_TIT	C1_PH	C1_PHA
ROBERT E. GURLEY	V.P. MANUFACTURING	(205)841-8725	(205)979-4555

SECONDARY EMERGENCY CONTACT INFORMATION

C2_NM	C2_TIT	C2_PH	C2_PHA
ROBERT E. GURLEY	V.P. MANUFACTURING	(205)841-8725	(205)979-4555

FACILITY LATITUDE / LONGITUDE

LATLONG

SIGNATURE ON THE TIER II REPORT

SIGNATURE

MR. ROBERT E. GURLEY, JR.

COUNTY
JEFFERSON

BARRY PATTERN AND FOUNDRY CO., INC. ID: BARRY ADDRESS: 3333 35TH AVENUE NORTH
BIRMINGHAM AL 35207

MAX 04 AVE 03 CAS: BARAMIX

Container Type	Pres	Temp	LOCATIONS
J	1	4	IN SUPER SACKS ON PALLETS INSIDE MAIN ENTRANCE DOOR, NORTHEAST CORNER OF BU

MAX 04 AVE 03 CAS: CARBON STEEL SCRAP

Container Type	Pres	Temp	LOCATIONS
R	1	4	ON CONCRETE FLOOR, SOUTHEAST CORNER OF FOUNDRY BUILDING NEXT TO FURNACE PLA

MAX 04 AVE 04 CAS: CAST IRON SCRAP

Container Type	Pres	Temp	LOCATIONS
R	1	4	ON CONCRETE FLOOR, SOUTHEAST CORNER OF FOUNDRY BUILDING NEXT TO FURNACE PLA

MAX 05 AVE 05 CAS: MOLDING SAND

Container Type	Pres	Temp	LOCATIONS
H	1	4	CENTER OF FOUNDRY
R	1	4	HEAPED IN SOUTHWEST CORNER (REAR) OF BUILDING
R	1	4	IN EVERY MOLD BEING MADE LOCATED ON THE POURING FLOOR BEFORE BEING POURED

MAX 04 AVE 03 CAS: RAW SILICA SAND

Container Type	Pres	Temp	LOCATIONS
K	1	4	JUST OUTSIDE MAIN ENTRANCE DOOR NORTHEAST CORNER OF THE BUILDING

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE, SOUTH P.O.BOX 2648 BIRMINGHAM, ALABAMA 35202 205/930-1550 FAX 939-3019

Environmental Health Services
Wayne Studyvin, PE, MSCE, Director
Frank Phillips, PE, Assistant Director

January 21, 2005

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2004 Emissions Calculations Summary for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2004 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Corey Masuca, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

CM/ds

Enclosure: 2004 Emissions Calculations Summary

File:EXCEL\CALCS\BARRY\BARRY 2004 PM 2.5 Added .XLS

<AQ116S> JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)
PLANT ID: [000040] STACK ID: [ ] APPL YR: [2004] PRINTER #: [P201]
PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC. >

POLLUTANT	ACTUAL EMISSION LBS/HR	ACTUAL EMISSION TONS/YR	ALLOWABLE EMISSION LBS/HR	ALLOWABLE EMISSION TONS/YR	POTENTIAL TONS/YR	PEAK SEASON LBS/DAY
[VOC]	< >	<0.728 >	< >	< >	<13.000 >	< >
[TSP]	< >	<1.393 >	< >	<39.869 >	<31.599 >	< >
[SO2]	< >	<0.010 >	< >	< >	<0.010 >	< >
[PM25-FIL]	< >	<0.791 >	< >	< >	<19.383 >	< >
[PM10]	< >	<1.259 >	< >	< >	<28.912 >	< >
[NOX]	< >	<0.410 >	< >	< >	<0.410 >	< >
[LEAD]	< >	<0.020 >	< >	< >	<0.410 >	< >
[CO]	< >	<0.170 >	< >	< >	<0.170 >	< >
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2004 results

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 29, 2004

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2003 Emissions Calculations for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2003 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Scott Gibbs, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

SG/ds
Enclosure: 2003 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY 2003.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

2003 Emissions Calculations

January 28, 2004

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	906	Tons	
Iron Produced	=	675	Tons	
Hours of Operation	=	1127	Hours	
Process Rate (P)	=	0.80	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 906 T / Yr X T / 2000 lb
= 0.10 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

* PM 10
Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 906 T / Yr X T / 2000 lb
= 0.10 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 906 T/yr X T/ 2000 lb = 0.61 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb

X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged

AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 906 T / Yr X T / 2000 lb = 0.02 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb

X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. **Additional Grey Iron Foundry Operations**

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80**	**lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions
2.20 lb/T X 906 T / Yr X T / 2000 lb
= 1.00 T/yr

Potential Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

Allowable Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76**	**lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions
1.94 lb/T X 906 T / Yr X T / 2000 lb
= 0.88 T/yr

Potential Emissions
1.94 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 18.69 T/yr

3. **Sand Handling System**

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions

0.02 lb/T X 675 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.02 T/yr

Potential Emissions

0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

Allowable Emissions

0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions

0.02 T/Yr X 0.83 = 0.01 T/yr

Potential Emissions

0.51 T/Yr X 0.83 = 0.42 T/yr

4. **Sand System with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 227 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions
11000 SCFM X 60 Min/Hr X 227 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.11 T/yr

Potential Emissions
0.11 T/Yr X 8760 Hr / 227 Hr
= 4.13 T/yr

Allowable Emissions
0.94 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 4.12 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.11 T/yr

Potential Emissions = 4.13 T/yr

5. **Sand Muller with Cartridge Type Dust Collector System**

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 320 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions

1137	SCFM	X	60	Min/Hr	X	320	Hr/yr	X
0.01	gr/SCF	X	T /	2000		X lb/	7000	gr
						=	0.02	T/yr

Potential Emissions

0.02	T/Yr	X	8760	Hr	/	320	Hr	
						=	0.43	T/yr

Allowable Emissions

0.1	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb
						=	0.44	T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.02 T/yr

Potential Emissions = 0.43 T/yr

6. **Two (2) Aluminum Crucible Furnaces**

Quantity Charged = 26 Tons
Quantity Cast = 19 Tons
Hours of Operation = 161 Hours
Process Rate (P) = 0.16 T/Hr
Control Equipment = None

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 19 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 161 Hr
X 2 Furnaces = 1.86 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 1.16 lb/Hr
2 Furnaces = 10.15 T/yr

7. **Cleaning Table with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation = 121 Hours
Control Equipment = Fabric Filter
Flow Rate = 1750 SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 121 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 121 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.02 T/yr

Potential Emissions = 1.31 T/yr

8. **Natural Gas Combusted**

Hours of Operation	=	1127	Hours
Heat Input	=	1.18E+09	BTU/yr
	=	1.18E+06	Ft^3/yr
	=	1.05E+06	BTU/hr

Emission Factors		Airs; SCC 1-05-001-06	
		Space Heaters	
Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.06	T/yr
CO	=	0.01	T/yr
VOC	=	0.00	T/yr

9. **No. 2 Fuel Oil**

Fuel Combusted	=	620	Gallons

Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.15	T/yr
CO	=	0.03	T/yr
VOC	=	0.01	T/yr

10. **LPG**

Fuel Combusted	=	1763	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.12	T/yr
CO	=	0.11	T/yr
VOC	=	0.07	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
2003 Emissions Summary
Tons Per Year

January 28, 2004

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.051	1.084	1.084
004	Electric Induction Furnace	0.051	1.084	1.084
	Add'l Foundry Operations	0.997	21.199	21.199
	Molding and Sand Handling	0.018	0.506	0.506
005	Sand Shakeout and Silo Filter	0.107	4.130	4.117
006	Sand Muller and Cart. Filter	0.016	0.427	0.438
	Aluminum Furnaces	0.017	1.861	10.154
003	Cleaning Table Fabric Filter	0.018	1.314	1.314
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.010	N/A	N/A
	LP Gas	0.004	N/A	N/A
	TOTAL	**1.29**	**31.60**	**39.90**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.049	1.036	N/A
004	Electric Induction Furnace	0.049	1.036	N/A
	Add'l Foundry Operations	0.879	18.694	N/A
	Molding and Sand Handling	0.015	0.420	N/A
005	Sand Shakeout and Silo Filter	0.107	4.130	N/A
006	Sand Muller and Cart. Filter	0.016	0.427	N/A
	Aluminum Furnaces	0.017	1.861	N/A
003	Cleaning Table Fabric Filter	0.018	1.314	N/A
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.010	N/A	N/A
	LP Gas	0.004	N/A	N/A
	TOTAL	**1.17**	**28.92**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.000	N/A	N/A
	No. 2 Fuel Oil	0.010	N/A	N/A
	LP Gas	0.000	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.059	N/A	N/A
	No. 2 Fuel Oil	0.145	N/A	N/A
	LP Gas	0.123	N/A	N/A
	TOTAL	**0.33**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.012	N/A	N/A
	No. 2 Fuel Oil	0.032	N/A	N/A
	LP Gas	0.114	N/A	N/A
	TOTAL	**0.16**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.304	6.456	N/A
004	Electric Induction Furnace	0.304	6.456	N/A
	Natural Gas	0.003	N/A	N/A
	No. 2 Fuel Oil	0.010	N/A	N/A
	LP Gas	0.073	N/A	N/A
	TOTAL	**0.69**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.010	0.205	N/A
004	Electric Induction Furnace	0.010	0.205	N/A
	TOTAL	**0.02**	**0.41**	

Prepared by:
Date: 1-28-2004

Reviewed by:
Date: 1-30-04

<AQ116S> JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)
PLANT ID: [000040] STACK ID: [ ] APPL YR: [2003] PRINTER #: [P201]
PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC. >

	ACTUAL EMISSION		ALLOWABLE EMISSION		POTENTIAL	PEAK SEASON
POLLUTANT	LBS/HR	TONS/YR	LBS/HR	TONS/YR	TONS/YR	LBS/DAY
[VOC]	<	><0.694 >	<	>< >	<12.998 >	< >
[TSP]	<	><1.291 >	<	><39.896 >	<31.605 >	< >
[SO2]	<	><0.010 >	<	>< >	<0.010 >	< >
[PM25-FIL]	<	>< >	<	>< >	< >	< >
[PM10]	<	><1.166 >	<	>< >	<28.918 >	< >
[NOX]	<	><0.330 >	<	>< >	<0.330 >	< >
[LEAD]	<	><0.020 >	<	>< >	<0.410 >	< >
[CO]	<	><0.160 >	<	>< >	<0.160 >	< >
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JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 15, 2003

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2002 Emissions Calculations for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2002 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

Scott Gibbs, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

Enclosure: 2002 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY2002.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

2002 Emissions Calculations

January 14, 2003

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	881	Tons	
Iron Produced	=	659	Tons	
Hours of Operation	=	1168	Hours	
Process Rate (P)	=	0.75	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 881 T / Yr X T / 2000 lb
= 0.10 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

* PM 10
Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 881 T / Yr X T / 2000 lb
= 0.09 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 881 T/yr X T/ 2000 lb = 0.59 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 881 T / Yr X T / 2000 lb = 0.02 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80**	**lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions

2.20	lb/T	X	881	T / Yr	X	T /	2000	lb
						=	0.97	T/yr

Potential Emissions

2.20	lb/T	X	9636	T / Yr	X	T /	2000	lb
		X	2	Furnaces		=	21.20	T/yr

Allowable Emissions

2.20	lb/T	X	9636	T / Yr	X	T /	2000	lb
		X	2	Furnaces		=	21.20	T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76**	**lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions

1.94	lb/T	X	881	T / Yr	X	T /	2000	lb
						=	0.85	T/yr

Potential Emissions

1.94	lb/T	X	9636	T / Yr	X	T /	2000	lb
		X	2	Furnaces		=	18.69	T/yr

3. **Sand Handling System**

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions

0.02	lb/T	X	659	T / Yr	X	T /	2000	lb
X		3	Ton Sand/ Ton Iron			=	0.02	T/yr

Potential Emissions

0.02	lb/T	X	9636	T / Yr	X	T /	2000	lb
3	lb/T	X	2	Furnaces		=	0.51	T/yr

Allowable Emissions

0.02	lb/T	X	9636	T / Yr	X	T /	2000	lb
3	lb/T	X	2	Furnaces		=	0.51	T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions

0.02	T/Yr	X	0.83			=	0.01	T/yr

Potential Emissions

0.51	T/Yr	X	0.83			=	0.42	T/yr

4. **Sand System with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 250 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions

11000	SCFM	X	60	Min/Hr	X	250	Hr/yr	X
0.01	gr/SCF	X	T /	2000	X	lb/	7000	gr
						=	0.12	T/yr

Potential Emissions

0.12	T/Yr	X	8760	Hr	/	250	Hr	
						=	4.13	T/yr

Allowable Emissions

0.94	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb
						=	4.12	T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.12 T/yr

Potential Emissions = 4.13 T/yr

5. **Sand Muller with Cartridge Type Dust Collector System**

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 385 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions

1137 SCFM X 60 Min/Hr X 385 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.02 T/yr

Potential Emissions

0.02 T/Yr X 8760 Hr / 385 Hr
= 0.43 T/yr

Allowable Emissions

0.1 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 0.44 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.02 T/yr

Potential Emissions = 0.43 T/yr

6. **Two (2) Aluminum Crucible Furnaces**

Quantity Charged = 26 Tons
Quantity Cast = 19 Tons
Hours of Operation = 188 Hours
Process Rate (P) = 0.14 T/Hr
Control Equipment = None

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 19 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 188 Hr
X 2 Furnaces = 1.59 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 1.05 lb/Hr
2 Furnaces = 9.22 T/yr

7. **Cleaning Table with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation = 138 Hours
Control Equipment = Fabric Filter
Flow Rate = 1750 SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 138 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 138 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.02 T/yr

Potential Emissions = 1.31 T/yr

8. Natural Gas Combusted

Hours of Operation	=	1168	Hours
Heat Input	=	1.35E+09	BTU/yr
	=	1.35E+06	Ft^3/yr
	=	1.15E+06	BTU/hr

Emission Factors		Airs; SCC 1-05-001-06	
		Space Heaters	
Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.07	T/yr
CO	=	0.01	T/yr
VOC	=	0.00	T/yr

9. No. 2 Fuel Oil

Fuel Combusted	=	575	Gallons

Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.13	T/yr
CO	=	0.03	T/yr
VOC	=	0.01	T/yr

10. LPG

Fuel Combusted	=	1560	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.11	T/yr
CO	=	0.10	T/yr
VOC	=	0.06	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
2002 Emissions Summary
Tons Per Year

January 14, 2003

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.050	1.084	1.084
004	Electric Induction Furnace	0.050	1.084	1.084
	Add'l Foundry Operations	0.969	21.199	21.199
	Molding and Sand Handling	0.017	0.506	0.506
005	Sand Shakeout and Silo Filter	0.118	4.130	4.117
006	Sand Muller and Cart. Filter	0.019	0.427	0.438
	Aluminum Furnaces	0.017	1.594	9.224
003	Cleaning Table Fabric Filter	0.021	1.314	1.314
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.010	N/A	N/A
	LP Gas	0.004	N/A	N/A
	TOTAL	**1.28**	**31.34**	**38.97**

Pollutant: **PM-10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.047	1.036	N/A
004	Electric Induction Furnace	0.047	1.036	N/A
	Add'l Foundry Operations	0.855	18.694	N/A
	Molding and Sand Handling	0.014	0.420	N/A
005	Sand Shakeout and Silo Filter	0.118	4.130	N/A
006	Sand Muller and Cart. Filter	0.019	0.427	N/A
	Aluminum Furnaces	0.017	1.594	N/A
003	Cleaning Table Fabric Filter	0.021	1.314	N/A
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.010	N/A	N/A
	LP Gas	0.004	N/A	N/A
	TOTAL	**1.15**	**28.65**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.000	N/A	N/A
	No. 2 Fuel Oil	0.009	N/A	N/A
	LP Gas	0.000	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.067	N/A	N/A
	No. 2 Fuel Oil	0.135	N/A	N/A
	LP Gas	0.108	N/A	N/A
	TOTAL	**0.31**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.013	N/A	N/A
	No. 2 Fuel Oil	0.029	N/A	N/A
	LP Gas	0.101	N/A	N/A
	TOTAL	**0.14**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.295	6.456	N/A
004	Electric Induction Furnace	0.295	6.456	N/A
	Natural Gas	0.004	N/A	N/A
	No. 2 Fuel Oil	0.009	N/A	N/A
	LP Gas	0.065	N/A	N/A
	TOTAL	**0.67**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.009	0.205	N/A
004	Electric Induction Furnace	0.009	0.205	N/A
	TOTAL	**0.02**	**0.41**	

Prepared by:

Date: 1-14-2003

Reviewed by:

Date: 1-16-03

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 29, 2002

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2001 Emissions Calculations for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2001 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

R. H. Barrett

Robert H. Barrett, P.E.
Senior Engineer
Air & Radiation Protection Division

Enclosure: 2001 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY2001.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

2001 Emissions Calculations

January 28, 2002

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	934	Tons	
Iron Produced	=	699	Tons	
Hours of Operation	=	1132	Hours	
Process Rate (P)	=	0.83	T/Hr	
Maximum Production Each Furnace	=	9636	T/Yr	Permit Condition
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 934 T / Yr X T / 2000 lb
= 0.11 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

* PM 10
Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 934 T / Yr X T / 2000 lb
= 0.10 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80**	**lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions
2.20 lb/T X 934 T / Yr X T / 2000 lb
= 1.03 T/yr

Potential Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

Allowable Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76**	**lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions
1.94 lb/T X 934 T / Yr X T / 2000 lb
= 0.91 T/yr

Potential Emissions
1.94 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 18.69 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 934 T/yr X T/ 2000 lb = 0.63 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 934 T / Yr X T / 2000 lb = 0.02 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

3. **Sand Handling System**

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions

0.02 lb/T X 699 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.02 T/yr

Potential Emissions

0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

Allowable Emissions

0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions

0.02 T/Yr X 0.83 = 0.02 T/yr

Potential Emissions

0.51 T/Yr X 0.83 = 0.42 T/yr

4. **Sand System with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 320 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions
11000 SCFM X 60 Min/Hr X 320 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.15 T/yr

Potential Emissions
0.15 T/Yr X 8760 Hr / 320 Hr
= 4.13 T/yr

Allowable Emissions
0.94 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 4.12 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.15 T/yr

Potential Emissions = 4.13 T/yr

5. **Sand Muller with Cartridge Type Dust Collector System**

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 473 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions

1137	SCFM	X	60	Min/Hr	X	473	Hr/yr	X
0.01	gr/SCF	X	T /	2000	X	lb/	7000	gr
						=	0.02	T/yr

Potential Emissions

0.02	T/Yr	X	8760	Hr	/	473	Hr	
						=	0.43	T/yr

Allowable Emissions

0.1	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb
						=	0.44	T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.02 T/yr

Potential Emissions = 0.43 T/yr

6. **Two (2) Aluminum Crucible Furnaces**

Quantity Charged = 34 Tons
Quantity Cast = 26 Tons
Hours of Operation = 314 Hours
Process Rate (P) = 0.11 T/Hr
Control Equipment = None

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 26 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 314 Hr
X 2 Furnaces = 1.31 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 0.90 lb/Hr
2 Furnaces = 1.93 T/yr

7. **Cleaning Table with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation = 222 Hours
Control Equipment = Fabric Filter
Flow Rate = 1750 SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 222 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.03 T/yr

Potential Emissions
0.03 T/Yr X 8760 Hr / 222 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.03 T/yr

Potential Emissions = 1.31 T/yr

8. Natural Gas Combusted

Hours of Operation	=	1132	Hours
Heat Input	=	1.62E+09	BTU/yr
	=	1.62E+06	Ft^3/yr
	=	1.43E+06	BTU/hr

Emission Factors — Airs; SCC 1-05-001-06
Space Heaters

Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.08	T/yr
CO	=	0.02	T/yr
VOC	=	0.00	T/yr

9. No. 2 Fuel Oil

Fuel Combusted	=	753	Gallons

Emission Factors — AIRS; SCC 2-02-001-02

Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.18	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

10. **LPG**

Fuel Combusted	=	2280	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.16	T/yr
CO	=	0.15	T/yr
VOC	=	0.09	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
2001 Emissions Summary
Tons Per Year

January 28, 2002

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.053	1.084	1.084
004	Electric Induction Furnace	0.053	1.084	1.084
	Add'l Foundry Operations	1.027	21.199	21.199
	Molding and Sand Handling	0.018	0.506	0.506
005	Sand Shakeout and Silo Filter	0.151	4.130	4.117
006	Sand Muller and Cart. Filter	0.023	0.427	0.438
	Aluminum Furnaces	0.023	1.306	7.925
003	Cleaning Table Fabric Filter	0.033	1.314	1.314
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.013	N/A	N/A
	LP Gas	0.006	N/A	N/A
	TOTAL	**1.40**	**31.05**	**37.67**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.050	1.036	N/A
004	Electric Induction Furnace	0.050	1.036	N/A
	Add'l Foundry Operations	0.906	18.694	N/A
	Molding and Sand Handling	0.015	0.420	N/A
005	Sand Shakeout and Silo Filter	0.151	4.130	N/A
006	Sand Muller and Cart. Filter	0.023	0.427	N/A
	Aluminum Furnaces	0.023	1.306	N/A
003	Cleaning Table Fabric Filter	0.033	1.314	N/A
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.013	N/A	N/A
	LP Gas	0.006	N/A	N/A
	TOTAL	**1.27**	**28.36**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.000	N/A	N/A
	No. 2 Fuel Oil	0.012	N/A	N/A
	LP Gas	0.000	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.081	N/A	N/A
	No. 2 Fuel Oil	0.177	N/A	N/A
	LP Gas	0.158	N/A	N/A
	TOTAL	**0.42**		

Pollutant: **Carbon Monoxide**

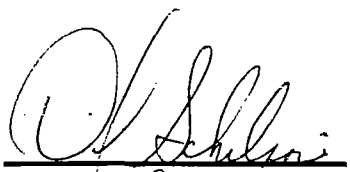
Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.016	N/A	N/A
	No. 2 Fuel Oil	0.038	N/A	N/A
	LP Gas	0.147	N/A	N/A
	TOTAL	**0.20**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.313	6.456	N/A
004	Electric Induction Furnace	0.313	6.456	N/A
	Natural Gas	0.004	N/A	N/A
	No. 2 Fuel Oil	0.012	N/A	N/A
	LP Gas	0.095	N/A	N/A
	TOTAL	**0.74**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.010	0.205	N/A
004	Electric Induction Furnace	0.010	0.205	N/A
	TOTAL	**0.02**	**0.41**	

Prepared by: 

Date: 1-28-2002

Reviewed by: _____

Date: _____

<AQ116S> JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM <336429632>
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)
PLANT ID: [000040] STACK ID: [ ] APPL YR: [2001] PRINTER #: [P201]
PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC.]

	ACTUAL EMISSION		ALLOWABLE EMISSION		POTENTIAL	PEAK SEASON
LUTANT	LBS/HR	TONS/YR	LBS/HR	TONS/YR	TONS/YR	LBS/DAY
CO	<	<0.737	<	<	<12.912	<
TSP	<	<1.402	<	<37.667	<31.050	<
SO2	<	<0.010	<	<	<	<
PM10	<	<1.272	<	<	<28.363	<
NOX	<	<0.420	<	<	<	<
LEAD	<	<0.020	<	<	<0.410	<
CO	<	<0.200	<	<	<	<
	<	<	<	<	<	<
	<	<	<	<	<	<
	<	<	<	<	<	<
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	<	<	<	<	<	<

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 19, 2001

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 2000 Emissions Calculations for the Barry Pattern and Foundry Company, Inc. for your reference. The calculations were based on the 2000 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Engineer
Air & Radiation Protection Division

Enclosure: 2000 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY2000.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

2000 Emissions Calculations

January 16, 2001

1. Two (2) Induction Furnaces (Furnaces Operate Alternately)

Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	1099	Tons	
Iron Produced	=	823	Tons	
Hours of Operation	=	1377	Hours	
Process Rate (P)	=	0.80	T/Hr	
Maximum Production Each Furnace	=	9636	T/Yr	Permit Condition
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 1099 T / Yr X T / 2000 lb = 0.12 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

* PM 10
Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 1099 T / Yr X T / 2000 lb = 0.12 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS; SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS; SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 1099 T/yr X T/ 2000 lb = 0.74 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 1099 T / Yr X T / 2000 lb = 0.02 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80**	**lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions
2.20 lb/T X 1099 T / Yr X T / 2000 lb
= 1.21 T/yr

Potential Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

Allowable Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76**	**lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions
1.94 lb/T X 1099 T / Yr X T / 2000 lb
= 1.07 T/yr

Potential Emissions
1.94 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 18.69 T/yr

3. Sand Handling System

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions

0.02	lb/T	X	823	T / Yr	X	T / 2000	lb
X		3	Ton Sand/ Ton Iron		=	0.02	T/yr

Potential Emissions

0.02	lb/T	X	9636	T / Yr	X	T / 2000	lb
3	lb/T	X	2	Furnaces	=	0.51	T/yr

Allowable Emissions

0.02	lb/T	X	9636	T / Yr	X	T / 2000	lb
3	lb/T	X	2	Furnaces	=	0.51	T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions

0.02	T/Yr	X	0.83	=	0.02 T/yr

Potential Emissions

0.51	T/Yr	X	0.83	=	0.42 T/yr

4. Sand System with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 357 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions
11000 SCFM X 60 Min/Hr X 357 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.17 T/yr

Potential Emissions
0.17 T/Yr X 8760 Hr / 357 Hr
= 4.13 T/yr

Allowable Emissions
0.94 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 4.12 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.17 T/yr

Potential Emissions = 4.13 T/yr

5. Sand Muller with Cartridge Type Dust Collector System

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 491 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions
1137 SCFM X 60 Min/Hr X 491 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 491 Hr
= 0.43 T/yr

Allowable Emissions
0.1 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 0.44 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.02 T/yr

Potential Emissions = 0.43 T/yr

6. Two (2) Aluminum Crucible Furnaces

Quantity Charged	=	44	Tons
Quantity Cast	=	34	Tons
Hours of Operation	=	347	Hours
Process Rate (P)	=	0.13	T/Hr
Control Equipment	=	None	

* Particulate

Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions

1.8 lb/T X 34 T / Yr X T / 2000 lb = 0.03 T/yr

Potential Emissions

0.03 T/Yr X 8760 Hr / 347 Hr X 2 Furnaces = 1.54 T/yr

Allowable Emissions

E = 3.59(P)^.62 = 1.00 lb/Hr

2 Furnaces = 8.74 T/yr

7. Cleaning Table with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation	=	384	Hours
Control Equipment	=	Fabric Filter	
Flow Rate	=	1750	SCFM

* Particulate

Emission Factor	=	0.02	gr/SCF (PM-SIP Documents)
Allowable Emission	=	0.30	lb/Hr (Permit Condition)

Actual Emissions

1750 SCFM X 60 Min/Hr X 384 Hr/yr X 0.02 gr/SCF X T / 2000 X lb/ 7000 gr = 0.06 T/yr

Potential Emissions

0.06 T/Yr X 8760 Hr / 384 Hr = 1.31 T/yr

Allowable Emissions

0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb = 1.31 T/yr

* PM 10

Emission Factor = 100% TSP Emissions

Actual Emissions = 0.06 T/yr

Potential Emissions = 1.31 T/yr

8. Natural Gas Combusted

Hours of Operation	=	1377	Hours
Heat Input	=	1.64E+09	BTU/yr
	=	1.64E+06	Ft^3/yr
	=	1.19E+06	BTU/hr

Emission Factors		Airs; SCC 1-05-001-06	
		Space Heaters	
Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.08	T/yr
CO	=	0.02	T/yr
VOC	=	0.00	T/yr

9. No. 2 Fuel Oil

Fuel Combusted	=	800	Gallons

Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.19	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

10. LPG

Fuel Combusted	=	2395	Gallons
Emission Factors		AIRS: SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.17	T/yr
CO	=	0.15	T/yr
VOC	=	0.10	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
2000 Emissions Summary
Tons Per Year

January 16, 2001

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.062	1.084	1.084
004	Electric Induction Furnace	0.062	1.084	1.084
	Add'l Foundry Operations	1.209	21.199	21.199
	Molding and Sand Handling	0.022	0.506	0.506
005	Sand Shakeout and Silo Filter	0.168	4.130	4.117
006	Sand Muller and Cart. Filter	0.024	0.427	0.438
	Aluminum Furnaces	0.031	1.545	8.740
003	Cleaning Table Fabric Filter	0.058	1.314	1.314
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.013	N/A	N/A
	LP Gas	0.006	N/A	N/A
	TOTAL	**1.66**	**31.29**	**38.48**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.059	1.036	N/A
004	Electric Induction Furnace	0.059	1.036	N/A
	Add'l Foundry Operations	1.066	18.694	N/A
	Molding and Sand Handling	0.018	0.420	N/A
005	Sand Shakeout and Silo Filter	0.168	4.130	N/A
006	Sand Muller and Cart. Filter	0.024	0.427	N/A
	Aluminum Furnaces	0.031	1.545	N/A
003	Cleaning Table Fabric Filter	0.058	1.314	N/A
	Natural Gas	0.002	N/A	N/A
	No. 2 Fuel Oil	0.013	N/A	N/A
	LP Gas	0.006	N/A	N/A
	TOTAL	**1.50**	**28.60**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.000	N/A	N/A
	No. 2 Fuel Oil	0.012	N/A	N/A
	LP Gas	0.000	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.082	N/A	N/A
	No. 2 Fuel Oil	0.188	N/A	N/A
	LP Gas	0.166	N/A	N/A
	TOTAL	**0.44**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.016	N/A	N/A
	No. 2 Fuel Oil	0.041	N/A	N/A
	LP Gas	0.154	N/A	N/A
	TOTAL	**0.21**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.368	6.456	N/A
004	Electric Induction Furnace	0.368	6.456	N/A
	Natural Gas	0.004	N/A	N/A
	No. 2 Fuel Oil	0.013	N/A	N/A
	LP Gas	0.099	N/A	N/A
	TOTAL	**0.85**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.012	0.205	N/A
004	Electric Induction Furnace	0.012	0.205	N/A
	TOTAL	**0.02**	**0.41**	

Prepared by:
Date: 1-16-2001

Reviewed by:
Date: 1.22.01

<AQ116S] JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM <336429632]
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)
PLANT ID: [000040] STACK ID: [ ] APPL YR: [2000] PRINTER #: [P201]
PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC.]

POLLUTANT	ACTUAL EMISSION LBS/HR	ACTUAL EMISSION TONS/YR	ALLOWABLE EMISSION LBS/HR	ALLOWABLE EMISSION TONS/YR	POTENTIAL TONS/YR	PEAK SEASON LBS/DAY
CO		0.852			12.912	
PSP		1.657		38.482	31.289	
SO2		0.012				
PM10		1.504			28.602	
NOX		0.436				
LEAD		0.024			0.410	
CO		0.211				

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 21, 2000

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 1999 Emissions Calculations for the Barry Pattern and Foundry Company for your reference. The calculations were based on the 1999 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Engineer
Air Pollution Control Program

Enclosure: 1999 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY99.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

1999 Emissions Calculations

January 20, 2000

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	1260	Tons	
Iron Produced	=	949	Tons	
Hours of Operation	=	1576	Hours	
Process Rate (P)	=	0.80	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 1260 T / Yr X T / 2000 lb
= 0.14 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 1260 T / Yr X T / 2000 lb
= 0.14 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 1260 T/yr X T/ 2000 lb
= 0.84 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 1260 T / Yr X T / 2000 lb
= 0.03 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80**	**lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions
2.20 lb/T X 1260 T / Yr X T / 2000 lb
= 1.39 T/yr

Potential Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

Allowable Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76**	**lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions
1.94 lb/T X 1260 T / Yr X T / 2000 lb
= 1.22 T/yr

Potential Emissions
1.94 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 18.69 T/yr

3. Sand Handling System

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions
0.02 lb/T X 949 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.02 T/yr

Potential Emissions
0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

Allowable Emissions
0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions
0.02 T/Yr X 0.83 = 0.02 T/yr

Potential Emissions
0.51 T/Yr X 0.83 = 0.42 T/yr

4. Sand System with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 486 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions

11000 SCFM X 60 Min/Hr X 486 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.23 T/yr

Potential Emissions

0.23 T/Yr X 8760 Hr / 486 Hr
= 4.13 T/yr

Allowable Emissions

0.94 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 4.12 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.23 T/yr

Potential Emissions = 4.13 T/yr

5. Sand Muller with Cartridge Type Dust Collector System

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 622 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions

1137	SCFM	X	60	Min/Hr	X	622	Hr/yr	X
0.01	gr/SCF	X	T /	2000	X	lb/	7000	gr
						=	0.03	T/yr

Potential Emissions

0.03	T/Yr	X	8760	Hr	/	622	Hr	
						=	0.43	T/yr

Allowable Emissions

0.1	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb
						=	0.44	T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.03 T/yr

Potential Emissions = 0.43 T/yr

6. **Two (2) Aluminum Crucible Furnaces**

Quantity Charged = 22 Tons
Quantity Cast = 17 Tons
Hours of Operation = 176 Hours
Process Rate (P) = 0.13 T/Hr
Control Equipment = None

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 17 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 176 Hr
X 2 Furnaces = 1.52 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 0.99 lb/Hr
2 Furnaces = 8.66 T/yr

7. **Cleaning Table with Fabric Filter System**

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation = 384 Hours
Control Equipment = Fabric Filter
Flow Rate = 1750 SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 384 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.06 T/yr

Potential Emissions
0.06 T/Yr X 8760 Hr / 384 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.06 T/yr

Potential Emissions = 1.31 T/yr

8. Natural Gas Combusted

Hours of Operation	=	1576	Hours
Heat Input	=	1.79E+09	BTU/yr
	=	1.79E+06	Ft^3/yr
	=	1.13E+06	BTU/hr

Emission Factors		Airs; SCC 1-05-001-06 Space Heaters	
Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.09	T/yr
CO	=	0.02	T/yr
VOC	=	0.00	T/yr

9. No. 2 Fuel Oil

Fuel Combusted	=	850	Gallons

Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.20	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

10. LPG

Fuel Combusted	=	2304	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.16	T/yr
CO	=	0.15	T/yr
VOC	=	0.10	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
1999 Emissions Summary
Tons Per Year

January 20, 2000

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.071	1.084	1.084
004	Electric Induction Furnace	0.071	1.084	1.084
	Add'l Foundry Operations	1.386	21.199	21.199
	Molding and Sand Handling	0.025	0.506	0.506
005	Sand Shakeout and Silo Filter	0.229	4.130	4.117
006	Sand Muller and Cart. Filter	0.030	0.427	0.438
	Aluminum Furnaces	0.015	1.523	8.663
003	Cleaning Table Fabric Filter	0.058	1.314	1.314
	Natural Gas	0.003	N/A	N/A
	No. 2 Fuel Oil	0.014	N/A	N/A
	LP Gas	0.006	N/A	N/A
	TOTAL	**1.91**	**31.27**	**38.41**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.068	1.036	N/A
004	Electric Induction Furnace	0.068	1.036	N/A
	Add'l Foundry Operations	1.222	18.694	N/A
	Molding and Sand Handling	0.021	0.420	N/A
005	Sand Shakeout and Silo Filter	0.229	4.130	N/A
006	Sand Muller and Cart. Filter	0.030	0.427	N/A
	Aluminum Furnaces	0.015	1.523	N/A
003	Cleaning Table Fabric Filter	0.058	1.314	N/A
	Natural Gas	0.003	N/A	N/A
	No. 2 Fuel Oil	0.014	N/A	N/A
	LP Gas	0.006	N/A	N/A
	TOTAL	**1.73**	**28.58**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.001	N/A	N/A
	No. 2 Fuel Oil	0.013	N/A	N/A
	LP Gas	0.000	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.089	N/A	N/A
	No. 2 Fuel Oil	0.199	N/A	N/A
	LP Gas	0.160	N/A	N/A
	TOTAL	**0.45**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.018	N/A	N/A
	No. 2 Fuel Oil	0.043	N/A	N/A
	LP Gas	0.149	N/A	N/A
	TOTAL	**0.21**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.422	6.456	N/A
004	Electric Induction Furnace	0.422	6.456	N/A
	Natural Gas	0.005	N/A	N/A
	No. 2 Fuel Oil	0.014	N/A	N/A
	LP Gas	0.096	N/A	N/A
	TOTAL	**0.96**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.013	0.205	N/A
004	Electric Induction Furnace	0.013	0.205	N/A
	TOTAL	**0.03**	**0.41**	

Prepared by:
Date: 1-20-2000

Reviewed by:
Date: 1-21-00

EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)

PLANT ID: [000040] STACK ID: [ ] APPL YR: [1999] PRINTER #: [P201]

PLANT/STACK: ‹BARRY PATTERN AND FOUNDRY COMPANY, INC.]

	ACTUAL EMISSION		ALLOWABLE EMISSION		POTENTIAL	PEAK SEASON
POLLUTANT	LBS/HR	TONS/YR	LBS/HR	TONS/YR	TONS/YR	LBS/DAY
OC		0.950			12.920	
TSP		1.910		38.420	31.260	
SO2		0.010				
PM10		1.740			28.620	
NOX		0.450				
LEAD		0.020			0.400	
CO		0.210				

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 12, 1999

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 1998 Emissions Calculations for the Barry Pattern and Foundry Company for your reference. The calculations were based on the 1998 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Engineer
Air Pollution Control Program

Enclosure: 1998 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY98.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

1998 Emissions Calculations

January 11, 1999

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	1262	Tons	
Iron Produced	=	944	Tons	
Hours of Operation	=	1515	Hours	
Process Rate (P)	=	0.83	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 1262 T / Yr X T / 2000 lb
= 0.14 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 1262 T / Yr X T / 2000 lb
= 0.14 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 1262 T/yr X T/ 2000 lb
= 0.85 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 1262 T / Yr X T / 2000 lb
= 0.03 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor	Source
Charge Handling	0.60 lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00 lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80 lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40 lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80 lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions
2.20 lb/T X 1262 T / Yr X T / 2000 lb
= 1.39 T/yr

Potential Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

Allowable Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

* PM 10

Operation	Emission Factor	Source
Charge Handling	0.36 lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20 lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80 lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40 lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76 lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions
1.94 lb/T X 1262 T / Yr X T / 2000 lb
= 1.22 T/yr

Potential Emissions
1.94 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 18.69 T/yr

3. Sand Handling System

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions
0.02 lb/T X 944 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.02 T/yr

Potential Emissions
0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

Allowable Emissions
0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions
0.02 T/Yr X 0.83 = 0.02 T/yr

Potential Emissions
0.51 T/Yr X 0.83 = 0.42 T/yr

4. Sand System with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 395 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions

11000 SCFM X 60 Min/Hr X 395 Hr/yr X
0.01 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.19 T/yr

Potential Emissions

0.19 T/Yr X 8760 Hr / 395 Hr
= 4.13 T/yr

Allowable Emissions

0.94 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 4.12 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.19 T/yr

Potential Emissions = 4.13 T/yr

5. Sand Muller with Cartridge Type Dust Collector System

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 624 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions

1137	SCFM	X	60	Min/Hr	X	624	Hr/yr	X
0.01	gr/SCF	X	T /	2000		X lb/	7000	gr
						=	0.03	T/yr

Potential Emissions

0.03	T/Yr	X	8760	Hr	/	624	Hr	
						=	0.43	T/yr

Allowable Emissions

0.1	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb
						=	0.44	T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.03 T/yr

Potential Emissions = 0.43 T/yr

6. Two (2) Aluminum Crucible Furnaces

Quantity Charged = 40 Tons
Quantity Cast = 30 Tons
Hours of Operation = 298 Hours
Process Rate (P) = 0.13 T/Hr
Control Equipment = None

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 30 T / Yr X T / 2000 lb
= 0.03 T/yr

Potential Emissions
0.03 T/Yr X 8760 Hr / 298 Hr
X 2 Furnaces = 1.59 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 1.03 lb/Hr
2 Furnaces = 9.05 T/yr

7. Cleaning Table with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation = 368 Hours
Control Equipment = Fabric Filter
Flow Rate = 1750 SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 368 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.06 T/yr

Potential Emissions
0.06 T/Yr X 8760 Hr / 368 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.06 T/yr

Potential Emissions = 1.31 T/yr

8. Natural Gas Combusted

Hours of Operation	=	1515	Hours
Heat Input	=	1.72E+09	BTU/yr
	=	1.72E+06	Ft^3/yr
	=	1.13E+06	BTU/hr

Emission Factors		Airs; SCC 1-05-001-06 Space Heaters	
Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.09	T/yr
CO	=	0.02	T/yr
VOC	=	0.00	T/yr

9. No. 2 Fuel Oil

Fuel Combusted	=	800	Gallons

Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.19	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

10. LPG

Fuel Combusted	=	2392	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.17	T/yr
CO	=	0.15	T/yr
VOC	=	0.10	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
1998 Emissions Summary
Tons Per Year

January 11,1999

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.07	1.08	1.08
004	Electric Induction Furnace	0.07	1.08	1.08
	Add'l Foundry Operations	1.39	21.20	21.20
	Molding and Sand Handling	0.02	0.51	0.51
005	Sand Shakeout and Silo Filter	0.19	4.13	4.12
006	Sand Muller and Cart. Filter	0.03	0.43	0.44
	Aluminum Furnaces	0.03	1.59	9.05
003	Cleaning Table Fabric Filter	0.06	1.31	1.31
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**1.88**	**31.33**	**38.80**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.07	1.04	N/A
004	Electric Induction Furnace	0.07	1.04	N/A
	Add'l Foundry Operations	1.22	18.69	N/A
	Molding and Sand Handling	0.02	0.42	N/A
005	Sand Shakeout and Silo Filter	0.19	4.13	N/A
006	Sand Muller and Cart. Filter	0.03	0.43	N/A
	Aluminum Furnaces	0.03	1.59	N/A
003	Cleaning Table Fabric Filter	0.06	1.31	N/A
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**1.70**	**28.64**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.00	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.09	N/A	N/A
	No. 2 Fuel Oil	0.19	N/A	N/A
	LP Gas	0.17	N/A	N/A
	TOTAL	**0.44**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.02	N/A	N/A
	No. 2 Fuel Oil	0.04	N/A	N/A
	LP Gas	0.15	N/A	N/A
	TOTAL	**0.21**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.42	6.46	N/A
004	Electric Induction Furnace	0.42	6.46	N/A
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.10	N/A	N/A
	TOTAL	**0.96**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.01	0.20	N/A
004	Electric Induction Furnace	0.01	0.20	N/A
	TOTAL	**0.03**	**0.41**	

Prepared by:
Date: 1-11-99

Reviewed by:
Date: 1-11-99

<AQI16S] JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM <336429632]
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)

PLANT ID: [000040] STACK ID: [ ] APPL YEAR: [98] PRINTER #: [W071]

PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC.]

	ACTUAL EMISSION		ALLOWABLE EMISSION		POTENTIAL	PEAK SEASON
LLUTANT	LBS/HR	TONS/YR	LBS/HR	TONS/YR	TONS/YR	LBS/DAY
[VOC	<	<0.950	<	<	<12.920	<
[TSP	<	<1.880	<	<38.790	<31.330	<
[SO2	<	<0.010	<	<	<	<
[PM10	<	<1.710	<	<	<28.650	<
[NOX	<	<0.440	<	<	<	<
[LEAD	<	<0.020	<	<	<0.400	<
[CO	<	<0.210	<	<	<	<
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JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

February 16, 1998

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 1997 Emissions Calculations for the Barry Pattern and Foundry Company for your reference. The calculations were based on the 1997 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Engineer
Air and Solid Waste Division

Enclosure: 1997 Emissions Calculations

File:EXCEL\CALCS\BARRY\BARRY97.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

1997 Emissions Calculations

February 16, 1998

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	1172	Tons	
Iron Produced	=	872	Tons	
Hours of Operation	=	2090	Hours	
Process Rate (P)	=	0.56	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 1172 T / Yr X T / 2000 lb
= 0.13 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 1172 T / Yr X T / 2000 lb
= 0.13 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 1172 T/yr X T/ 2000 lb
= 0.79 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 1172 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**8.80**	**lb/T**	

Raw Emission Factor = 8.8 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 2.20 lb/T

Actual Emissions
2.20 lb/T X 1172 T / Yr X T / 2000 lb
= 1.29 T/yr

Potential Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

Allowable Emissions
2.20 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 21.20 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
TOTAL	**7.76**	**lb/T**	

Raw Factor = 7.76 lb/T
Assume 75% Remains Within Building Enclosure

Actual Factor = 1.94 lb/T

Actual Emissions
1.94 lb/T X 1172 T / Yr X T / 2000 lb
= 1.14 T/yr

Potential Emissions
1.94 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 18.69 T/yr

3. Sand Handling System

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
TOTAL	**0.07**	**lb/Ton of Sand**		

Raw Factor = 0.07 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.02 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions

0.02 lb/T X 872 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.02 T/yr

Potential Emissions

0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

Allowable Emissions

0.02 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 0.51 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions

0.02 T/Yr X 0.83 = 0.02 T/yr

Potential Emissions

0.51 T/Yr X 0.83 = 0.42 T/yr

4. Sand System with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 005

Hours of Operation = 426 Hours
Control Equipment = Fabric Filter
Flow Rate = 11000 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.94 lb/Hr (Permit Condition)

Actual Emissions

11000	SCFM	X	60	Min/Hr	X	426	Hr/yr	X	
0.01	gr/SCF	X	T /	2000		X lb/	7000	gr	
						=	0.20	T/yr	

Potential Emissions

0.20	T/Yr	X	8760	Hr	/	426	Hr		
						=	4.13	T/yr	

Allowable Emissions

0.94	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb	
						=	4.12	T/yr	

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.20 T/yr

Potential Emissions = 4.13 T/yr

5. Sand Muller with Cartridge Type Dust Collector System

Permit 4-07-0040-01 Emission Unit 006

Hours of Operation = 515 Hours
Control Equipment = Cartridge Type Dust Collector
Flow Rate = 1137 SCFM

* Particulate
Emission Factor = 0.01 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.10 lb/Hr (Permit Condition)

Actual Emissions

1137	SCFM	X	60	Min/Hr	X	515	Hr/yr	X
0.01	gr/SCF	X	T /	2000	X	lb/	7000	gr
						=	0.03	T/yr

Potential Emissions

0.03	T/Yr	X	8760	Hr	/	515	Hr	
						=	0.43	T/yr

Allowable Emissions

0.1	lb/Hr	X	8760	Hr/ yr	X	T/	2000	lb
						=	0.44	T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.03 T/yr

Potential Emissions = 0.43 T/yr

6. Two (2) Aluminum Crucible Furnaces

Quantity Charged	=	45	Tons
Quantity Cast	=	34	Tons
Hours of Operation	=	248	Hours
Process Rate (P)	=	0.18	T/Hr
Control Equipment	=	None	

* Particulate

Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions

1.8 lb/T X 34 T / Yr X T / 2000 lb = 0.03 T/yr

Potential Emissions

0.03 T/Yr X 8760 Hr / 248 Hr X 2 Furnaces = 2.16 T/yr

Allowable Emissions

E = 3.59(P)^.62 = 1.25 lb/Hr

2 Furnaces = 10.92 T/yr

7. Cleaning Table with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation	=	552	Hours
Control Equipment	=	Fabric Filter	
Flow Rate	=	1750	SCFM

* Particulate

Emission Factor = 0.02 gr/SCF (PM-SIP Documents)

Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions

1750 SCFM X 60 Min/Hr X 552 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr = 0.08 T/yr

Potential Emissions

0.08 T/Yr X 8760 Hr / 552 Hr = 1.31 T/yr

Allowable Emissions

0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb = 1.31 T/yr

* PM 10

Emission Factor = 100% TSP Emissions

Actual Emissions = 0.08 T/yr

Potential Emissions = 1.31 T/yr

8. Natural Gas Combusted

Hours of Operation	=	2090	Hours
Heat Input	=	2.18E+09	BTU/yr
	=	2.18E+06	Ft^3/yr
	=	1.04E+06	BTU/hr

Emission Factors		Airs; SCC 1-05-001-06	
		Space Heaters	
Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.11	T/yr
CO	=	0.02	T/yr
VOC	=	0.01	T/yr

9. No. 2 Fuel Oil

Fuel Combusted	=	810	Gallons

Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.19	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

10. LPG

Fuel Combusted	=	2952	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.21	T/yr
CO	=	0.19	T/yr
VOC	=	0.12	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
1997 Emissions Summary
Tons Per Year

February 16, 1998

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.07	1.08	1.08
004	Electric Induction Furnace	0.07	1.08	1.08
	Add'l Foundry Operations	1.29	21.20	21.20
	Molding and Sand Handling	0.02	0.51	0.51
005	Sand Shakeout and Silo Filter	0.20	4.13	4.12
006	Sand Muller and Cart. Filter	0.03	0.43	0.44
	Aluminum Furnaces	0.03	2.16	10.92
003	Cleaning Table Fabric Filter	0.08	1.31	1.31
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**1.81**	**31.91**	**40.66**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.06	1.04	N/A
004	Electric Induction Furnace	0.06	1.04	N/A
	Add'l Foundry Operations	1.14	18.69	N/A
	Molding and Sand Handling	0.02	0.42	N/A
005	Sand Shakeout and Silo Filter	0.20	4.13	N/A
006	Sand Muller and Cart. Filter	0.03	0.43	N/A
	Aluminum Furnaces	0.03	2.16	N/A
003	Cleaning Table Fabric Filter	0.08	1.31	N/A
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**1.65**	**29.22**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.00	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.11	N/A	N/A
	No. 2 Fuel Oil	0.19	N/A	N/A
	LP Gas	0.21	N/A	N/A
	TOTAL	**0.50**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.02	N/A	N/A
	No. 2 Fuel Oil	0.04	N/A	N/A
	LP Gas	0.19	N/A	N/A
	TOTAL	**0.25**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.39	6.46	N/A
004	Electric Induction Furnace	0.39	6.46	N/A
	Natural Gas	0.01	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.12	N/A	N/A
	TOTAL	**0.93**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.01	0.20	N/A
004	Electric Induction Furnace	0.01	0.20	N/A
	TOTAL	**0.02**	**0.41**	

Prepared by:
Date: 2-16-98

Reviewed by;
Date: 2-17-98

EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)

PLANT ID: [000040] STACK ID: [ ] APPL YEAR: [97] PRINTER #: [A206]

PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC.]

	ACTUAL EMISSION		ALLOWABLE EMISSION		POTENTIAL	PEAK SEASON
POLLUTANT	LBS/HR	TONS/YR	LBS/HR	TONS/YR	TONS/YR	LBS/DAY
VOC		0.920			12.920	
TSP		1.810		40.660	31.900	
SO2		0.010				
PM10		1.640			29.220	
NOX		0.500				
LEAD		0.020			0.400	
CO		0.250				

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

January 23, 1997

Mr. Robert Gurley Jr., Vice President Manufacturing
Barry Pattern and Foundry Company, Inc.
3333 - 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Enclosed is a copy of the 1996 Emission Calculations for the Barry Pattern and Foundry Company for your reference. The calculations were based on the 1996 Production Data you furnished for the company.

If you have any questions concerning these calculations, please contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

David R. Wootton
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure: 1996 Emission Calculations

File:EXCEL\CALCS\BARRY\BARRY96.XLS

Barry Pattern & Foundry Company, Inc.
Facility No. 40

1996 Emission Calculations

January 23, 1996

1. **Two (2) Induction Furnaces (Furnaces Operate Alternately)**
Permit 4-07-0040-01
Emission Unit 002 and Unit 004

Quantity Charged	=	1518	Tons	
Iron Produced	=	1138	Tons	
Hours of Operation	=	2005	Hours	
Process Rate (P)	=	0.76	T/Hr	
Maximum Production	=	9636	T/Yr	Permit Condition
Each Furnace				
Building Capture	=	75	%	
Control Equipment	=	None		

* Particulate
Raw Emission Factor= 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.225 lb/Ton Charged

Actual Emissions
0.225 lb/T X 1518 T / Yr X T / 2000 lb
= 0.17 T/yr

Potential Emissions
0.225 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.17 T/yr

Allowable Emissions
0.225 lb/T X 9636 T/Yr X T / 2000
X 2 Furnaces = 2.17 T/yr

Raw Emission Factor= 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Factor = 0.215 lb/Ton Charged

Actual Emissions
0.215 lb/T X 1518 T / Yr X T / 2000 lb
= 0.16 T/yr

Potential Emissions
0.215 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 2.07 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**1.34**	**lb/Ton**	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 1518 T/yr X T/ 2000 lb = 1.02 T/yr

Potential Emissions

1.34 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 12.91 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 1518 T / Yr X T / 2000 lb = 0.03 T/yr

Potential Emissions

0.0425 lb/T X 9636 T/Yr X T / 2000 lb
X 2 Furnaces = 0.41 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
Casting Shakeout	3.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**12.00**	**lb/T**	

Raw Emission Factor = 12.0 lb/Ton
Assume 75% Remains Within Building Enclosure

Actual Factor = 3.00 lb/T

Actual Emissions
3.00 lb/T X 1518 T / Yr X T / 2000 lb
= 2.28 T/yr

Potential Emissions
3.00 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 28.91 T/yr

Allowable Emissions
3.00 lb/T X 9636 T / Yr X T / 2000 lb
X 2 Furnaces = 28.91 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
Casting Shakeout	2.24	lb/T	AIRS;SCC 3-04-003-31
TOTAL	**10.00**	**lb/T**	

Raw Factor = 10.00 lb/T

Assume 75% Remains Within Building Enclosure

Actual Factor = 2.50 lb/T

Actual Emissions

2.50 lb/T X 1518 T / Yr X T / 2000 lb

= 1.90 T/yr

Potential Emissions

2.50 lb/T X 9636 T / Yr X T / 2000 lb

X 2 Furnaces = 24.09 T/yr

3. Sand Handling System

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Sand Preparation	0.13	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
Binder Mixing	0.30	lb/T	(PEDCO)	1981
Sand Reclamation	1.50	lb/T	(PEDCO)	1981
TOTAL	**2.00**	**lb/Ton of Sand**		

Raw Factor = 2.00 lb/Ton of Sand
Assume 75% Remains Within Building Enclosure

Actual Factor = 0.50 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions
0.50 lb/T X 1138 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 0.85 T/yr

Potential Emissions
0.50 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 14.45 T/yr

Allowable Emissions
0.50 lb/T X 9636 T / Yr X T / 2000 lb
3 lb/T X 2 Furnaces = 14.45 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions
0.85 T/Yr X 0.83 = 0.71 T/yr

Potential Emissions
14.45 T/Yr X 0.83 = 12.00 T/yr

4. Two (2) Aluminum Crucible Furnaces

Quantity Charged	=	30	Tons
Quantity Cast	=	23	Tons
Hours of Operation	=	285	Hours
Process Rate (P)	=	0.11	T/Hr
Control Equipment	=	None	

* Particulate
Emission Factor = 1.8 lb/Ton Cast PEDCO

Actual Emissions
1.8 lb/T X 23 T / Yr X T / 2000 lb
= 0.02 T/yr

Potential Emissions
0.02 T/Yr X 8760 Hr / 285 Hr
X 2 Furnaces = 1.27 T/yr

Allowable Emissions
E = 3.59(P)^.62 = 0.89 lb/Hr
2 Furnaces = 7.79 T/yr

5. Cleaning Table with Fabric Filter System

Permit 4-07-0040-01 Emission Unit 003

Hours of Operation	=	732	Hours
Control Equipment	=	Fabric Filter	
Flow Rate	=	1750	SCFM

* Particulate
Emission Factor = 0.02 gr/SCF (PM-SIP Documents)
Allowable Emission = 0.30 lb/Hr (Permit Condition)

Actual Emissions
1750 SCFM X 60 Min/Hr X 732 Hr/yr X
0.02 gr/SCF X T / 2000 X lb/ 7000 gr
= 0.11 T/yr

Potential Emissions
0.11 T/Yr X 8760 Hr / 732 Hr
= 1.31 T/yr

Allowable Emissions
0.3 lb/Hr X 8760 Hr/ yr X T/ 2000 lb
= 1.31 T/yr

* PM 10
Emission Factor = 100% TSP Emissions

Actual Emissions = 0.11 T/yr

Potential Emissions = 1.31 T/yr

6. Natural Gas Combusted

Hours of Operation	=	2005	Hours
Heat Input	=	2.26E+09	BTU/yr
	=	2.26E+06	Ft^3/yr
	=	1.13E+06	BTU/hr

Emission Factors — Airs; SCC 1-05-001-06
Space Heaters

Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.11	T/yr
CO	=	0.02	T/yr
VOC	=	0.01	T/yr

7. No. 2 Fuel Oil

Fuel Combusted	=	850	Gallons

Emission Factors — AIRS; SCC 2-02-001-02

Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon

Emissions:

Particulate	=	0.01	T/yr
SOX	=	0.01	T/yr
NOX	=	0.20	T/yr
CO	=	0.04	T/yr
VOC	=	0.01	T/yr

8. LPG

Fuel Combusted	=	3144	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.22	T/yr
CO	=	0.20	T/yr
VOC	=	0.13	T/yr

Barry Pattern & Foundry Company, Inc.
Facility No. 40
1996 Emission Summary
Tons Per Year

January 23, 1997

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.09	1.08	1.08
004	Electric Induction Furnace	0.09	1.08	1.08
	Add'l Foundry Operations	2.28	28.91	28.91
	Sand Handling System	0.85	14.45	14.45
	Aluminum Furnaces	0.02	1.27	7.79
003	Fabric Filter System	0.11	1.31	1.31
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**3.46**	**48.12**	**54.63**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.08	1.04	N/A
004	Electric Induction Furnace	0.08	1.04	N/A
	Add'l Foundry Operations	1.90	24.09	N/A
	Sand Handling System	0.71	12.00	N/A
	Aluminum Furnaces	0.02	1.27	N/A
003	Fabric Filter System	0.11	1.31	N/A
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**2.93**	**40.75**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.00	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.11	N/A	N/A
	No. 2 Fuel Oil	0.20	N/A	N/A
	LP Gas	0.22	N/A	N/A
	TOTAL	**0.53**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.02	N/A	N/A
	No. 2 Fuel Oil	0.04	N/A	N/A
	LP Gas	0.20	N/A	N/A
	TOTAL	**0.27**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.51	6.46	N/A
004	Electric Induction Furnace	0.51	6.46	N/A
	Natural Gas	0.01	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.13	N/A	N/A
	TOTAL	**1.17**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.02	0.20	N/A
004	Electric Induction Furnace	0.02	0.20	N/A
	TOTAL	**0.03**	**0.41**	

<AQ116S] JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM <336429632]
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)

PLANT ID: [000040] STACK ID: [ ] APPL YEAR: [96] PRINTER #: [A206]

PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC.]

POLLUTANT	ACTUAL EMISSION LBS/HR	ACTUAL EMISSION TONS/YR	ALLOWABLE EMISSION LBS/HR	ALLOWABLE EMISSION TONS/YR	POTENTIAL TONS/YR	PEAK SEASON LBS/DAY
VOC		1.170			12.920	
TSP		3.460		54.620	48.100	
SO2		0.010				
PM10		2.920			40.750	
NOX		0.530				
LEAD		0.040			0.400	
CO		0.270				

Barry Pattern & Foundry Company, Inc.
Facility No. 40
1996 Emission Summary
Tons Per Year

January 23, 1997

Pollutant: **Particulate Matter**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.09	1.08	1.08
004	Electric Induction Furnace	0.09	1.08	1.08
	Add'l Foundry Operations	2.28	28.91	28.91
	Sand Handling System	0.85	14.45	14.45
	Aluminum Furnaces	0.02	1.27	7.79
003	Fabric Filter System	0.11	1.31	1.31
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**3.46**	**48.12**	**54.63**

Pollutant: **PM 10**

Emission Unit No.	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.08	1.04	N/A
004	Electric Induction Furnace	0.08	1.04	N/A
	Add'l Foundry Operations	1.90	24.09	N/A
	Sand Handling System	0.71	12.00	N/A
	Aluminum Furnaces	0.02	1.27	N/A
003	Fabric Filter System	0.11	1.31	N/A
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.01	N/A	N/A
	TOTAL	**2.93**	**40.75**	

Pollutant: **Sulfur Dioxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.00	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.00	N/A	N/A
	TOTAL	**0.01**		

Pollutant: **Nitrogen Oxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.11	N/A	N/A
	No. 2 Fuel Oil	0.20	N/A	N/A
	LP Gas	0.22	N/A	N/A
	TOTAL	**0.53**		

Pollutant: **Carbon Monoxide**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
	Natural Gas	0.02	N/A	N/A
	No. 2 Fuel Oil	0.04	N/A	N/A
	LP Gas	0.20	N/A	N/A
	TOTAL	**0.27**		

Pollutant: **Volatile Organic Compounds**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.51	6.46	N/A
004	Electric Induction Furnace	0.51	6.46	N/A
	Natural Gas	0.01	N/A	N/A
	No. 2 Fuel Oil	0.01	N/A	N/A
	LP Gas	0.13	N/A	N/A
	TOTAL	**1.17**	**12.91**	

Pollutant: **Lead**

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
002	Electric Induction Furnace	0.02	0.20	N/A
004	Electric Induction Furnace	0.02	0.20	N/A
	TOTAL	**0.03**	**0.41**	

<AQ116S] JEFFERSON COUNTY AIR POLLUTION CONTROL PROGRAM <336429632]
EMISSIONS INQUIRY - PLANT/STACK

ACTION: [Q] (Q,N,P,T,?)

PLANT ID: [000040] STACK ID: [ ] APPL YEAR: [96] PRINTER #: [A206]

PLANT/STACK: <BARRY PATTERN AND FOUNDRY COMPANY, INC.]

POLLUTANT	ACTUAL EMISSION LBS/HR	ACTUAL EMISSION TONS/YR	ALLOWABLE EMISSION LBS/HR	ALLOWABLE EMISSION TONS/YR	POTENTIAL TONS/YR	PEAK SEASON LBS/DAY
VOC		1.170			12.920	
TSP		3.460		54.620	48.100	
SO2		0.010				
PM10		2.920			40.750	
NOX		0.530				
LEAD		0.040			0.400	
CO		0.270				

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, ALABAMA 35202 205/933-9110

Enclosure

Environmental Health
James L. Carroll, Director

January 25, 1995

Mr. Robert Gurley, Jr.
Vice President Manufacturing
Barry Pattern and Foundry Company
3333 35th Avenue North
Birmingham, AL 35207

Dear Mr. Gurley:

Enclosed is a copy of Emission Calculations for Barry Pattern and Foundry Company for your reference. The calculations were based on the 1994 Production Data furnished by your company.

If you have any questions concerning these calculations, please feel free to contact Mr. David Schilson of this Department at 930-1218.

Sincerely,

R. H. Barrett

Robert H. Barrett
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure: 1994 Emission Calculations

Barry Pattern & Foundry Company. Inc.
Facility No. 40

1994 Emission Calculations

January 25. 1995

1. Two (2) Induction Furnaces (Furnaces Operate Alternately)
Permit 4-07-0040-8601
4-07-0040-8602

Quantity Charged	=	1677	Tons
Iron Produced	=	1340	Tons
Hours of Operation	=	1590	Hours
Process Rate (P)	=	1.05	T/Hr
Control Equipment	=	None	

* Particulate
Emission Factor = 0.9 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.9 lb/T X 1677 T / Yr X T / 2000 lb
= 0.75 T/yr

Potential Emissions

0.75 T/Yr X 8760 Hr / 1590 Hr
X 2 Furnaces = 8.32 T/yr

Allowable Emissions

E = 3.59(P)^.62 = 3.71 lb/Hr
= 32.50 T/yr

* PM 10
Emission Factor = 0.86 lb/Ton Charged
AIRS; SCC (3-04-003-03)

Actual Emissions

0.86 lb/T X 1677 T / Yr X T / 2000 lb
= 0.72 T/yr

Potential Emissions

0.72 T/Yr X 8760 Hr / 1590 Hr
X 2 Furnaces = 7.95 T/yr

* Volatile Organic Compounds

Operation	Emission Factor		Source
Pouring/Casting	0.14	lb/T	AIRS;SCC 3-04-003-20
Casting Shakeout	1.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	1.34	lb/Ton	

Emission Factor = 1.34 lb/Ton Charged

Actual Emissions

1.34 lb/T X 1677 T/yr X T/ 2000 lb = 1.12 T/yr

Potential Emissions

1.12 T/Yr X 8760 Hr / 1590 Hr
X 2 Furnaces = 12.38 T/yr

* Lead

Emission Factor = 0.0425 lb/Ton Charged

AIRS; SCC (3-04-003-03)

Actual Emissions

0.0425 lb/T X 1677 T / Yr X T / 2000 lb = 0.04 T/yr

Potential Emissions

0.04 T/Yr X 8760 Hr / 1590 Hr
X 2 Furnaces = 0.39 T/yr

Allowable Emissions = N/A

2. Additional Grey Iron Foundry Operations

* Particulate

Operation	Emission Factor		Source
Charge Handling	0.60	lb/T	AIRS;SCC 3-04-003-15
Inoculation	4.00	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
Casting Shakeout	3.20	lb/T	AIRS;SCC 3-04-003-31
TOTAL	12.00	lb/T	

Raw Emission Factor = 12.0 lb/Ton
Assume 50% Remains Within Building Enclosure

Actual Factor = 6.00 lb/T

Actual Emissions
6.00 lb/T X 1677 T / Yr X T / 2000 lb
= 5.03 T/yr

Potential Emissions
5.03 T/Yr X 8760 Hr / 1590 Hr
X 2 Furnaces = 55.44 T/yr

Allowable Emissions
E = 3.59(P)^.62 (Each Operation) = 3.71 lb/Hr

Five(5) Operations; Plus Two(2) Furnaces
3.71 lb/Hr X 8760 Hr/Yr X 5 Operations X
2 Furnaces X Ton / 2000 lb = 162.52 T/yr

* PM 10

Operation	Emission Factor		Source
Charge Handling	0.36	lb/T	AIRS;SCC 3-04-003-15
Inoculation	3.20	lb/T	AIRS;SCC 3-04-003-10
Pouring/Casting	2.80	lb/T	AIRS;SCC 3-04-003-20
Casting Cooling	1.40	lb/T	AIRS;SCC 3-04-003-25
Casting Shakeout	2.24	lb/T	AIRS;SCC 3-04-003-31
TOTAL	10.00	lb/T	

Raw Factor = 10.00 lb/T

Assume 50% Remains Within Building Enclosure

Actual Factor = 5.00 lb/T

Actual Emissions

5.00 lb/T X 1677 T / Yr X T / 2000 lb

= 4.19 T/yr

Potential Emissions

4.19 T/Yr X 8760 Hr / 1590 Hr

X 2 Furnaces = 46.20 T/yr

3. Sand Handling System

* Particulate

Operation	Emission Factor		Source	
Sand & Binder Recv'd	0.03	lb/T	(PEDCO)	1981
Sand Preparation	0.13	lb/T	(PEDCO)	1981
Mold Making	0.04	lb/T	(PEDCO)	1981
Binder Mixing	0.30	lb/T	(PEDCO)	1981
Sand Reclamation	1.50	lb/T	(PEDCO)	1981
TOTAL	2.00	lb/Ton of Sand		

Raw Factor = 2.00 lb/Ton of Sand
Assume 50% Remains Within Building Enclosure

Actual Factor = 1.00 lb/Ton of Sand

Assumption: 3 lb Sand Per 1 lb Iron Produced

Actual Emissions
1.00 lb/T X 1340 T / Yr X T / 2000 lb
X 3 Ton Sand/ Ton Iron = 2.01 T/yr

Potential Emissions
2.01 T/Yr X 8760 Hr / 1590 Hr
X 2 Furnaces = 22.15 T/yr

Allowable Emissions
E = 3.59(P)^.62 (Each Operation) = 3.23 lb/Hr

Five(5) Operations; Plus Two(2) Furnaces
3.23 lb/Hr X 8760 Hr/Yr X 5 Operations X
2 Furnaces X Ton / 2000 lb = 141.42 T/yr

* PM 10
Assume 83% TSP is PM 10

Actual Emissions
2.01 T/Yr X 0.83 = 1.67 T/yr

Potential Emissions
22.15 T/Yr X 0.83 = 18.38 T/yr

4. Two (2) Aluminum Crucible Furnaces

Quantity Charged	=	47	Tons
Quantity Cast	=	38	Tons
Hours of Operation	=	430	Hours
Process Rate (P)	=	0.11	T/Hr
Control Equipment	=	None	

* Particulate

Emission Factor = 1.8 lb/Ton Cast
PEDCO

Actual Emissions

1.8 lb/T X 38 T / Yr X T / 2000 lb
= 0.03 T/yr

Potential Emissions

0.03 T/Yr X 8760 Hr / 430 Hr
"X 2 Furnaces = 1.39 T/yr

5. Natural Gas Combusted

Hours of Operation	=	1590	Hours
Heat Input	=	2.31E+09	BTU/yr
	=	2.31E+06	Ft^3/yr
	=	1.45E+06	BTU/hr

Emission Factors Airs; SCC 1-05-001-06
Space Heaters

Particulate	=	3.00E-06	lb/ Ft^3
SOX	=	6.00E-07	lb/ Ft^3
NOX	=	1.00E-04	lb/ Ft^3
CO	=	2.00E-05	lb/ Ft^3
VOC	=	5.30E-06	lb/ Ft^3

Emissions:

Particulate	=	0.00	T/yr
SOX	=	0.00	T/yr
NOX	=	0.12	T/yr
CO	=	0.02	T/yr
VOC	=	0.01	T/yr

6. No. 2 Fuel Oil

Fuel Combusted	=	1300	Gallons
Emission Factors		AIRS; SCC 2-02-001-02	
Particulate	=	33.50	lb/ 1000 Gallon
SOX	=	31.20	lb/ 1000 Gallon
NOX	=	469.00	lb/ 1000 Gallon
CO	=	102.00	lb/ 1000 Gallon
VOC	=	32.10	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.02	T/yr
SOX	=	0.02	T/yr
NOX	=	0.30	T/yr
CO	=	0.07	T/yr
VOC	=	0.02	T/yr

7. LPG

Fuel Combusted	=	3540	Gallons
Emission Factors		AIRS; SCC 2-02-010-01	
Particulate	=	5.00	lb/ 1000 Gallon
SOX	=	0.35	lb/ 1000 Gallon
NOX	=	139.00	lb/ 1000 Gallon
CO	=	129.00	lb/ 1000 Gallon
VOC	=	83.00	lb/ 1000 Gallon
Emissions:			
Particulate	=	0.01	T/yr
SOX	=	0.00	T/yr
NOX	=	0.25	T/yr
CO	=	0.23	T/yr
VOC	=	0.15	T/yr

Barry Pattern & Foundry Company. Inc.
Facility No. 40
1994 Emission Summary
Tons Per Year

January 25. 1995

Pollutant: Particulate Matter

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
8601	Electric Induction Furnace	0.38	4.16	16.25
8602	Electric Induction Furnace	0.38	4.16	16.25
2.	Add'l Foundry Operations	5.03	55.44	162.52
3.	Sand Handling System	2.01	22.15	141.42
4.	Aluminum Furnaces	0.03	1.39	
5.	Natural Gas	0.00		
6.	No. 2 Fuel Oil	0.02		
7.	LP Gas	0.01		
	TOTAL	7.86	87.29	336.45

Pollutant: PM 10

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
8601	Electric Induction Furnace	0.36	3.97	
8602	Electric Induction Furnace	0.36	3.97	
2.	Add'l Foundry Operations	4.19	46.20	
3.	Sand Handling System	1.67	18.38	
4.	Aluminum Furnaces			
5.	Natural Gas	0.00		
6.	No. 2 Fuel Oil	0.02		
7.	LP Gas	0.01		
	TOTAL	6.62	72.53	

Barry Pattern & Foundry Company. Inc.
Facility No. 40
1994 Emission Summary
Tons Per Year

January 25. 1995

Pollutant: Sulfur Dioxide

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
5.	Natural Gas	0.00		
6.	No. 2 Fuel Oil	0.02		
7.	LP Gas	0.00		
	TOTAL	0.02		

Pollutant: Nitrogen Oxide

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
5.	Natural Gas	0.12		
6.	No. 2 Fuel Oil	0.30		
7.	LP Gas	0.00		
	TOTAL	0.42		

Pollutant: Carbon Monoxide

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
5.	Natural Gas	0.02		
6.	No. 2 Fuel Oil	0.07		
7.	LP Gas	0.23		
	TOTAL	0.32		

Pollutant: Volatile Organic Compounds

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
8601	Electric Induction Furnace	0.56	6.19	
8602	Electric Induction Furnace	0.56	6.19	
	TOTAL	1.12	12.38	

Pollutant: Lead

Permit	Description	Emissions Tons Per Year Actual	Potential	Allowable
8601	Electric Induction Furnace	0.02	0.20	
8602	Electric Induction Furnace	0.02	0.20	
	TOTAL	0.04	0.39	

Barry Craft

Jefferson County Health Department
P.O. Box ~~2646~~ 2648
Birmingham, AL. 35202

Attn: Mr. Dave Schilson

BARRY PATTERN & FOUNDRY CO., INC.

PRODUCTION DATA 1994

GRAY IRON

Quantity charged	-	1,677 Tons
Iron (castings) produced	-	1,340 Tons
Hours of Operation	-	1,590
Process Rate	-	1.05 T/HR.
Control Equipment	-	None

ALUMINUM

Quantity charged	-	47 Tons
Quantity cast	-	38 Tons
Hours of Operation	-	430
Process Rate	-	.11 T/HR.
Control Equipment	-	None

Tons Sand Recucled Daily	-	34
Natural Gas Used	-	2,312,300 Cu. Ft.
#2 Fuel	-	1,300 Gallons
L.P.G. Gas for Inplant Vehicles	-	3,540 Gallons

Robert E. Gurley, Jr.

Robert E. Gurley, Jr., Vice-President Mfg.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, ALABAMA 35202 205/933-9110

Bureau of Environmental Health
James L. Carroll, Director

April 13, 1992

Mr. Jack Barry
Barry Pattern & Foundry Company, Inc.
3333 - 35th Avenue, North
Birmingham, AL 35212

Dear Mr. Barry:

In keeping with our policy of conducting annual comprehensive inspections of every major stationary air emission source in Jefferson County, the fiscal year 92 inspection was conducted at Barry Pattern & Foundry Company, Inc. on December 12, 1991. A copy of the inspection report, prepared by Mr. Walter Allen from data obtained and observations made during the inspection, is submitted for your records.

Please note that the report includes emission estimates based on the operations data you forwarded to us for calendar year 1991 operations.

We appreciate your cooperation with us in conducting these inspections. If you have any questions regarding the report, or our Rules and Regulations, please contact Mr. Allen of our office at (205) 930-1283.

Sincerely,

R. H. Barrett

Robert H. Barrett
Senior Air Pollution Control Engineer
Air Pollution Control Program

RHB/cdm

Enclosure

JEFFERSON COUNTY DEPARTMENT OF HEALTH
BUREAU OF ENVIRONMENTAL HEALTH
AIR POLLUTION CONTROL PROGRAM

Barry Pattern and Foundry Co., Inc.
1991 Emissions Calculations

March 11, 1992

I. Particulate Emissions

A. Two G.I. Electric Induction Furnaces (Uncontrolled, 3-04-003-03)

E. F. for PM10 = 96% of total particulates from AIRS Manual (3-04-003-03)

Ratio = 0.86 ÷ 0.90 x 100 = 96%

Uncontrolled Emission Factor for Metal Melting Only = 0.9 lb/ton of metal charged

Gray Iron:

Tons Melted = 1000 tons charged
Tons Casting = 850 tons produced
Furnace(s) hours = 1200 hours/year

Actual Emissions

.000 Tons Charger/1200 hr/yr = 0.833 Tons Charged/Year

E_A = 0.9 lb/Ton Charged x 0.833 Tons Charged/Year = 0.75 PPH

0.75 lb/hr x 1200 hr/yr x T/2000 lbs = 0.45 TPY (2 furnaces alternating)

Actual Allowable Emissions

Pw = 0.833 Tons Charged/yr

$E = 3.59\ (0.833)^{0.62} = 3.21$ lb/hr
= 3.21 lb/hr x 1200 hr/yr x T/2000 lbs = 1.92 TPY (2 furnaces alternating)

Potential Emissions

Emission Factor (3-04-003-03) 0.9 lb/Ton Metal Charged

0.9 lb/Tons x 4.4 Ton/hr = 3.96 lb/hr

3.96 lb/hr x 8760 hr/yr x T/2000 lb = 17.34 TPY (2 furnaces together operating @ 8760 HPY each)

Potential Allowable Emissions

$E = 3.59\ (2.2\ TPH)^{0.62} = 5.85$ lb/hr
$= 5.85$ lb/hr x 8760 hr/yr x T/2000 lb $= 25.64$ TPY
$= 25.64$ TPY x 2 furnaces $= 51.28$ TPY

B. Emissions from Induction Furnaces

Reference: AIRS Manual, Pg. 105 & 106, EPA 450/4-90-003, 3/90

SCC No.	Foundry Operation	TSP Emission Factor	PM_{10}	Source of Emission Factor
3-04-003-15	Scrap & Charge Handling	0.6 lb/Ton of Metal Chrg	0.36 lb/Ton of Metal Chrg	
3-04-003-10	Ferro-Alloy Ladle Inocululations	(4.0 lb/T)(.05) = 0.20	0.12	
3-04-003-20	Pouring & Cooling	4.2 lb/T Melt	4.2 lb/T Melt	
3-04-003-25	Grinding & Finishing	(1.61 lb/Ton Cast) x (1000/850) = 1.89	0.19	3-04-003-40 PEDCO 1981
3-04-003-31	Sand Shakeout	3.2 lb/Ton of Metal Chrg	2.24 lb/Ton of Metal Chrg	
Total		10.09	7.11 (lb/Ton of Metal Charged)	

Basis: Building Containment = 50% of TSP & PM_{10}

Emission Factor - Outside Building = 5.05 TSP & 3.56 PM_{10}

Emissions from Sand System (Gray Iron)

Assume 70% of TSP is PM_{10} Unless Noted

SCC No.	Foundry Operation	TSP Emission Factor	PM_{10} Emission Factor	Source of Emission Factor
	Sand & Binder Receiving & Storage (Mold & Cores)	.03 lb/Ton Sand	.02 lb/Ton Sand	PEDCO 1981
	Sand Preparation (Molds)	1.3 lb/Ton Sand	.91 lb/Ton Sand	PEDCO 1981
	Mold Make-Up	.04 lb/Ton Sand	.03 lb/Ton Sand	PEDCO 1981
	Core Sand & Binder Mixing	.3 lb/Ton Sand	.21 lb/Ton Sand	PEDCO 1981
	Core Making	*.35 lb/Ton of Core Sand	*.25 lb/Ton of Core Sand	PEDCO 1981
	Sand Drying & Reclaimation	**1.5 lb/Ton of Melt	**1.05 lb/Ton of Melt	PEDCO 1981
Total		2.17 lb/Ton Sand	1.52 lb/Ton Sand	

* .35 lb/Ton of Core Sand x 4 Tons of Core Sand x Yr/3000 Tons Sand = 4.67×10^{-4} (Negligible)

** 1.5 lb/Ton of Melt x 1000 Tons Melted/Yr x Yr/3000 Tons Sand = 0.5 lb/(TSP) Ton Sand
& 0.35 lb/(PM_{10}) Ton Sand

Basis: Building Containment = 50% of TSP & PM_{10}

Emission Factor - Outside Building = 1.09 lb/Ton Sand (TSP),
& 1.06 lb/Ton Sand (PM_{10})

Maximum Pw (Sand)
= 4.4 TPH (2 Furnaces on Iron) x 3/1 Ratio
Max Ps = 13.20 TPH Sand
Max Pwt = 13.20 TPHS + 4.4 TPHI = 17.60 TPH

Actual Pw = 1000 TPY ÷ 1200 HPY = 0.83 TPH Iron
= 3000 Ts ÷ 1200 HPY = 2.50 TPH Sand
Pwt = 3.33 TPH (Sand & Iron)

Actual Emissions

5.05 lb/Tons (melt) x 0.833 Tons (melt)/hr + 1.09 lb/Ton (sand) x 2.5 Ton (sand)/hr
= 4.21 + 2.73 = 6.93 lb/hr x 1200 hr/yr x T/2000 lb = 4.16 T/yr

Actual Allowable Emissions

$3.59\ (3.33)^{0.62}$ = 7.57 lb/hr x 1200 hr/yr x T/2000 lb = 4.54 TPY

Potential Emissions

5.05 lb/Ton (melt) x 2.2 Tons (melt)/hr = 11.11 lb/hr x 2 furnaces = 22.22 lb/hr
= 22.22 lb/hr x 8760 hr/yr x T/2000 lb = 97.32 TPY (Melt)

1.09 lb/Ton (sand) x 6.6 Tons (sand)/hr = 7.19 lb/hr x 2 (furnace sys.) = 14.39 lb/hr
= 14.39 lb/hr x 8760 hr/yr x Ton/2000 lb = 63.02 TPY (Sand)

Potential Allowable Emissions

3.59 (8.8)0/62 = 13.83 PPH x 2 = 27.65 PPH
= 27.65 PPH x 8760 hr/yr x T/2000 lb = 121.11 TPY (Melt)

3.59 (6.6)0.62 = 11.5 lb/hr x 2 = 23.13 lb/hr
= 23.13 lb/hr x 8760 hr/yr x Ton/2000 lb = 101.32 TPY (Sand)

D. Three (3) Aluminum Crucible Furnace (Volume 300 lbs of Al. Ingots)

Tertiary Al. Process

E. F. Melt = 1.8 lb/Tons of metal processed (Al. crucible furnace from Pg. 19 & 20 of Misc. Medal Industries dated 1/14/81)

E. F. Charging & Tapping = Negligible

PM_{10} E. F. = 92% of uncontrolled (Ref. P. C. 2-15, Category 8 of Table c. 2-2 of PM_{10} EPA Manual)

= 0.92 x 1.8 = 1.6 lb/Ton

Actual Pw = 40 TPY ÷ 650 HPY = 0.06 TPH or 120.0 PPH

Actual Emissions

1.8 lb/T x 0.06 T/hr = 0.11 PPH
= 0.11 PPH x 850 hr/yr x Ton/2000 lb = 0.05 TPY

PM_{10} Actual Emissions = 0.92 x 0.05 TPY = 0.04 TPY

One (1) Furnace:

Max. Pw = 300 lb/charge x 4 charges/shift = 8 hr/shift

= 150 PPH or .075 TPH

For all 3 Furnaces, Max Pw = 450 PPH or 0.225 TPH

Three Furnaces:

Potential Emissions

= 0.225 Ton/hr x 1.8 lb/T = 0.405 lb/hr x 8760 hr/yr x T/2000 lb = 1.77 TPY

PM_{10} Potential Emissions

= 0.92 x 1.77 TPY = 1.63 TPY

Potential Allowable

= 3.59 (0.075)0.62 = 0.7205 PPH
= 0.7205 PPH x 3 Furnaces = 2.1615 PPH

2.1615 lb/hr x 8760 hr/yr x T/2000 lb = 9.47 TPY

One Furnace:

Actual Allowable

Pw = 40 TPY ÷ 650 HPY = 0.06 TPH
$= 3.59\ (0.06)^{0.62} = 0.63$ PPH

0.63 lb/hr x 650 hr/yr x T/2000 lb = 0.20 TPY (1 furnace)

E. PM_{10} from Iron Melting, Sand Handling and Total PM_{10}

Gray Iron: Actual Emissions

3.56 lb/Tons of Metal Charge x 1000 Tons of Metal Charged/yr x T/2000 lb = 1.78 TPY

Sand System:

1.06 lb/Ton of Sand x 3000 Tons Sand/yr x T/2000 lb = 1.59 TPY

Total (Iron + Sand) = 3.33 TPY

Potential Emissions

Gray Iron:

3.56 lb/Tons of Metal Charge x 4.4 Tons/hr = 15.66 lb/hr

15.66 lb/hr x 8760 hr/yr x T/2000 lbs = 68.59 TPY

Sand System:

4.4 Tons/hr (melt) x 3 (3:1 Ratio Sand/Melt) = 13.20 Tons Sand/hr

1.06 lb/Ton of Sand x 13.20 Tons Sand/hr x 8760 hr/yr x T/2000 lbs = 61.28 TPY

Total (Iron + Sand) = 129.87 TPY

II. Lead Emissions

The following are MSDS sheet on scrap charged to the furnaces:

Manufacturers Name: Southern Scrap Co., Inc.
Material Name: Cast Iron Scrap

	Cas Number	%
Iron	(1309-37-1)	>92
Carbon	(1333-86-4)	<5
Silicon	(7440-21-3)	≤3

Manufacturers Name: Denbo Iron & Metal Co., Inc.

	Cas Number	%
Iron	(1309-37-1)	>54
Manganese	(7439-96-5)	<2
Carbon	(1333-86-4)	<5
Silicon	(7440-21-3)	<6
Nickel	(7440-02-0)	<19
Chromium	(7440-47-3)	≤4
Molybdenum	(7439-98-7)	<2
Copper	(7440-50-8)	<8

Avg. E.F. = 0.0425 lb PB/T.G.I. produced (AIRS P. 105, 3-04-003-03)

Maximum Iron Production = 38,544 TPY (2 furnaces @ 8760 ea)

Actual Emissions

0.0425 lb Pb/Ton Melt x 1000 Tons Melt/yr x T/2000 lbs x 0.50 = 0.01 TPY

Potential Emissions

$$\frac{0.0425 \text{ lb Pb/T} \times 8760 \text{ HPY} \times 2 \text{ furnaces} \times 2.2 \text{ TPH} \times 0.50}{2000 \text{ lb/T}} = 0.41 \text{ TPY}$$

Allowable Emissions - None

III. SO_2, CO, & NO_x Less than 1 TPY

Negligible Emissions per Table 7.10-1 of AP-42 for SO_2 and CO, no emission factors given for NO_x and VOC.

IV. VOC Emissions

Emission Factors (1985 NAPA Manual, Gray Iron, P. 79)

Induction Furnace	Negligible
Charge Handling & Drying	Negligible
Pouring & Cooling	0.14 lb/T
Shakeout	1.23 lb/T
Total	1.37 lb/T

Actual Emission

E_{VOC} = 1.37 lb/Ton (metal charged) x 0.83 Tons/hr = 1.14 PPH

1.14 lb/hr x 1200 hr/yr x T/2000 lbs = 0.68 TPY

Potential Emissions

E_{VOC} = 1.37 lb/Ton x 4.4 Ton/hr = 6.03 PPH

6.03 lb/hr x 8760 hr/yr x T/2000 lbs = 26.40 TPY

Paint Actual

E_{VOC} = 3.39 lbs VOC/gal x 320 gal/yr = 1084 gal/yr

1084 gal/yr x T/2000 lbs = 0.54 TPY

Potential (Paint)

E_{VOC} = 0.54 Tons/yr x 8760/1200 = 3.96 TPY

Natural Gas Actual

E_{VOC} = 0.0075 x $10^6 FT^3$ x 2.8 lb/$10^6 FT^3$ x T/2000 lbs = 0.00001 TPY = 0 TPY

Natural Gas Potential

E_{VOC} = .00001 TPY x 8760/1200 = .00008 TPY

No. 2 Fuel Oil

Actual E_{VOC} = 500 gal x 0.028 lb/gal x 1/2000 = 0.007 TPY = 0.01 TPY

Potential Emissions

0.007 Tons/yr x 8760/1200 = 0.05 TPY

LPG Gas Actual

E_{VOC} = 1000 gal/yr x 0.039 lb/gal x T/2000 lbs = 0.02 TPY

Total VOC Emissions = 1.25 TPY (Actual)

1.25 Tons/yr x 8760/1200 = 9.1 TPY (Potential)

The following are chemicals used or added in the casting process:

The Casting Process:

Core Making: Sodium Silicate Solution
(Cas No. 1344-09-8) CA 47%

Green Sand Binder: Premix
Ingredients:
- Western Bentonite
- Southern Bentonite
- Seacoal
- Petroleum Asphalt
- Starch
- Gilsonite

Dry Parting (Pattern)
Ingredients:
- Mixture of a natural calcite with a fatty (stearic) acid.

NO_x Actual

= 140 lb/MMCF x 0.0075 x $10^6 FT^3$ x 1/2000 = 0.005 TPY

NO_x Potential

= 0.005 TPY x 8760/1200 = 0.037 TPY

V. Hazardous Emissions

1,1,1, Trichloroethane (Thinner) (Cas 71556)

Actual = 160 gal x 8.34 lb/gal = 1334.40 lb

1334.40 lb/yr x T/2000 lbs = 0.67 T/yr

Potential = 0.67 T/yr x 8760/1200 = 4.89 T/yr

BA/cdm

ATTACHMENT H

AGENCY CORRESPONDENCE

Please separate form here and return upper portion with your payment. Keep lower portion for your records.

Date	Description		Amount
04/01/2010	Annual Compliance Verif - Synthetic Minor 2010 Annual Compliance Verif - Synthetic Mino BARRY PATTERN AND FOUNDRY COMPANY, INC. 3333 35th AVE N Birmingham AL 35207		550.00
	Permit # 40	110100044	550.00
Invoice Date	**Reference**	**Invoice No.**	**Balance Due**

Fee Payment is Due May 1, 2010. Failure to make payment within 30 days of this due date shall constitute cause for revocation of your permit.
If you have any questions, please call (205) 930-1239.

JEFFERSON COUNTY DEPARTMENT OF HEALTH

Telephone	Date
930-1239	04/01/2010
Invoice Number	
110100044	

2010 Annual Compliance Verif - Synthetic Minor

BARRY PATTERN AND FOUNDRY COMPANY, INC.
3333 35th AVE N
Birmingham, AL 35207

Permit # 40

Please return this portion with your payment to the address below.

Jefferson County Department of Health
Attention: Environmental Health
P.O. Box 2648
Birmingham, Alabama 35202

Amount Remitted $550.00

Please separate form here and return upper portion with your payment. Keep lower portion for your records.

Date	Description		Amount
04/01/2010	Annual Compliance Verif - Synthetic Minor 2010 Annual Compliance Verif - Synthetic Mino BARRY PATTERN AND FOUNDRY COMPANY, INC. 3333 35th AVE N Birmingham, AL 35207		550.00
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Invoice Date	**Reference**	**Invoice No.**	**Balance Due**

Fee Payment is Due May 1, 2010. Failure to make payment within 30 days of this due date shall constitute cause for revocation of your permit.
If you have any questions, please call (205) 930-1239.

BARRY PATTERN & FOUNDRY CO., INC.

QUALITY CONSTRUCTION CASTINGS • FOUNDED 1923

3333 - 35TH Ave. No., Birmingham, Alabama 35207 Phone (205) 841-8725

No. 48012

BarryCraft

SUPERIOR BANK
WARRIOR, ALABAMA

DATE 4-10-13

PAY [illegible] $ 550.00

TO THE ORDER OF

* Jefferson County Dept of Health
Attn. Environmental Health
P.O. Box 2648
Birmingham, Alabama 35202

BARRY PATTERN AND FOUNDRY CO., INC.

COPY—NOT NEGOTIABLE

AUTHORIZED SIGNATURE

ENTRY DATE	DEPT. REF.	VOUCHER NUMBER	INVOICE DATE	% DISC.	DISCOUNT DATE	DISCOUNT & RETURNS	INVOICE AMOUNT	NET BALANCE
	Annual Compliance Verif - Synthetic Monor							
	Synthetic Minor Permit							

BARRY PATTERN AND FOUNDRY CO., INC.
BIRMINGHAM, ALABAMA

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

PRELIMINARY INSPECTION REPORT

NAME		EPA ID NUMBER	
Barmag Foundry			
STREET ADDRESS	CITY	COUNTY	ZIP CODE
3333 35th Avenue N.	Birmingham	Jefferson	
TELEPHONE(S)	DATE OF INSPECTION		PAGE OF
	4/14/09		1 1

OBSERVATIONS

→ Generates no Haz Waste

→ Generates less than 250 gallons of used oil a year

→ No Violations noted during Inspection

This information is provided to call your attention to these areas of potential noncompliance at the earliest possible time. This report does not constitute a Notice of Violation nor a compliance order issued pursuant to 22-30-19 of the Alabama Hazardous Waste Management and Minimization Act and may not be a complete listing of all areas of noncompliance which may be identified as a result of this inspection.

If you have any questions or wish to discuss this action you may contact Cory S. Holmes

by telephone at 334-270-5630 or by email at cholmes @adem.state.al.us.

Signature of Preparer C. S. Holmes Date 4/14/09

lersigned person hereby acknowledges that he/she received a copy of this report and has read and understands same.

SIGNATURE	PRINTED NAME
Robert E. Gurley Jr	ROBERT E. GURLEY JR
TLE	DATE
VP Manufacturing	4-14-09

ONIS "TREY" GLENN, III
DIRECTOR

ADEM
Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2059 • Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700
FAX (334) 271-7950

BOB RILEY
GOVERNOR

April 22, 2009

VIA EMAIL DELIVERY

Mr. Robert Gurley
Barry Pattern & Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

In re: **Results of Compliance Evaluation Inspection**
Barry Pattern & Foundry Co., Inc.
USEPA Identification Number ALN930902002

On April 14, 2009, Mr. Corey Holmes of the Department's Industrial Hazardous Waste Branch conducted a compliance evaluation inspection of Barry Pattern & Foundry Co., Inc. The purpose of this inspection was to determine compliance with the applicable requirements of ADEM Administrative Code div. 335-14, the Hazardous Waste Program regulations.

The findings of that inspection have been reviewed and evaluated by Department personnel. Based on the findings, the Department has determined that Barry Pattern & Foundry Co., Inc. appears to be in compliance with the applicable requirements of the ADEM Administrative Code div. 335-14.

This letter is intended to convey the decision of the Department with regards to the findings of the aforementioned inspection, and only pertains to activities regulated under ADEM Administrative Code div 335-14. Barry Pattern & Foundry Co., Inc.'s activities may be subject to regulation under other divisions of ADEM.

Should you have any questions regarding this matter, please contact Corey Holmes at (334) 270-5630 or by email at cholmes@adem.state.al.us.

Sincerely,

Clethes Stallworth

Clethes Stallworth, Chief
Compliance and Enforcement Section
Industrial Hazardous Waste Branch
Land Division

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ATLANTA, GEORGIA 30303-8960

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

Mr. Robert E. Gurley, Jr.
Vice-President of Manufacturing
Barry Pattern & Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Al 35207

ADEM Report
12/25/03

35207+2998 08

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE, SOUTH • P.O. BOX 2648 • BIRMINGHAM, AL 35202-2648 • 205.933.9110 • WWW.JCDH.ORG

Environmental Health Services
Wayne Studyvin, P.E., M.S.C.E., Director
Frank Phillips, P.E., Assistant Director

October 27, 2008

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

A Comprehensive Full Compliance Evaluation Inspection, for fiscal year 2009, was conducted at Barry Pattern and Foundry Company, Inc., October 20, 2008. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

The Department appreciates your cooperation in conducting the Inspection. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson at (205) 930-1218.

Sincerely,

Corey Masuca, P.E., PhD
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

CM/ds

Enclosure: Barry-Full Compliance Evaluation Inspection Report 2009

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR & RADIATION PROTECTION DIVISION

FY 2009 Synthetic Minor Full Compliance Evaluation/Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

October 21, 2008

Executive Summary

A Full Compliance Evaluation Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Monday, October 20, 2008. At the time of the Inspection, neither of the two Electric Induction Furnaces was operating. These Furnaces "Normally" begin melting at 10:00 P.M. and are "Shut-Down" by 6:00 A.M. Neither of the two Aluminum Furnaces was being utilized. The Gray Iron Electric Induction Furnaces are normally operated Monday through Thursday, and Aluminum is produced on Fridays.

Cleaning operations are done on an enclosed Blast Table which is serviced by a 1,750 SCFM Fabric Filter Baghouse. The Cleaning Operation Dust Collector and the 11,000 SCFM Foundry Sand Shakeout System Dust Collector were examined. Dust Collector Discharge Stacks were observed, opacities "read", and pressure differentials recorded. There were no visible emissions at the discharge of either Dust Collector. Molding operations were also observed.

The Facility has determined that they are not required to file a Risk Management Plan (RMP) in accord with the Accidental Release Prevention Program of Section 112(r) of the Federal Clean Air Act Amendments of 1990.

As part of the Department's pollution prevention efforts, the Department encourages you to visit Enviroene (http://es.epa.gov/describe.html), which is a free, public environmental information system resident on the Internet's World Wide Web. This Web site provides users with pollution prevention/cleaner production solutions, compliance and enforcement assistance information, and innovative technology and policy options.

Based upon this Inspection and the Emissions Calculations previously submitted using 2007 Production Data, Barry Pattern and Foundry Company, Inc., is in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR & RADIATION PROTECTION DIVISION

FY 2009 Synthetic Minor Full Compliance Evaluation Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

October 21, 2008

Date of Inspection: October 20, 2008

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

A pre-inspection meeting was held with Mr. Gurley before starting the Inspection. Several items were discussed:

During the previous week, Mr. Gurley had undergone knee surgery and was unable to accompany this Inspector during his Inspection.

The applicability of the "new" Area Source MACT for Foundries, contained in 40 CFR Part 63, Subpart ZZZZZ, was discussed. Mr. Gurley was reminded to review the MACT Regulations to determine the necessity for Barry Foundry to submit Annual Compliance Certifications for the scrap materials used in the plant's furnaces.

Work Schedule:

Foundry operations commence by 10:00 P.M. each evening and casting begins by 1:00 A.M. Furnace operations are terminated by 6:00 A.M. Grey Iron Melting is currently scheduled for 3-4 days per week; aluminum castings are made on Fridays.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc. operate a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant received a Synthetic Minor Operating Permit 4-07-040-02 on March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start late in the evening and continue until 6:00 A.M. the

following day. On the day of the Inspection, neither of the Induction Furnaces was operating.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 2007, the furnaces operated 180 hours and produced 22 tons of aluminum. Melting operations are done on Fridays when the Electric Induction Furnace(s) are not used.

MACT Requirements

By definition, Barry Pattern & Foundry Company, Inc. is an existing small foundry area source having a Synthetic Minor Permit Limit restricting their operation to less than 20,000 tons. They are subject to the rules contained in 40 CFR Part 63, Subpart ZZZZZ. The company submitted a Notification of Applicability to the Health Department on April 29, 2008. In the Notification, Barry Pattern indicated that their supplier of "raw materials" was sent written material specifications for the metal scrap and that he has provided written verification that the materials supplied to Barry Pattern meet the specifications outlined in 40 CFR 63. In addition, Barry Pattern indicated that materials containing mercury switches are not acceptable.

Binder formulations used at the plant had also been evaluated. The facility currently complies with the no methanol requirement for the catalyst portion of the binder formulation. There are no plans to deviate from the existing formulations.

Inspection:

Two (2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

Neither of the Induction Furnaces was operating at the time of the Inspection. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was operating during the Inspection. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 3.2 in. w.g.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

This fabric filter dust collector's fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. The differential pressure drop across the tube sheet was 4.0 in. w.g. A Visible Emissions Evaluation was done the previous week at the dust collector's fan discharge stack. No visible emissions were observed.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A cartridge style dust collection system is used to collect fugitive emissions from the Sand Muller. The design volume for the collector is 1,137 SCFM. There were no visible emissions at the discharge of the dust collector.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 pounds each. Neither furnace was operating on the day of the Inspection. The Aluminum Furnaces are used on Fridays when the Iron Induction Furnaces do not operate.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was placed in operation at the time of the Inspection. There were no visible emissions observed.

Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 2008 Production Data to this Department by February 10, 2009, to facilitate Emissions Calculations for the Calendar Year 2008.

Recommendations and Conclusions:

During the Compliance Inspection, no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:

David Schilson
Air Pollution Control Engineer
Air & Radiation Protection Division

Enclosure: Field Inspection Sheets
Visible Emission Evaluation Observation Reports:
Building Exhaust 10-20-2008
Shoot Blast Cleaner 10-20-2008
Sand System Shake-Out 10-20-2008

File: Word\Inspect\Barry\Barry - Full Compliance Evaluation Inspection 2009.doc

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection: October 20, 2008
Comments:

Emissions Unit Number:: 002
Emissions Unit Description:
No. 2 Electric Induction Furnace
2.2 Tons Per Hour Capacity

Induction Furnace Located Inside Building
Had Operated That Day, But Pouring
Operations Terminated at 6:00 AM

Source Enclosed: ☐ Yes ☒ No

Source Controlled: ☐ Yes ☒ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
None - Uncontrolled

Comments:
Estimated Building Capture 75 %.

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☒ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☐ compliant ☐ noncompliant ☒ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection: October 20, 2008
Comments:

Emissions Unit Number:: 003
Emissions Unit Description:
Shotblast Machine with a
1,750 CFM Baghouse

No Visible Emissions
0 % Opacity

Source Enclosed: ☒ Yes ☐ No

Source Controlled: ☒ Yes ☐ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
Fabric Filter - Shaker

Comments: Has Hour Meter

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: 3.2 Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☒ Operative ☐ Inoperative

VE method employed: ☒ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection: October 20, 2008
Comments:

Emissions Unit Number:: 004
Emissions Unit Description:
No. 1 Electric Induction Furnace
2.2 Tons Per Hour Capacity

Induction Furnace Located Inside Building
Furnace "Down"

Source Enclosed: ☐ Yes ☒ No

Source Controlled: ☐ Yes ☒ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
None- Uncontrolled

Comments:
Estimated Building Capture 75 %.

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☐ compliant ☐ noncompliant ☒ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection: October 20, 2008
Comments:

Emissions Unit Number:: 005
Emissions Unit Description:
Foundry Shakeout Area with a
11,000 SCFM Baghouse

No Visible Emissions
0 % Opacity

Source Enclosed: ☒ Yes ☐ No

Source Controlled: ☒ Yes ☐ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
Fabric Filter

Comments: Has Hour Meter
Cleaning Cycle – 20 Second Interval

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: 4.0 Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☒ Operative ☐ Inoperative

VE method employed: ☒ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection October 20, 2008
Comments:

Emissions Unit Number:: 006
Emissions Unit Description:
Sand Muller with a
1,137 DSCFM Cartridge Type Collector

No Visible Emissions

0 % Opacity

Source Enclosed: ☒ Yes ☐ No

Source Controlled: ☒ Yes ☐ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
Fabric Filter

Comments: Pressure Not Recorded

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☒ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: _____
Facility Number: _____

Date of Inspection _____
Comments:

Emissions Unit Number:: _____
Emissions Unit Description:

Source Enclosed: ☐ Yes ☐ No

Source Controlled: ☐ Yes ☐ No

Records Reviewed: ☐ Yes ☐ No

If yes, type of control device:

Comments:

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☐ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

JCDH

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
AIR POLLUTION CONTROL PROGRAM

VISIBLE EMISSIONS OBSERVATION REPORT

Company Name: BARRY PATTERN Plant ID #: 000040

Source/Control Equipment: SHOT BLAST CLEANER Point ID #: 003

Date: 102008 Start/Stop Time: 10/22/10:37a Total Minutes Observed: 15

Evaluation Reg.: 060101 Evaluation Method: 1 Highest Allowable 6 Min. Avg.: 20

Highest 6 Min. Avg: 00 2nd: ___ Standard Exceeded ? N Regulation Nbr.: 060101

Min. Exceeding: 20% Opacity = ___ OR ___ % Opacity = ___ Vapor/Steam Plume Visible ? N

Direction from Source: SE Distance from Source: 20 Plume Detatched ? N/A

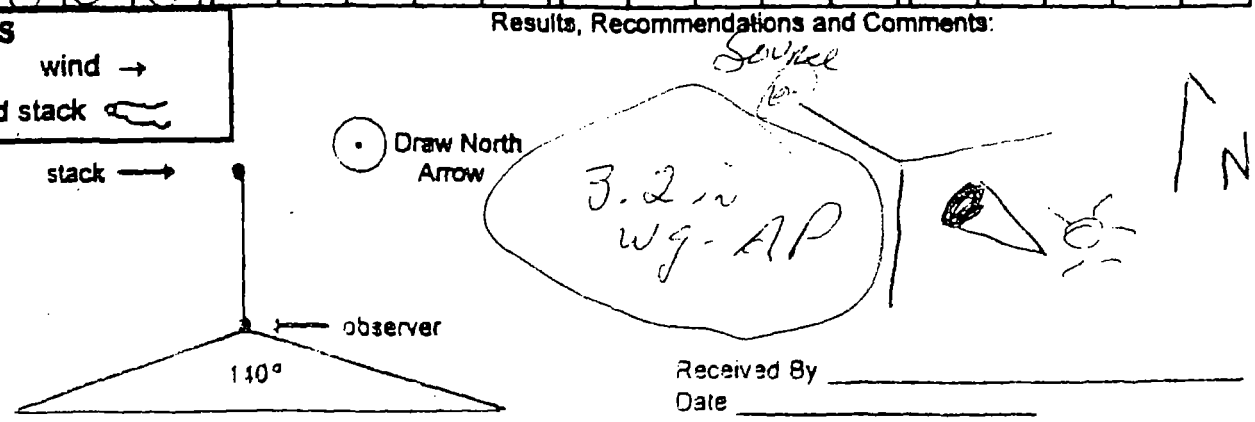
Stack Height: 10 ft. Stack Height Rel. to Obs.: — ft. Wind Direction: N/A Wind Speed: Calm

Plume Color: NONE OBSERVED Background: Building Sky Condition: 100% CLEAR

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
0	0	0	0	0	15					30					45				
1	0	0	0	0	16					31					46				
2	0	0	0	0	17					32					47				
3	0	0	0	0	18					33					48				
4	0	0	0	0	19					34					49				
5	0	0	0	0	20					35					50				
6	0	0	0	0	21					36					51				
7	0	0	0	0	22					37					52				
8	0	0	0	0	23					38					53				
9	0	0	0	0	24					39					54				
10	0	0	0	0	25					40					55				
11	0	0	0	0	26					41					56				
12	0	0	0	0	27					42					57				
13	0	0	0	0	28					43					58				
14	0	0	0	0	29					44					59				

SYMBOLS
sun ✱ wind →
plume and stack

Results, Recommendations and Comments:



Received By _____
Date _____

Observer: Schelson 22 Municipality Code: 03 Time Analysis: 25

ENV-AP-003-Revised 7/97

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
AIR POLLUTION CONTROL PROGRAM

VISIBLE EMISSIONS OBSERVATION REPORT

Company Name: BARRY PATTERN Plant ID #: 000040

Source/Control Equipment: Building Exhaust Point ID #: 002

Date: 102008 Start/Stop Time: 10:07/10:22a Total Minutes Observed: 15

Evaluation Reg.: 060101 Evaluation Method: 1 Highest Allowable 6 Min. Avg.: 20

Highest 6 Min. Avg: 00 2nd: ___ Standard Exceeded ? N Regulation Nbr.: 060101

Min. Exceeding: 20% Opacity = ___ OR ___ % Opacity = ___ Vapor/Steam Plume Visible ? N

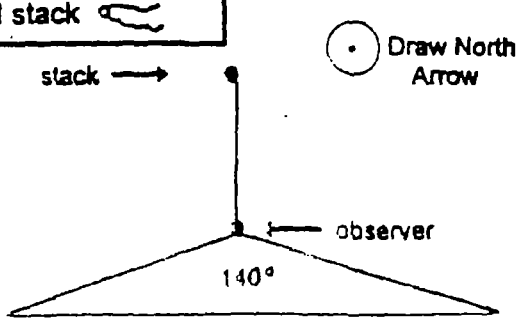
Direction from Source: S.E Distance from Source: 50 ft Plume Detatched ? N/A

Stack Height: 20 ft. Stack Height Rel. to Obs. ___ ft. Wind Direction: N/A Wind Speed: Calm

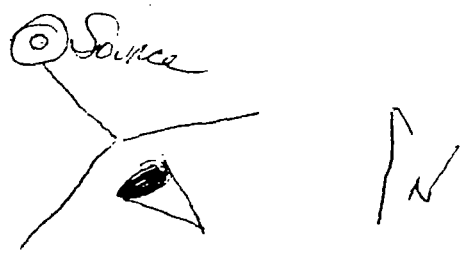
Plume Color: NONE OBSERVED Background: Building & Sky Sky Condition: 100% CLEAR

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
0	0	0	0	0	15					30					45				
1	0	0	0	0	16					31					46				
2	0	0	0	0	17					32					47				
3	0	0	0	0	18					33					48				
4	0	0	0	0	19					34					49				
5	0	0	0	0	20					35					50				
6	0	0	0	0	21					36					51				
7	0	0	0	0	22					37					52				
8	0	0	0	0	23					38					53				
9	0	0	0	0	24					39					54				
10	0	0	0	0	25					40					55				
11	0	0	0	0	26					41					56				
12	0	0	0	0	27					42					57				
13	0	0	0	0	28					43					58				
14	0	0	0	0	29					44					59				

SYMBOLS
sun ✱ wind →
plume and stack



Results, Recommendations and Comments:



Received By ___
Date ___

Observer: Sc Wilson 22 Municipality Code: 03 Time Analysis: 45

EMV-AP-003-Revised 7/97

JCDH

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
AIR POLLUTION CONTROL PROGRAM

VISIBLE EMISSIONS OBSERVATION REPORT

Company Name: BARRY PATTERN Plant ID #: 000040

Source/Control Equipment: Sand System Shake Out Point ID #: 005

Date: 102008 Start/Stop Time: 10:45a / 11:00a Total Minutes Observed: 15

Evaluation Reg.: 060101 Evaluation Method: 1 Highest Allowable 6 Min. Avg.: 20

Highest 6 Min. Avg: 00 2nd: ___ Standard Exceeded ? N Regulation Nbr.: 060101

Min. Exceeding: 20% Opacity = ___ OR ___ % Opacity = ___ Vapor/Steam Plume Visible ? N

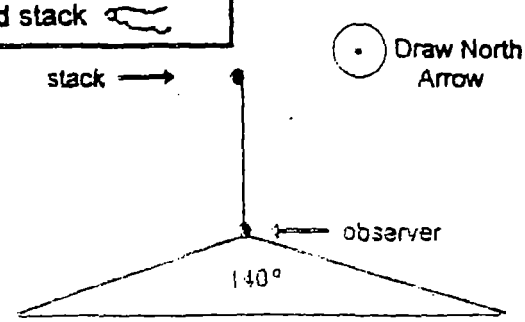
Direction from Source: South Distance from Source: 40 ft. Plume Detatched ? N/A

Stack Height: 20 ft. Stack Height Rel. to Obs. ___ ft. Wind Direction: N/A Wind Speed: Calm

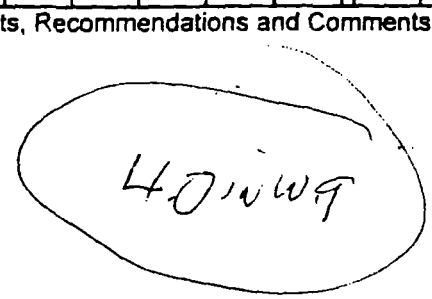
Plume Color: NONE OBSERVED Background: SKY Sky Condition: 100% CLEAR

Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45	Min	Seconds 0	15	30	45
0	0	0	0	0	15					30					45				
1	0	0	0	0	16					31					46				
2	0	0	0	0	17					32					47				
3	0	0	0	0	18					33					48				
4	0	0	0	0	19					34					49				
5	0	0	0	0	20					35					50				
6	0	0	0	0	21					36					51				
7	0	0	0	0	22					37					52				
8	0	0	0	0	23					38					53				
9	0	0	0	0	24					39					54				
10	0	0	0	0	25					40					55				
11	0	0	0	0	26					41					56				
12	0	0	0	0	27					42					57				
13	0	0	0	0	28					43					58				
14	0	0	0	0	29					44					59				

SYMBOLS
sun ✱ wind →
plume and stack



Results, Recommendations and Comments:



Received By _____
Date _____

Observer: Schilson 22 Municipality Code: 03 Time Analysis: 25

ENV-AP-[illegible] Revised 7/97

BarryCraft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
P.O. Box 2648
Birmingham, AL. 35202

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 2008

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit
4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	936 Tons
Gray Iron Castings Produced	702 Tons
Hours of Operation	1,486 Hours
Process Ratio	.63 Tons/ Hour
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	51 Tons
Ductile Iron Castings Produced	34 Tons
Hours of Operation	59 Hours
Process Ratio	.86 Tons/ Hour
Control Equipment	None

ALUMINUM

Aluminum Charged	27 Tons
Aluminum Castings Produced	20 Tons
Hours of Operation	165 Hours
Process Ratio	.17
Control Equipment	None

2008

BarryCraft

EMISSION UNIT 003
Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	89 Hours
Flow Rate	1,750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Area all connected to a 11,000 SCFM (Aerocology) Dust Collector.

Average Tons of Sand Used Per Day	19 Tons
Hours of Operation	468 Hours
Control Equipment	11,000 SCFM Aerocology Dust Coll

EMISSION UNIT 006

Sand Muller (Simpson 3F) with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Ai

Average Tons of Sand Mixed Per Day	19 Tons
Hours of Operation	552 Hours
Control Equipment	1,137 DSCFM Cartridge type Dust Collector (Micro-Air)

Natural Gas Used	1,291,000	Cu. Ft.
#2 Fuel Used	1,150	Gallons
LPG Gas for Inplant Vehicles	2,710	Gallons

Respectfully Submitted,

Robert E. Gurley, Jr.
VP Manufacturing

dbm/ REG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

Barry Craft

APRIL 7, 2008

SOUTHERN SCRAP COMPANY, INC.
P.O. Box 2100
Pensacola, Florida 32513-2100

Attn: MELTING SCRAP METAL SUPPLIER

All scrap metals for melting purposes supplied to BARRY PATTERN & FOUNDRY CO., INC., must conform to EPA 40 CFR III (B)(1). The material specification requirements are based on pollution prevention and require removal of HAP-generating materials from metallic scrap before melting.

As a responsible Foundry, we require the purchase and use of only metal ingots, pig iron, slitter, or other materials that do not include metallic scrap from motor vehicle bodies, engine blocks, oil filters, oily turnings, lead components, chlorinated plastics, or free liquids. The term "free liquids" is defined as material that fails the paint filter test by EPA Method 9095 B. (40CFR 63.14). All metals must be free of mercury switches or any part associated with their use.

We value your years of dedicated friendship and diligence and look forward to many more prosperous years ahead.

Yours Truly,

Robert E. Gurley, Jr.
V.P. Mfg.

REG/dbm

SOUTHERN SCRAP COMPANY, INC.
2911 N. PALAFOX ST. PO BOX 2100
PENSACOLA, FL 32501 PENSACOLA, FL 32513-2100
OFFICE 850-438-3197 FAX 850-433-2642

April 28, 2008

Barry Pattern & Foundry Company, Inc.
3333-35th Avenue North
Birmingham, Alabama 35207

Attn: Mr. Bob Gurley

This letter serves to verify that all scrap metal supplied to Barry Foundry meets the material specifications as outlined in the EPA Federal Register Part II, 40 CFR Part 63. No material supplied contains mercury switches or any part thereof, or "free liquids" defined as material that fails the paint filter test by EPA Method 9095B (ref 40CFR63.14).

Gene Rosenbaum, President
Southern Scrap Company

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

November 10, 2003

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

A Comprehensive Full Compliance Evaluation Inspection, for fiscal year 2004, was conducted at Barry Pattern and Foundry Company, Inc., November 4, 2003. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

The Department appreciates your cooperation in conducting the Inspection. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson at (205) 930-1218.

Sincerely,

Scott Gibbs, P.E.
Senior Air Pollution Control Engineer
Air & Radiation Protection Division

SG/ds

Enclosure: Barry-Full Compliance Evaluation Inspection Report 2004

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR & RADIATION PROTECTION DIVISION

FY 2004 Synthetic Minor Full Compliance Evaluation/Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 6, 2003

Executive Summary

A Full Compliance Evaluation Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Tuesday, November 4, 2003. At the time of the Inspection neither of the two Electric Induction Furnaces was operating. Furnace No.1 was "down" waiting for repairs, and Furnace No. 2 had operated earlier that morning. Neither of the two Aluminum Furnaces had been used since the previous week. The Gray Iron Electric Induction Furnaces are normally operated Monday through Wednesday, and Aluminum is produced on Fridays.

Cleaning operations are done on an enclosed Blast Table which is serviced by a 1,750 SCFM baghouse. The Cleaning Operation Dust Collector and the 11,000 SCFM Foundry Sand Shakeout System Dust Collector were examined. There were no visible emissions at the discharge of either Dust Collector. Molding operations were also observed.

The Facility has determined that they are not required to file a Risk Management Plan (RMP) in accord with the Accidental Release Prevention Program of Section 112(r) of the Federal Clean Air Act Amendments of 1990.

Methods to enhance Pollution Prevention at the facility were discussed during the Inspection. Copies of the handouts titled An Introduction to Pollution Prevention (P2) for Industry and the Alabama Department of Environmental Management's brochure Safeguarding Alabama's Air Quality were given to Mr. Robert Gurley.

Based upon this Inspection and the Emissions Calculations previously submitted using 2002 Production Data, Barry Pattern and Foundry Company, Inc., is in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR & RADIATION PROTECTION DIVISION

FY 2004 Synthetic Minor Full Compliance Evaluation Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 6, 2003

Date of Inspection: November 4, 2003

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

A pre-inspection meeting was held with Mr. Gurley before starting the Inspection. Several items were discussed:

Mr. Gurley was provided with the current details applicable to Synthetic Minor Operating Sources when conducting a Full Compliance Evaluation Inspection. The changes regarding inspection frequency were discussed and facility's recent production records were reviewed.

The initiation of Annual Permit Holder Fees was discussed. An explanation regarding the necessity of the fees was given, and Mr. Gurley was advised that a letter, providing more details, would be sent to him in either November or December.

Work Schedule:

Foundry operations commence by 10:00 P.M. and casting begins by 1:00 A.M. Furnace operations are terminated by 7:00 A.M. Grey Iron Melting is currently scheduled for 3 days per week; aluminum castings are made on Fridays.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant received a revised Synthetic Minor Operating Permit 4-07-040-02 on March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start late in the evening and continue until 7:00 A.M. the following day. On the day of the Inspection, neither of the Induction Furnaces was operating.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 2002, the furnaces operated 188 hours. Melting operations are done on Fridays when the Electric Induction Furnace(s) are not used.

Inspection:

Two (2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

Neither of the Induction Furnaces was operating at the time of the Inspection. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was operating during the Inspection. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 3.8 in. w.g.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

This fabric filter dust collector's fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. The differential pressure drop across the tube sheet was 4.0 in. w.g. Minor modifications to the collector have reduced the quantity of collected material removed from the dust collector's hopper. A Visible Emissions Evaluation was done the previous week at the dust collector's fan discharge stack. No visible emissions were observed.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A cartridge style dust collection system is used to collect fugitive emissions from the Sand Muller. The design volume for the collector is 1,137 SCFM. There were no visible emissions at the discharge of the dust collector.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 pounds each. Neither furnace was operating on the day of the Inspection. The Aluminum Furnaces are used on Fridays when the Iron Induction Furnaces do not operate.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was placed in operation at the time of the Inspection. The quantity of air induced into the enclosure, as confirmed by the position of the curtain enclosure, was adequate to prevent the escape of fugitive emissions during the Shake-Out Procedure. There were no visible emissions observed.

Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 2003 Production Data to this Department by February 10, 2004, to facilitate Emissions Calculations for the Calendar Year 2003.

Recommendations and Conclusions:

During the Compliance Inspection, no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:

David Schilson
Air Pollution Control Engineer
Air & Radiation Protection Division

Enclosure: Field Inspection Sheets
Visible Emission Evaluation Observation Report 10-31-2000
Manufacturing Data – September for October 2003 Report
TCLP Laboratory Analysis of Dust and Sand Material 10-14-2003

File: Word\Inspect\Barry\Barry - Full Compliance Evaluation Inspection 2004.doc

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection November 4, 2003
Comments:

Emissions Unit Number:: 002
Emissions Unit Description:
No. 2 Electric Induction Furnace
2.2 Tons Per Hour Capacity

Induction Furnace Located Inside Building
Had Operated That Day, But Pouring
Operations Terminated at 7:00 AM

Source Enclosed: ☐ Yes ☒ No

Source Controlled: ☐ Yes ☒ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
None - Uncontrolled

Comments:
Estimated Building Capture 75 %.

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☒ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection November 4, 2003
Comments:

Emissions Unit Number:: 003
Emissions Unit Description:
Shotblast Machine with a
1,750 CFM Baghouse

No Visible Emissions
0 % Opacity

Source Enclosed: ☒ Yes ☐ No

Source Controlled: ☒ Yes ☐ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
Fabric Filter - Shaker

Comments: Has Hour Meter

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: 3.8 Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☒ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☒ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection November 4, 2003
Comments:

Emissions Unit Number:: 004
Emissions Unit Description:
No. 1 Electric Induction Furnace
2.2 Tons Per Hour Capacity

Induction Furnace Located Inside Building
Furnace "Down" For Repairs

Source Enclosed: ☐ Yes ☒ No

Source Controlled: ☐ Yes ☒ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
None- Uncontrolled

Comments:
Estimated Building Capture 75 %.

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☐ compliant ☐ noncompliant ☒ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection November 4, 2003
Comments:

Emissions Unit Number:: 005
Emissions Unit Description:
Foundry Shakeout Area with a
11,000 SCFM Baghouse

No Visible Emissions
0 % Opacity

Source Enclosed: ☒ Yes ☐ No

Source Controlled: ☒ Yes ☐ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
Fabric Filter

Comments: Has Hour Meter
Cleaning Cycle – 20 Second Interval

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: 4.0 Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☒ Operative ☐ Inoperative

VE method employed: ☒ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: Barry Pattern & Foundry Co.
Facility Number: 040

Date of Inspection November 4, 2003
Comments:

Emissions Unit Number:: 006
Emissions Unit Description:
Sand Muller with a
1,137 DSCFM Cartridge Type Collector

No Visible Emissions

0 % Opacity

Source Enclosed: ☒ Yes ☐ No

Source Controlled: ☒ Yes ☐ No

Records Reviewed: ☒ Yes ☐ No

If yes, type of control device:
Fabric Filter

Comments: Pressure Not Recorded

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☒ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☒ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

Field Inspection Sheet

Facility: _____
Facility Number: _____

Date of Inspection _____
Comments: _____

Emissions Unit Number:: _____
Emissions Unit Description: _____

Source Enclosed: ☐ Yes ☐ No

Source Controlled: ☐ Yes ☐ No

Records Reviewed: ☐ Yes ☐ No

If yes, type of control device: _____

Comments: _____

Scrubber ΔP: _____ Inches W.G.

Baghouse ΔP: _____ Inches W.G.

Scrubber liquid flow rate: _____ GPM

Bag Cleaning: ☐ Operative ☐ Inoperative

VE method employed: ☐ Method 9 ☐ Method 22 *Attach appropriate VE Observation Form*
Compliance status: ☐ compliant ☐ noncompliant ☐ not determined (explain in comments)

Inspector's Signature: David Schilson

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
AIR POLLUTION CONTROL PROGRAM

VISIBLE EMISSIONS OBSERVATION REPORT

Company Name BARRY Plywood Plant ID # 0 0 0 0 4 0

Source/Control Equipment Sand Shakeout System 11,000 SCFM Point ID # 0 0 5 Fabric Filter

Date 1 0 3 1 0 3 Start/Stop Time 2:15P / 2:30 Total Minutes Observed 1 5

Evaluation Reg. 0 6 0 1 0 1 Evaluation Method 1 Highest Allowable 6 Min. Avg. 2 0

Highest 6 Min. Avg: [ ][ ] 2nd: [ ][ ] Standard Exceeded ? N Regulation Nbr. 0 6 0 1 0 1

Min. Exceeding: **20%** Opacity = [ ][ ] **OR** [ ][ ] % Opacity = [ ][ ] Vapor/Steam Plume Visible ? N

Direction from Source NW Distance from Source 200 Ft Plume Detatched ? N/A

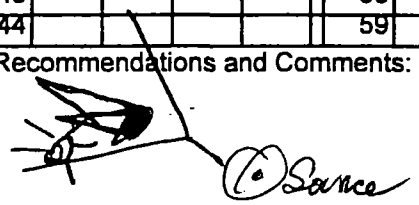
Stack Height 20 ft. Stack Height Rel. to Obs. — ft. Wind Direction CALM Wind Speed CALM

Plume Color NONE OBSERVED Background TREES Sky Condition CLEAR

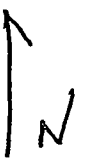
Seconds					Seconds					Seconds					Seconds				
Min	0	15	30	45	Min	0	15	30	45	Min	0	15	30	45	Min	0	15	30	45
0	0	0	0	0	15					30					45				
1	0	0	0	0	16					31					46				
2	0	0	0	0	17					32					47				
3	0	0	0	0	18					33					48				
4	0	0	0	0	19					34					49				
5	0	0	0	0	20					35					50				
6	0	0	0	0	21					36					51				
7	0	0	0	0	22					37					52				
8	0	0	0	0	23					38					53				
9	0	0	0	0	24					39					54				
10	0	0	0	0	25					40					55				
11	0	0	0	0	26					41					56				
12	0	0	0	0	27					42					57				
13	0	0	0	0	28					43					58				
14	0	0	0	0	29					44					59				

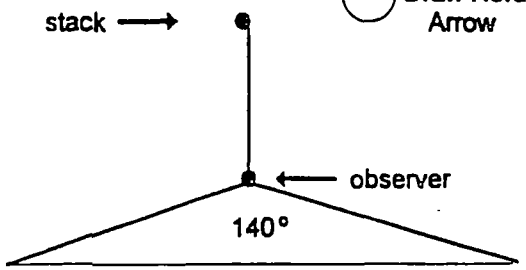
SYMBOLS
sun ✳ wind →
plume and stack

Results, Recommendations and Comments:



Draw North Arrow





Received By _____
Date _____

Observer Schlson 2 2 Municipality Code 0 3 Time Analysis 1 5

ENV-AP-008-Revised 7/97

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

4WD-RCRA

DEC 1 1 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert E. Gurley, Jr.
Vice-President of Manufacturing
Barry Pattern & Foundry Co., Inc.
3333 35th Ave. North
Birmingham, AL 35207

SUBJ: RCRA Compliance Assistance Visit
Barry Pattern & Foundry Co., Inc.
EPA ID # NA

Dear Mr. Gurley:

On September 10, 2003, the United States Environmental Protection Agency (EPA), along with the Alabama Department of Environmental Management (ADEM), conducted an on-site visit of the subject facility. This was a Compliance Assistance Visit (CAV) for the purpose of evaluating the facility's compliance with applicable Resource Conservation and Recovery Act (RCRA) regulations.

Enclosed is a copy of the EPA's report indicating that one deficiency of RCRA was discovered. The facility has already corrected this deficiency and has provided EPA with written verification of RCRA compliance. If you have any questions, please contact Margaret Olson, of my staff, at (404) 562-8601.

Sincerely,

Jeffrey T. Pallas, Chief
South Enforcement and Compliance Section
RCRA Enforcement and Compliance Branch

Enclosure

cc: Clethes Stallworth, ADEM w/encl.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RCRA COMPLIANCE ASSISTANCE VISIT REPORT

1) INSPECTOR AND AUTHOR OF REPORT

Margaret Olson, Environmental Engineer

2) FACILITY INFORMATION

Barry Pattern & Foundry Co., Inc.
3333 35th Ave. North
Birmingham, AL 35207
EPA ID # NA

3) RESPONSIBLE OFFICIAL

Robert E. Gurley, Jr.
Vice-President of Manufacturing

4) CAV PARTICIPANTS

Robert E. Gurley, Barry Pattern & Foundry Co., Inc.
Clethes Stallworth, ADEM
Margaret Olson, USEPA Region 4

5) DATE OF CAV

September 10, 2003

6) APPLICABLE REGULATIONS

40 C.F.R. Parts 260-270, RCRA Sections 3005 and 3007; Alabama Department of Environmental Management Administrative Code (ADEM Admin. Code) R.335-14.

Pursuant to Section 3006 of RCRA, 42 U.S.C. Section 6926, on December 22, 1987, the State of Alabama began receiving authorization from EPA to carry out certain portions of the State hazardous waste program in lieu of the federal program set forth in RCRA. For the purpose of this Inspection Report, citations to the requirements of RCRA, the equivalent requirements of the Alabama Statutes and the requirements of 40 C.F.R. Parts 260-270 are cited along with the equivalent requirements of the Alabama Administrative Code. Alabama has the authority to promulgate regulations

7) PURPOSE OF CAV

To conduct a Compliance Assistance Visit (CAV) at Barry Pattern & Foundry Co., Inc. (Barry Foundry) and to evaluate the facility's compliance status with applicable RCRA regulations.

8) FACILITY DESCRIPTION

Barry Foundry is a sand casting foundry that casts aluminum and cast iron parts. Casting patterns are done by the job. The facility generally casts down spouts and tree grates. Barry Foundry has approximately thirty-seven employees and has operated the facility at this location since 1938. The facility is a conditionally exempt small quantity generator (CESQG) of hazardous waste.

9) FINDINGS

Barry Foundry has two aluminum crucibles and two electric induction furnaces for melting iron. Only one furnace is used at a time and the facility generally runs one for a week and then the other the next week. The facility receives both ingot and scrap metal and has made an effort to avoid lead containing scrap. The scrap metal pile is shown in photograph #1.

The facility uses green sand for all castings. The green sand is constantly reused with new sand being consistently added to the sand pile and no direct disposal occurring except from the dust collection device. The facility also collects dust from the building with an air cleaner (see photograph #2). All dust is collected is picked up by Lee Contractors. The facility last had this dust tested approximately five years ago and found it to be non-hazardous. Since this time, the facility has found two employees (the two furnace operators) have elevated blood lead levels. In light of this information, EPA and ADEM requestED that the facility re-test (TCLP metals) the dust collected in the foundry in accordance with the following:

40 CFR §262.11/ADEM R. 335-14-3-.01(2) A person who generates a solid waste as defined in 40 CFR

§261.2/ADEM R. 335-14-2-.01(2), must determine if that waste is a hazardous waste.

The facility did re-test this material along with the foundry sand for all eight RCRA metals and sent the results to EPA and ADEM. All materials tested were found to be non-hazardous.

The facility performs a minimal amount of machine maintenance on site but when used oil is generated from the facility equipment, it is stored in a properly closed and labeled 55-gallon drum (see photograph #3).

10) CONCLUSIONS

This Compliance Assistance Visit found that Barry Foundry is properly managing hazardous wastes at this facility. However, in light of recent elevated blood lead level findings of two facility employees, EPA and ADEM requested that the facility re-test all dust waste sent off-site for disposal. The dust and foundry sand all tested non-hazardous so the facility should examine other possible reasons and protective equipment for the the employees with elevated blood lead levels.

11) SIGNED

Margaret A. Olson — 12/11/03

Margaret A. Olson
Inspector and Author of Report

Date

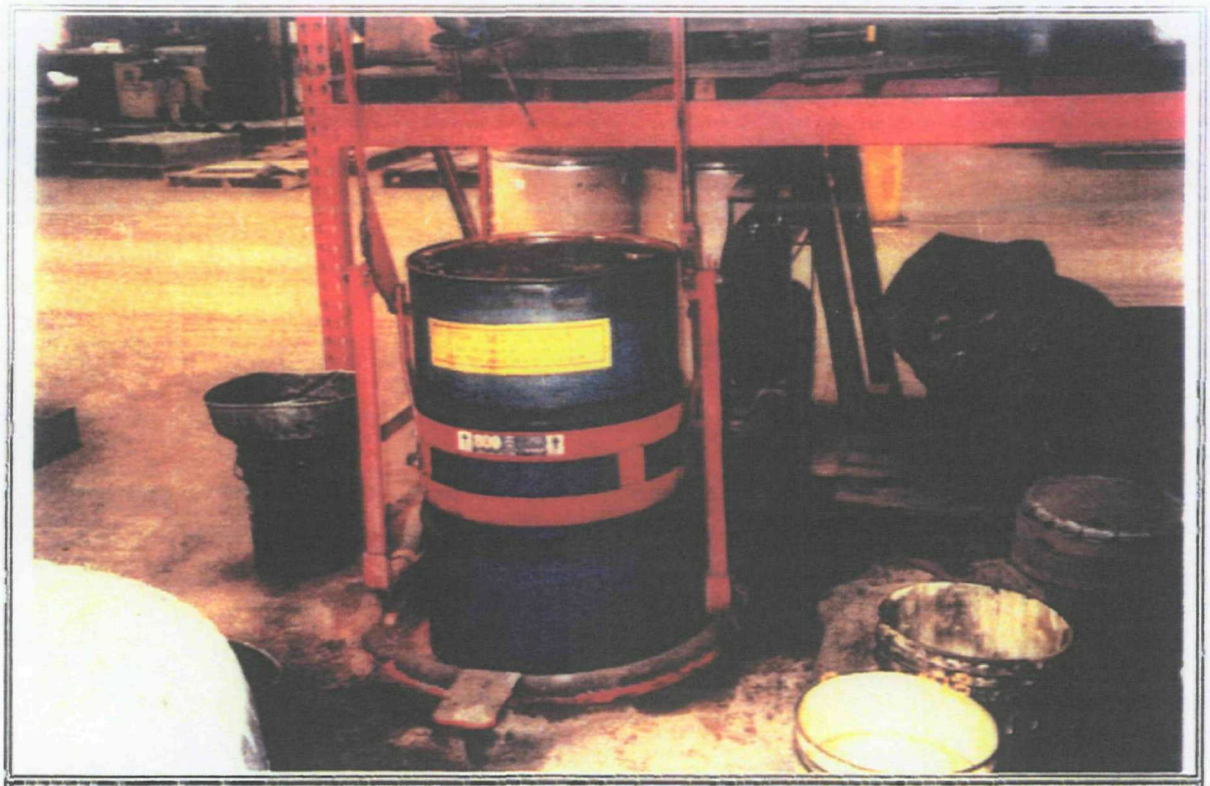
12) CONCURRENCE AND APPROVAL

Jeffrey T. Pallas, Chief
South Enforcement and
Compliance Section

Date

Photograph #1
Scrap metal pile.
Barry Pattern & Foundry Company, Inc. - Birmingham, AL - September 10, 2003

Photograph #2
Foundry dust collector.
Barry Pattern & Foundry Company, Inc. - Birmingham, AL - September 10, 2003



Photograph #3
Properly closed and labeled used oil drum.
Barry Pattern & Foundry Company, Inc. - Birmingham, AL - September 10, 2003

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR & RADIATION PROTECTION DIVISION

FY 2001 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 2, 2000

Executive Summary

An Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Wednesday, November 1, 2000. At the time of the Inspection neither of the Two (2) Electric Induction Furnaces was operating. One (1) of the Furnaces was being repaired and the other Furnace had operated earlier that morning. The two (2) Aluminum Furnaces had not been used since the previous day. The Gray Iron Electric Induction Furnaces are normally operated Monday through Thursday and Aluminum is normally produced on Fridays.

Cleaning Operations are done on an enclosed Blast Table serviced by a Fabric Filter Collector. The Sand System Fabric Filter Dust Collector was placed in operation to observe the outlet opacity. There were no visible emissions at the exhaust of either Collector. Molding operations were also observed.

→ The Facility has determined that they are not required to file a Risk Management Plan (RMP) in accord with the Accidental Release Prevention Program of Section 112(r) of the Federal Clean Air Act Amendments of 1990.

Pollution Prevention was not discussed during the Inspection; however, a copy of the handout entitled An Introduction to Pollution Prevention (P2) for Industry is included with this Report.

Based upon this Inspection and the Emissions Calculations previously submitted using 1999 Production Data, Barry Pattern and Foundry Company, Inc. is in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR & RADIATION PROTECTION DIVISION

FY 2001 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 2, 2000

Date of Inspection: November 1, 2000

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. Randolph Taylor, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

A meeting was not held with Mr. Gurley before the Inspection.

Work Schedule:

Foundry operations commence by 9:00 P.M. and casting begins by 1:00 A.M. Furnace operations are terminated by 6:00 A.M. Grey Iron Melting is scheduled for four (4) days per week; aluminum castings are made on Fridays.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant received a revised Synthetic Minor Operating Permit 4-07-040-02 on March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start late in the evening and continue until 6:00 A.M. the following day. On the day of the Inspection, neither of the Induction Furnaces was operating.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 1999, the furnaces operated 176 hours. Melting operations are done on Fridays when the Electric Induction Furnace(s) are not used.

Inspection:

Two (2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

Neither of the Induction Furnaces was operating at the time of the Inspection. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was placed in operation during the Inspection. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 3.8 in. w.g.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

This fabric filter dust collector was added to the Sand System in early 1997. The dust collector's fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. The differential pressure drop across the tube sheet was 3.9 in. w.g. Approximately two (2) drums of collected material are removed from the Dust Collector's Hopper every week. A Visible Emissions Evaluation was done the previous day at the Dust Collector's Fan Discharge Stack. No visible emissions were observed.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A cartridge style dust collection system is used to collect fugitive emissions from the Sand Muller. The design volume for the collector is 1,137 SCFM. There were no visible emissions at the discharge of the dust collector.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 pounds each. Neither furnace was operating on the day of the Inspection. The Aluminum Furnaces are used on Fridays when the Iron Induction Furnaces do not operate.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was placed in operation at the time of the Inspection. The Quantity of air induced into the enclosure, as confirmed by the position of the curtain enclosure, was adequate to prevent the escape of fugitive emissions during the Shake-Out Procedure. There were no visible emissions observed.

Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 2000 Production Data to this Department by February 10, 2001, to facilitate Emissions Calculations for the Calendar Year 2000.

Recommendations and Conclusions:

During the Compliance Inspection, no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:

David Schilson
Air Pollution Control Engineer
Air & Radiation Protection Division

Enclosure: Hand-Out: Pollution Prevention (P2) For Industry
Visible Emission Evaluation Observation Report 10-31-2000

File: WORD\INSPECT\BARRY\BARRY-2001.DOC

C

Barry Craft

November 24, 1999

Mr. David Schilson
Air Pollution Control Engineer
Jefferson County Department of Health
1400 Sixth Avenue South
Birmingham, AL. 35233

RE: CAA112(r) RISK MANAGEMENT PLAN APPLICABILITY

Dear Mr. Schilson,

We have carefully reviewed the flyer supplied to us by your department that lists the chemicals (with CAS number and threshold quantity in pounds) which are regulated under accidental release prevention requirements of the Clean Air Act. Barry Pattern & Foundry Co., Inc., does not exceed the CAA112 (r) threshold quantity for certain hazardous substances stored on site. Based on this determination, submittal of a Risk Management Plan is not required.

Please contact me if you have any questions regarding this issue at (205) 841-8725.

Sincerely,

Robert E. Gurley Jr.

Robert E. Gurley Jr.
VP MFG.

REG/dbm

BARRY PATTERN AND FOUNDRY COMPANY • [illegible] AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR POLLUTION CONTROL PROGRAM

FY 2000 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

October 19, 1999

Date of Inspection: October 15, 1999

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. Randolph Taylor, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

Before the Inspection, a meeting was held in Mr. Gurley's office. Two (2) items were discussed.

Work Schedule

Production at the Facility has improved significantly since the last Inspection. Furnace operations commence early in the evening and terminate by 10:00 A.M. the following morning. Production is done at this time to procure the lowest electric rates. Melting operations in the gray iron furnaces are done four (4) days per week; aluminum castings are made on Fridays.

Sand System Fabric Filter Dust Collection System

The amount of material collected in the hopper of the Fabric Filter Dust Collector that services the Sand System has increased. In addition, Mr. Gurley has noticed an increase in pressure drop across the fabric filter bags and a small area of rust has appeared on the surface of the Dust Collector's casing. This rust may be an indication that there is excess moisture in the compressed air cleaning system. Because of these indicators, Southern Environmental has been contracted to do a complete Operations Review of the Sand System Fabric Filter Dust Collector, the electrical/pneumatic controls and the associated ductwork.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant received a revised Synthetic Minor Operating Permit 4-07-040-02 on March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start late in the evening and continue until 10:00 A.M. the following day. On the day of the Inspection, the Induction Furnaces were not operating.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Both furnaces had been operated that day with a combined production of 1,740 pounds. Their rated capacity is 300 pounds each. During 1998, the furnaces operated 298 hours. Melting operations are done on Fridays when the Electric Induction Furnace(s) are not used.

Inspection:

Two (2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

Neither of the Induction Furnaces was operating at the time of the Inspection. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was placed in operation during the Inspection. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 4.0 in. w.g.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

This fabric filter dust collector was added to the Sand System in early 1997. The dust collector's fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. The differential pressure drop across the tube sheet was 3.7 in. w.g. Mr. Gurley indicated that this was higher than normal and reconfirmed that a contract had been placed with a service company to thoroughly review the operation of the Dust Collection System. Approximately three (3) drums of collected material are removed from the Dust Collector's Hopper every two (2) weeks. There were no visible emissions at the dust collector fan exhaust.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A cartridge style dust collection system is installed to collect fugitive emissions from the Sand Muller. The design volume for the collector is 1,137 SCFM. The Plant continues to be pleased with the collection system. All of the sand and binder material collected in the cartridge filter's hopper is disposed of in a landfill. The material is no longer recycled to the mixer.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 pounds each. The furnaces were operating on the day of the Inspection. Installation of a new burner has produced the desirable "blue" flame associated with proper air/fuel combustion ratios. There were no emissions observed during the Inspection. The Aluminum Furnaces are used on Fridays when the Iron Induction Furnaces do not operate.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was not operating at the time of the Inspection. There were no visible emissions observed.

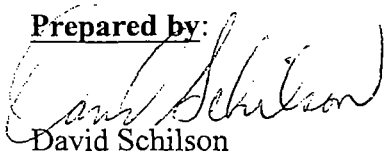
Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 1999 Production Data to this Department by February 10, 2000, to facilitate Emissions Calculations for the Calendar Year 1999. A copy of those calculations will be forwarded to Mr. Robert Gurley at Barry Pattern upon completion.

Recommendations and Conclusions:

The production areas near the Sand Muller and in the areas where material transfer operations are completed appeared to be cleaner. The utilization of both the large Sand System Dust Collector and the small Sand Muller Cartridge Dust Collector is credited with this improvement. During the Compliance Inspection, no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:



David Schilson
Air Pollution Control Engineer
Air Pollution Control Program

File: WORD\INSPECT\BARRY\BARRY-2000.DOC

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR POLLUTION CONTROL PROGRAM

FY 2000 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

October 19, 1999

Executive Summary

An Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Friday, October 15, 1999. At the time of the Inspection neither of the Electric Induction Furnaces was operating. The two (2) Aluminum Furnaces had operated that morning producing 1,740 pounds of castings. Production Schedules for all equipment operations have improved since last inspected. The Gray Iron Electric Induction Furnaces are used Monday through Thursday and Aluminum is produced on Fridays.

Cleaning Operations are done on an enclosed Blast Table serviced by a Fabric Filter Collector. The Sand System Fabric Filter Dust Collector was placed in operation to observe the outlet opacity. There were no visible emissions at the exhaust of either Collector.

Molding operations were also observed. Utilization of both the large Sand System Dust Collector and the small Sand Muller Cartridge Dust Collector has improved the collection of particulate emissions from material handling operations. There has been a significant reduction in the quantity of "spilled" material in the molding area and on the floor near the transfer points. Based upon this Inspection and the Emissions Calculations previously submitted using 1998 Production Data, Barry Pattern and Foundry Company, Inc. should be considered in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

October 21, 1999

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

A Comprehensive Compliance Inspection, for fiscal year 2000, was conducted at Barry Pattern and Foundry Company, Inc. on October 15, 1999. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

Air Emissions Estimates for 1998 were previously sent to you.

The Department appreciates your cooperation in conducting the Inspection. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson at (205) 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure: Barry-2000 Inspection Report

Barry Craft

JEFFERSON COUNTY DEPARTMENT OF HEALTH
Environmental Health Services
Air and Solid Waste Division
P.O. Box 2648
Birmingham, Alabama 35202-2648

Attn: Mr. David Schilson

BARRY PATTERN & FOUNDRY CO., INC.
PRODUCTION DATA 1999

Synthetic Minor Operating Permit 4-07-0040-02
Facility Number 0040

Electric Induction Furnace Permit 4-07-0040-8601 Emission Unit 004
4-07-0040-8602 Emission Unit 002

GRAY IRON

Gray Iron Charged	1260 Tons
Gray Iron (Castings) Produced	949 Tons
Hours of Operation	1576 Hours
Process Rate	.80 T/H
Control Equipment	None

DUCTILE IRON

Ductile Iron Charged	98 Tons
Ductile iron (Castings) Produced	67 Tons
Hours of Operation	113 Hours
Process Rate	.87 T/H
Control Equipment	None

ALUMINUM

Quantity Charged	22 Tons
Aluminum (Castings) Produced	17 Tons
Hours of Operation	176 Hours
Process Rate	.13 T/H
Control Equipment	None

BarryCraft

EMISSION UNIT 003

Cleaning Table (Pangborn) with Fabric Filter System

Hours of Operation	384
Flow Rate	1750 CFM
Control Equipment	Fabric Filter

EMISSION UNIT 005

A Sand Storage Silo, A Sand Elevator, A Shaker Screen, and Foundry Shakeout area all connected to a 11,000 SCFM Dust Collector (AERCOLOGY)

Average Tons of Sand Used per Day	22
House of Operation	486
Control Equipment	11,000 SCFM Dust Collector

EMISSION UNIT 006

Sand Muller with a 1137 DSCFM Cartridge Type Dust Collector (Micro-Air)

Average Tons of Sand Used Per Day	22
Hours of Operation	622
Natural Gas Used	1,787,100 Cu. Ft.
#2 Fuel	850 Gallons
LPG Gas for Inplant Vehicles	2,304

Respectfully,

Robert E Gurley Jr

Robert E. Gurley, Jr.
Vice-President MFG

BARRY PATTERN AND FOUNDRY COMPANY • 3333 - 35TH AVENUE NORTH • BIRMINGHAM, ALABAMA 35207
(205) 841-8725 • WATS 1-800-524-1809

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR POLLUTION CONTROL PROGRAM

FY 1999 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 4, 1998

Date of Inspection: November 3, 1998

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

Prior to the Inspection a meeting was held in Mr. Gurley's office. Only one (1) item was discussed. The Facility is presently operating on a very limited production schedule.

Work Schedule

This year's work schedule has remained consistent with prior years. Furnace operations commence early in the evening and terminate by 10:00 AM the following morning. Production is done at this time to procure the lowest electric rates. Melting operations are presently done only two (2) days per week to accommodate reduced customer orders. No production is done on Fridays.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant received a revised Synthetic Minor Operating Permit 4-07-040-02 on March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start late in the evening and continue until 10:00 AM the following day. On the day of the Inspection, the Induction Furnace had four (4) "Turns."

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 1997 the furnaces operated 248 hours. Melting operations are done on days when the Electric Induction Furnace(s) are not used. No production is done on Fridays.

Inspection:

Two(2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

Neither of the Induction Furnaces was operating at the time of the Inspection. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was placed in operation during the Inspection. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 3.2 in. w.g.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

This fabric filter dust collector was added to the Sand System in early 1997. Since installation, modifications to the dust collector to improve filter bag cleaning efficiency and to lower the pressure drop across the unit have been very successful. The dust collector's fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. The differential pressure drop across the tube sheet was 3.4 in. w.g. There were no visible emissions from the dust collector.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A cartridge style dust collection system is installed to collect fugitive emissions from the Sand Muller. The design volume for the collector is 1,137 SCFM. Since installation, the Plant has been very pleased with the collection system. All sand and binder collected in the cartridge filter's hopper are recycled to the mixer.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 Pounds each. The furnaces are presently used on days when the Iron Induction Furnaces do not operate.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was not operating at the time of the Inspection. There were no visible emissions observed.

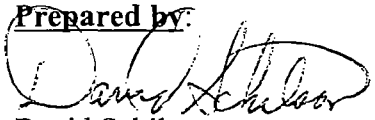
Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 1998 Production Data to this Department by February 10, 1999, to facilitate Emissions Calculations for the Calendar Year 1998. A copy of those calculations will be forwarded to Mr. Robert Gurley at Barry Pattern upon completion.

Recommendations and Conclusions:

During the Compliance Inspection no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:



David Schilson
Air Pollution Control Engineer
Air Pollution Control Program

File: WORD\INSPECT\BARRY\BARRY-99

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR POLLUTION CONTROL PROGRAM

FY 1999 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 4, 1998

Executive Summary

An Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Tuesday, November 3, 1998. At the time of the Inspection none of the Electric Induction Furnaces was operating. Furnace operations have been reduced to only two (2) days per week. The Sand System Fabric Filter Dust Collector was placed in service, there were no visible emissions from the Collector. Cleaning Operations on the Blast Table were initiated and an Opacity Observation made. There were no visible emissions. Opacity limits as outlined in Section 6.1.1 of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were being met at each of the operating sources.

Based upon this Inspection and the Emissions Calculations previously submitted using 1997 Production Data, Barry Pattern and Foundry Company, Inc. should be considered in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

November 5, 1998

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

A Comprehensive Compliance Inspection, for fiscal year 1999, was conducted at Barry Pattern and Foundry Company, Inc. on November 3, 1998. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

Air Emissions Estimates for 1997 were previously provided to your facility.

The Department appreciates your cooperation in conducting the Inspection. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson at (205) 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure: 1999 Inspection Report

Enclosure: File: WORD\INSPECT\BARRY\BARRY-99

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR POLLUTION CONTROL PROGRAM

FY 1999 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 4, 1998

Date of Inspection: November 3, 1998

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

Prior to the Inspection a meeting was held in Mr. Gurley's office. Only one (1) item was discussed. The Facility is presently operating on a very limited production schedule.

Work Schedule

This year's work schedule has remained consistent with prior years. Furnace operations commence early in the evening and terminate by 10:00 AM the following morning. Production is done at this time to procure the lowest electric rates. Melting operations are presently done only two (2) days per week to accommodate reduced customer orders. No production is done on Fridays.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant received a revised Synthetic Minor Operating Permit 4-07-040-02 on March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start late in the evening and continue until 10:00 AM the following day. On the day of the Inspection, the Induction Furnace had four (4) "Turns."

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 1997 the furnaces operated 248 hours. Melting operations are done on days when the Electric Induction Furnace(s) are not used. No production is done on Fridays.

Inspection:

Two(2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

Neither of the Induction Furnaces was operating at the time of the Inspection. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was placed in operation during the Inspection. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 3.2 in. w.g.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

This fabric filter dust collector was added to the Sand System in early 1997. Since installation, modifications to the dust collector to improve filter bag cleaning efficiency and to lower the pressure drop across the unit have been very successful. The dust collector's fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. The differential pressure drop across the tube sheet was 3.4 in. w.g. There were no visible emissions from the dust collector.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A cartridge style dust collection system is installed to collect fugitive emissions from the Sand Muller. The design volume for the collector is 1,137 SCFM. Since installation, the Plant has been very pleased with the collection system. All sand and binder collected in the cartridge filter's hopper are recycled to the mixer.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 Pounds each. The furnaces are presently used on days when the Iron Induction Furnaces do not operate.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was not operating at the time of the Inspection. There were no visible emissions observed.

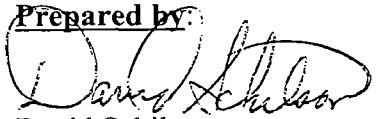
Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 1998 Production Data to this Department by February 10, 1999, to facilitate Emissions Calculations for the Calendar Year 1998. A copy of those calculations will be forwarded to Mr. Robert Gurley at Barry Pattern upon completion.

Recommendations and Conclusions:

During the Compliance Inspection no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:



David Schilson
Air Pollution Control Engineer
Air Pollution Control Program

File: WORD\INSPECT\BARRY\BARRY-99

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR POLLUTION CONTROL PROGRAM

FY 1999 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 4, 1998

Executive Summary

An Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Tuesday, November 3, 1998. At the time of the Inspection none of the Electric Induction Furnaces was operating. Furnace operations have been reduced to only two (2) days per week. The Sand System Fabric Filter Dust Collector was placed in service, there were no visible emissions from the Collector. Cleaning Operations on the Blast Table were initiated and an Opacity Observation made. There were no visible emissions. Opacity limits as outlined in Section 6.1.1 of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were being met at each of the operating sources.

Based upon this Inspection and the Emissions Calculations previously submitted using 1997 Production Data, Barry Pattern and Foundry Company, Inc. should be considered in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, AL 35202
FAX 205/939-3019
205/930-1550

Environmental Health
James L. Carroll, PE, MBA, Director
Frank Phillips, PE, Assistant Director

November 24, 1997

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, Alabama 35207

Dear Mr. Gurley:

A Comprehensive Compliance Inspection, for fiscal year 1998, was conducted at Barry Pattern and Foundry Company, Inc. on November 18, 1997. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

1996 Air Emission Estimates were previously sent to you.

The Department appreciates your cooperation in conducting the Inspection. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson at (205) 930-1218.

Sincerely,

David R. Wootton, P.E.
Senior Air Pollution Control Engineer
Air and Solid Waste Division

Enclosure: 1998 Inspection Report

Enclosure: File: WORD\INSPECT\BARRY\BARRY-98

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR AND SOLID WASTE DIVISION

FY 1998 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 19, 1997

Date of Inspection: November 18, 1997

Participants: Mr. Robert Gurley, Barry Pattern and Foundry Company
Mr. David Schilson, JCDH

Meeting:

Prior to the Inspection a meeting was held in Mr. Gurley's office. Three (3) items were discussed:

A) Continued Utilization of Pig Iron in combination with Steel Scrap in the Induction Furnaces

B) Installation and Modifications to the Sand System's New Fabric Filter

C) Revised Work Schedule

Continued Utilization of Pig Iron in the Induction Furnaces

Pig Iron continues to be used as charge material in the Induction Furnaces. Current usage is approximately 20%. Rates above 25% have been discontinued. This year local supplies of available "Scrap" continue to improve, but the silicon content has also increased. The increased silicon condition requires the usage of a greater weight of scrap material to maintain the same yield tonnage.

Installation of a New Dust Collection System for the Sand System

A new fabric filter dust collector was added to the Sand System in early 1997. Modifications are planned to the new dust collector to improve filter bag cleaning efficiency and to lower the pressure drop across the unit. A new "Pulse Diffuser" will be placed on the compressed air manifold's "Blow Pipes". The modification is designed to extend cleaning of the filter bags throughout their entire length. The "Diffuser" should be installed by the end of 1997. A small cartridge filter dust collector has also been added at the Sand Muller.

A Revised Work Schedule

The Work Schedule previously initiated and favorably received will be continued. Furnace operations commence at 7:00 PM each day and terminate by 10:00 AM the following morning. These hours are very attractive to the facility with lower guaranteed electrical power rates.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a gray iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. With the addition of the new Sand Handling fabric filter dust collection system and the new cartridge collector at the Sand Muller, the plant was issued a revised Synthetic Minor Operating Permit 4-07-040-02, March 21, 1997.

Two (2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start by 7:00 PM and continue until 10:00 AM the following day, Monday thru Thursday. Furnace tapping begins at 11:00 PM after an initial 1 Hour Preheat and 3 Hour Melt. Pouring time is approximately 1 1/4 Hours and Turn Around Times now average 2 1/4 Hours. The Induction Furnaces operate on alternate weeks to extend furnace lining life.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 1996 the furnaces operated 285 hours. Melting operations are done on Fridays.

Two(2) 4000 Pound Electric Induction Furnaces
Emission Unit 002 and Unit 004

One of the Induction Furnaces was operating at the time of the Inspection. Only melting operations were observed. Some limited emissions were noted during the melting operation, but these emissions were well contained within the building structure. There were no emissions observed at the discharges of the wall mounted fan ventilators.

Shotblast Machine, Separator, and Fabric Filter System
Emission Unit 003

The Shotblast Machine Dust Collection System was operating during the Inspection. Cleaning Operations were well contained within the building structure. There were no visible emissions at the outlet of the fabric filter system servicing the blasting cabinet and table. The pressure drop across the fabric filter's tube sheet was 3.8 in. w.g. The dust collector's hopper discharge valve was leaking to the atmosphere. Mr. Gurley stated that the cause of the leak would be determined and repairs initiated immediately. Upon returning to the office Mr. Gurley telephoned to advise that he had inspected the hopper discharge valve and that repair would require the removal of the hopper from the dust collector. The leak would be repaired at that time.

Sand System Fabric Filter Dust Collection System
Emission Unit 005

A new fabric filter dust collector and associated ductwork have been installed since the facility was last inspected. The dust collector fan withdraws approximately 11,000 SCFM of air from the shakeout area, bucket elevator, and conveyor system. Opacity at the fan outlet stack was 0%. The pressure drop across the filter bags was 7.2 in. w.g.

The higher than normal pressure drop has been observed during the past few weeks. Mr. Gurley suspects that there was water in the compressed air that is used to clean the filter bags. The deposition of this moisture on the inside of the filter bags has resulted in some filter media "Blinding". Improved moisture removal from the compressed air will be completed soon. In addition, a longer "Diffuser Pipe" will be inserted farther into the filter bags to promote improved cleaning efficiency of the fabric material.

Sand Muller Cartridge Dust Collector
Emission Unit 006

A new cartridge style dust collection system has been installed to collect fugitive emission from the sand Muller. The design volume for the collector was 1,137 SCFM. The Plant has been very pleased with the new collection system. All sand and binder collected in the cartridge filter's hopper is recycled to the mixer.

Aluminum Crucible Furnaces

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 Pounds each. The furnaces are used predominantly on Fridays. They were not operating at the time of the Inspection.

Sand System

The Sand System consists of a Shake-Out Area, Conveyors, Storage Bins, and Muller. The System was not operating at the time of the Inspection. There were no visible emissions from the Shake-Out Area.

Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 1997 Production Data to this Department by February 10, 1998, to facilitate Emission Calculations for the Calendar Year 1997. A copy of those calculations will be forwarded to Mr. Robert Gurley at Barry Pattern upon completion.

Recommendations and Conclusions:

One area of possible concern observed was the new fabric filter on the Sand System. The pressure drop across the filter media was 7.2 in. w.g. Mr. Gurley stated that this value was higher than normal. The higher than expected pressure loss across the bag filter media is probably reducing the volumetric air flow from the process areas it services. This high differential pressure loss should be investigated and corrections made.

During the Compliance Inspection no Violations of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were observed.

Prepared by:

David Schilson, P.E.
Air Pollution Control Engineer
Air Pollution Control Program

File: WORD\INSPECT\BARRY\BARRY-98

JEFFERSON COUNTY DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH SERVICES
AIR AND SOLID WASTE DIVISION

FY 1998 Synthetic Minor Source Inspection Report

Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

November 19, 1997

Executive Summary

An Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted Tuesday, November 18, 1997. At the time of the Inspection one (1) Electric Induction Furnace was operating. The Sand Handling System was "shut-down", but the Fabric Filter Dust Collector servicing the Shake-Out, Bucket Elevator, and Conveyor Transfer Points was operating. Cleaning Operations on the Blast Table were being performed. Opacity limits as outlined in Section 6.1.1 of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were being met at each of the operating sources.

Based upon this Inspection and the Emission Calculations previously submitted using 1996 Production Data, Barry Pattern and Foundry Company, Inc., should be considered in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, ALABAMA 35202 205/933-9110

Environmental Health
James L. Carroll, Director

December 5, 1994

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, AL 35207

Dear Mr. Gurley:

In keeping with our policy of conducting Annual Comprehensive Inspections of every Major Air Emission Source in Jefferson County, the fiscal year 95 Inspection was conducted at Barry Pattern and Foundry Company, Inc. on December 1, 1994. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

Emission Estimates will be computed and forwarded at a later date.

We appreciate your cooperation with us in conducting these inspections. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson of our office at (205) 930-1218.

Sincerely,

R. H. Barrett

Robert H. Barrett
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure File Barry-94

Annual Inspection Report
Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

December 2, 1994

Date of Inspection: December 1, 1994

Participants: Mr. Robert Gurley, Barry Pattern
Mr. David Schilson, JCDH

Meeting:

Prior to the inspection a meeting was held in Mr. Gurley's office. Five (5) items were discussed:

A) Utilization of Pig Iron in combination with Steel Scrap in the Induction Furnaces

B) Title V Permit Applications

C) The Proposed New Dust Collection System for the Sand Shakeout Area

D) A Revised Work Schedule

E) Pangborn Fabric Filter Dust Collector and Shotblast Table

Utilization of Pig Iron in the Induction Furnaces

During the past few months Pig Iron has been used in the Induction Furnaces. It was initially thought that this "Cleaner Material" could be used exclusively to help reduce air emissions. However, rapid deterioration of the furnace linings was experienced and the percentage of Pig Iron in each charge has been reduced.

Title V Air Permit Applications

The Title V Air Permit Application Package has been received by Mr. Gurley. During his initial review of the material he was concerned as to which forms would need to be filled-out and returned to this Department. In my discussions with Mr. Gurley I told him many forms did not apply to his operations and encouraged him to request that his Facility be considered a Synthetic Minor Source by taking a reduction in operating hours from a maximum of 8760 hours or some other limitation.

New Dust Collection System for the Sand Shakeout Area

A new Dust Collection System is still being considered for the Sand Shakeout Area. The decision has been made to install a new Dust Collector in the Shakeout Area prior to considering the purchase of a Dust Collector for the Induction Furnaces. No Project Schedule has been established.

A Revised Work Schedule

During the Summer of 1994 a Revised Work Schedule was initiated to reduce the exposure of plant workers to the high temperatures and the dangers present during melting and pouring operations. Furnace operation now commences at 12:00 AM (Midnight) and terminates by Noon. The program has received favorable reception and plans are to continue the schedule thruout the year.

Pangborn Fabric Filter Dust Collector

Design information regarding the Pangborn Fabric Filter Dust Collector for the Shotblast Table was again requested by this Inspector. A search was made for data in the files Mr. Gurley had receive from the collector's manufacturer. The additional information could not be located, but Mr. Gurley stated that he would continue his search and forward any information found to this Department.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a grey iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant has been issued two (2) "Active" Air Permits 8601 and 8602. A Paint Dip Tank (Permit 9101) has been removed from service.

Two(2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start at Midnight and continue until 12 Noon Monday thru Thursday. Furnace tapping begins at 4:00 AM after an initial 1 Hour Preheat and 3 Hour Melt. Pouring time is approximately 1 1/4 Hours and Turn Around Times now average 2 1/4 Hours. The Induction Furnaces operate on alternate weeks to extend furnace lining life.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 1994 the furnaces have been used approximately 600 hours. These operations are done on Fridays.

Inspection:

Two(2) 4000 Pound Electric Induction Furnaces
Permits 4-07-0040-8601 and 8602

One(1) Induction Furnace was operating at the time of the inspection. There were minor fugitive emissions observed at the cover and at the pouring spout. There are no pollution control devices for the furnaces. A wall mounted fan removes the fumes from the building. There were no visible emissions observed leaving the building enclosure during the inspection.

Shotblast Machine, Separator, and Fabric Filter System

The Dust Collection System was operating during the Inspection. Cleaning Operations were well contained within the building structure. There were no visible emissions at the outlet of the Fabric Filter System servicing the Blasting Cabinet and Table.

Aluminum Crucible Furnaces
(No Permit)

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 Pounds each. The furnaces are used predominantly on Fridays and were not operating at the time of this Inspection.

Sand System
(No Permit)

The Sand System consists of a Shake-out Area, Conveyors, Storage Bins, and Muller. The system was operated for a short duration during the inspection. There were no visible emissions from the Shakeout Area.

Manual Paint Dip Tank (Inactive)
(Permit 4-07-0040-9101)

The Paint Dip Tank has been taken out of service and removed. No protective paint has been applied to the finished parts since March 1992.

Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 1994 Production Data to this Department by February 10, 1995 to facilitate Emission Calculations for the Calendar Year 1994. A copy of those calculations will be forwarded to Barry Pattern upon completion.

Prepared by:

David Schilson P.E.
Air Pollution Control Engineer
Air Pollution Control Program

File BARRY-94

Annual Inspection Report
Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

December 2, 1994

Executive Summary

The Annual Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted December 1, 1994. At the time of the inspection only one (1) Electric Induction Furnace was operating. All other equipment associated with foundry operations was in service with the exception of the Sand Handling System and the Aluminum Crucible Furnaces. Opacity limits as outlined in Section 6.1.1 of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were being met.

Based upon this inspection and the Emission Calculations previously submitted using 1993 Production Data, Barry Pattern and Foundry Company, Inc. should be considered in compliance with the applicable Air Pollution Control Regulations.

JEFFERSON COUNTY DEPARTMENT OF HEALTH
1400 SIXTH AVENUE SOUTH P.O. BOX 2648 BIRMINGHAM, ALABAMA 35202 205/933-9110

Environmental Health
James L. Carroll, Director

December 5, 1994

Mr. Robert Gurley
Barry Pattern and Foundry Co., Inc.
3333 35th Avenue North
Birmingham, AL 35207

Dear Mr. Gurley:

In keeping with our policy of conducting Annual Comprehensive Inspections of every Major Air Emission Source in Jefferson County, the fiscal year 95 Inspection was conducted at Barry Pattern and Foundry Company, Inc. on December 1, 1994. A copy of the Inspection Report, prepared by Mr. David Schilson from data obtained and observations made during the Inspection, is submitted for your records.

Emission Estimates will be computed and forwarded at a later date.

We appreciate your cooperation with us in conducting these inspections. If you have any questions regarding the Report, do not hesitate to contact Mr. Schilson of our office at (205) 930-1218.

Sincerely,

R. H. Barrett

Robert H. Barrett
Senior Air Pollution Control Engineer
Air Pollution Control Program

Enclosure File Barry-94

Annual Inspection Report
Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

December 2, 1994

Date of Inspection: December 1, 1994

Participants: Mr. Robert Gurley, Barry Pattern
Mr. David Schilson, JCDH

Meeting:

Prior to the inspection a meeting was held in Mr. Gurley's office. Five (5) items were discussed:

A) Utilization of Pig Iron in combination with Steel Scrap in the Induction Furnaces

B) Title V Permit Applications

C) The Proposed New Dust Collection System for the Sand Shakeout Area

D) A Revised Work Schedule

E) Pangborn Fabric Filter Dust Collector and Shotblast Table

Utilization of Pig Iron in the Induction Furnaces

During the past few months Pig Iron has been used in the Induction Furnaces. It was initially thought that this "Cleaner Material" could be used exclusively to help reduce air emissions. However, rapid deterioration of the furnace linings was experienced and the percentage of Pig Iron in each charge has been reduced.

Title V Air Permit Applications

The Title V Air Permit Application Package has been received by Mr. Gurley. During his initial review of the material he was concerned as to which forms would need to be filled-out and returned to this Department. In my discussions with Mr. Gurley I told him many forms did not apply to his operations and encouraged him to request that his Facility be considered a Synthetic Minor Source by taking a reduction in operating hours from a maximum of 8760 hours or some other limitation.

New Dust Collection System for the Sand Shakeout Area

A new Dust Collection System is still being considered for the Sand Shakeout Area. The decision has been made to install a new Dust Collector in the Shakeout Area prior to considering the purchase of a Dust Collector for the Induction Furnaces. No Project Schedule has been established.

A Revised Work Schedule

During the Summer of 1994 a Revised Work Schedule was initiated to reduce the exposure of plant workers to the high temperatures and the dangers present during melting and pouring operations. Furnace operation now commences at 12:00 AM (Midnight) and terminates by Noon. The program has received favorable reception and plans are to continue the schedule thruout the year.

Pangborn Fabric Filter Dust Collector

Design information regarding the Pangborn Fabric Filter Dust Collector for the Shotblast Table was again requested by this Inspector. A search was made for data in the files Mr. Gurley had receive from the collector's manufacturer. The additional information could not be located, but Mr. Gurley stated that he would continue his search and forward any information found to this Department.

Process Description and Background Information:

Barry Pattern and Foundry Company, Inc., operates a grey iron foundry and casting operation at 3333 35TH Avenue North, Birmingham, Alabama. Mr. Robert Gurley is the Plant Environmental Contact. His telephone number is 841-8725. The plant has been issued two (2) "Active" Air Permits 8601 and 8602. A Paint Dip Tank (Permit 9101) has been removed from service.

Two(2) 4,000 pound Electric Induction Furnaces provide iron for casting operations. Melting and Casting operations start at Midnight and continue until 12 Noon Monday thru Thursday. Furnace tapping begins at 4:00 AM after an initial 1 Hour Preheat and 3 Hour Melt. Pouring time is approximately 1 1/4 Hours and Turn Around Times now average 2 1/4 Hours. The Induction Furnaces operate on alternate weeks to extend furnace lining life.

Two (2) Natural Gas Fired Aluminum Crucible Furnaces are also present. Their rated capacity is 300 pounds each. During 1994 the furnaces have been used approximately 600 hours. These operations are done on Fridays.

Inspection:

Two(2) 4000 Pound Electric Induction Furnaces
Permits 4-07-0040-8601 and 8602

One(1) Induction Furnace was operating at the time of the inspection. There were minor fugitive emissions observed at the cover and at the pouring spout. There are no pollution control devices for the furnaces. A wall mounted fan removes the fumes from the building. There were no visible emissions observed leaving the building enclosure during the inspection.

Shotblast Machine, Separator, and Fabric Filter System

The Dust Collection System was operating during the Inspection. Cleaning Operations were well contained within the building structure. There were no visible emissions at the outlet of the Fabric Filter System servicing the Blasting Cabinet and Table.

Aluminum Crucible Furnaces
(No Permit)

Two (2) Aluminum Crucible Furnaces are located in the foundry area. Furnace capacity is 300 Pounds each. The furnaces are used predominantly on Fridays and were not operating at the time of this Inspection.

Sand System
(No Permit)

The Sand System consists of a Shake-out Area, Conveyors, Storage Bins, and Muller. The system was operated for a short duration during the inspection. There were no visible emissions from the Shakeout Area.

Manual Paint Dip Tank (Inactive)
(Permit 4-07-0040-9101)

The Paint Dip Tank has been taken out of service and removed. No protective paint has been applied to the finished parts since March 1992.

Production Data:

Barry Pattern and Foundry Company, Inc. shall submit 1994 Production Data to this Department by February 10, 1995 to facilitate Emission Calculations for the Calendar Year 1994. A copy of those calculations will be forwarded to Barry Pattern upon completion.

Prepared by:

David Schilson P.E.
Air Pollution Control Engineer
Air Pollution Control Program

File BARRY-94

Annual Inspection Report
Barry Pattern and Foundry Company, Inc.
Facility No. 40
Birmingham, Alabama

December 2, 1994

Executive Summary

The Annual Inspection of Barry Pattern and Foundry Company, Inc., Birmingham, Alabama, was conducted December 1, 1994. At the time of the inspection only one (1) Electric Induction Furnace was operating. All other equipment associated with foundry operations was in service with the exception of the Sand Handling System and the Aluminum Crucible Furnaces. Opacity limits as outlined in Section 6.1.1 of the Jefferson County Board of Health Air Pollution Control Rules and Regulations were being met.

Based upon this inspection and the Emission Calculations previously submitted using 1993 Production Data, Barry Pattern and Foundry Company, Inc. should be considered in compliance with the applicable Air Pollution Control Regulations.

ADEM

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Leigh Pegues, Director

Jim Folsom
Governor

Mailing Address:
PO BOX 301463
MONTGOMERY AL
36130-1463

Physical Address:
1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36109-2608

(205) 271-7700
FAX 271-7950
270-5612

Field Offices:

110 Vulcan Road
Birmingham, AL
35209-4702
942-6168
941-1603

400 Well Street
P.O. Box 953
Decatur, AL
35602-0953
(205) 353-1713
FAX 340-9359

2204 Perimeter Road
Mobile, AL
36615-1131
(205) 450-3400
FAX 479-2593

October 7, 1993

CERTIFIED MAIL P 283 087 549
RETURN RECEIPT REQUESTED

Mr. Robert Gurley, Jr.
Barry Pattern & Foundry
Company, Incorporated
3333 35th Avenue, North
Birmingham, Alabama 35207

Dear Mr. Gurley:

Re: **Warning Letter**

On September 2, 1993, Mr. Edwin Johnston of the Alabama Department of Environmental Management (ADEM) conducted an inspection of Barry Pattern & Foundry Company. The purpose of the inspection was to determine the facility's compliance with the generator standards outlined in Chapter 335-14-3 of the ADEM Administrative Code, Division 14.

The following violation was noted during the inspection. Please refer to the specific Rule cited for more information on this violation.

RULE	VIOLATION/COMMENT
335-14-3-.01(2)	A person who generates a solid waste must determine if that waste is a hazardous waste as outlined in the subparagraphs of this rule. At the time of inspection, Barry Foundry had not performed hazardous waste determinations on each of the solid waste generated by the facility. **ALL** wastes generated at the facility must be evaluated as required by this rule.

Barry Foundry should submit documentation to the Department within 30 days of receipt of this notice that the above violation has been corrected.

Printed on Recycled Paper

This Warning Letter is intended to identify violations of the Department's environmental regulatory program. This violation should be corrected within the time limit set out above. Be advised that the Department retains the option to take further action including imposition of monetary penalties for the noted violations, as well as for failure to comply with the requirements of this notice.

Should questions arise regarding this matter, contact Mr. Edwin Johnston of the RCRA Compliance Branch at (205)271-7729.

Sincerely,

Dave Davis
for

Steven O. Jenkins, Chief
RCRA Compliance Branch
Land Division

SOJ/CEJ/sdm:#1796/133-134
c: Mr. John Dickinson, Chief
RCRA Compliance Section
USEPA Region IV

P 340 226 544

STEVEN O. JENKINS, CHIEF
1751 CONG. W.L. DICKINSON DR
MONTGOMERY, AL. 36109-2608

November 1, 1993

Steven O. Jenkins, Chief
c/o Dave Davis
RCRA Compliance Branch
Land Division
1751 Cong W.L.
Dickinson Drive
Montgomery, AL. 36109-2608

Dear Mr. Jenkins,

Please find the enclosed test results per Mr. Johnston's instructions. The Bag House dust in question was tested and also the foundry sand generated for disposal at this facility. The results confirm the solid waste being generated is safe for disposal.

If I can be of further assistance, please contact me at 205- 841-8725.

Sincerely,

Robert E. Gurley, Jr.

Robert E. Gurley, Jr.
Vice President, Mfg

REG/dbm

BARRY PATTERN AND FOUNDRY

Is your RETURN ADDRESS completed on the reverse side?

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- Complete items 1 and/or 2 for additional services.
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- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
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1751 Cong W.L. Dickinson Drive
Mont. AL 36109

4a. Article Number P 340 226 544

4b. Service Type
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☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

5. Signature (Addressee) J. Cason

6. Signature (Agent)

7. Date of Delivery 11/3/93

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1991 ☆U.S. GPO: 1992—323-402 DOMESTIC RETURN RECEIPT

(205) 841-8725 • WATS 1-800-524-1809

ANALYTICAL SYSTEMS, INC.

ENVIRONMENTAL TESTING LABORATORY

P.O. BOX 19667 439 INDUSTRIAL LANE
BIRMINGHAM, AL. 35219
(205) 940-7724

Client:	Barry Pattern and Foundry	Report Date:	September 10, 1993
Attention:	Mr. Bob Gurley	Reference #	1026
Address:	9333 35th Ave No.	P.O. #	verbal
	Birmingham, AL 35207	Project ID:	BHD and FS disposal

Sample Matrix:	solid	Analytical		Extraction	
Date Received:	9/8/93	Analyst:	John Sutherland	Analyst:	JCS
Date Collected:	9/8/93	Date :	9/9-9/10/93	Date:	9/8/93
Sample Collector:	RG/JS	Method:	*SW 846 1311/3010/3020/7000*		

METALLIC ANALYTES IN TCLP EXTRACT

	FIELD ID	FIELD ID					
	1	2					
Analyte,	LAB ID	LAB ID				Detection	Regulatory
mg/L in extract	1107	1108				Limit, mg/L	Limit, mg/L
Arsenic	BDL	BDL				0.002	5.000
Barium	BDL	BDL				0.10	100.00
Cadmium	BDL	BDL				0.01	1.00
Chromium	BDL	BDL				0.05	5.00
Lead	BDL	BDL				0.10	5.00
Mercury	BDL	BDL				0.0002	0.2000
Selenium	BDL	BDL				0.002	1.000
Silver	BDL	BDL				0.01	5.00

BDL = Below Detection Limit
Detection Limit is Method Detection Limit
All results expressed as mg/L of analyte produced from Toxicity Charactertistic Leaching Procedure

Respectfully submitted,

John Sutherland
Analytical Chemist
Director, ASI

Environmental Management & Engineering, Inc.
Birmingham Office: (205) 940-7700 (205) 940-7701 Fax
Houston Office: (713) 939-7028 (205) 939-7029 Fax

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client	Project	Date Delivered	Analyses Requested	Send Report to
	BARRY MNFG.			BARRY PATTON FOUNDRY, 3333 35TH AVE NO.
Samplers, (Signature) JOHN SUTHERLAND / ROBERT E. GURLEY JR		9/8/93	TCLP / TCLP / METALS ONLY	Phone 35207
				Remarks REF 1026

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers						
	9/8/93	11:30	BAGHOUSE DUST	1						1107
	9/8/93	11:30	FOUNDRY SAND	1						1108

Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Robert E Gurley Jr	9/8/93 11:30	John Sutherland			
Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

Barry Craft

MARGARET A. OLSON
ENVIRONMENTAL ENGINEER
RCRA ENFORCEMENT AND COMPLIANCE
UNITED STATE ENVIRONMENTL PROTECTION AGENCY
Sam Nunn Federal Center
61 Forsyth Street, S.W.
Atlanta, GA. 30303-8960

Ms. Olson,

Enclosed are the results of the updated TCLP tests you requested during your recent visit.

Please contact me if I can be of further assistance.

Yours Truly,

Robert E. Gurley Jr

Robert E. Gurley
V.P./ Mfg.

REG/dbm

ROBERT E. GURLEY, JR.
Vice-President
of Manufacturing

Barry Craft

Barry Pattern & Foundry Co., Inc.
Quality Construction Casting

3333 - 35th Ave. North
Birmingham, Ala. 35207

205-841-8725
1-800-524-1809
Fax 205-841-1972
E-Mail Barryfoundry@aol.com

Barry Craft

CLETHES STALLWORTH
Chief, Industrial Compliance Unit
Industrial Hazardous Waste Branch, Land Division
ADEM
Alabama Department of Environmental Management
P.O. Box 301463
Montgomery, AL. 36130-1463

Mr. Stallworth,

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Robert E. Gurley Jr

Robert E. Gurley
V.P./ MFG.

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Fax 205-841-1972
E-Mail Barryfoundry@aol.com

REG/dbm

ADEM
ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Leigh Pegues, Director

Jim Folsom
Governor

Mailing Address:
PO BOX 301463
MONTGOMERY AL
36130-1463

Physical Address:
1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
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FAX 340-9359

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FAX 479-2593

October 7, 1993

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Sincerely,

Dave Davis
for

Steven O. Jenkins, Chief
RCRA Compliance Branch
Land Division

SOJ/CEJ/sdm:#1796/133-134
c: Mr. John Dickinson, Chief
RCRA Compliance Section
USEPA Region IV

P 340 226 544

STEVEN O. JENKINS, CHIEF
1751 CONG. W.L. DICKINSON DR.
MONTGOMERY, AL. 36109-2608

29
100
100
229

NOV 2

Barry Craft

November 1, 1993

Steven O. Jenkins, Chief
c/o Dave Davis
RCRA Compliance Branch
Land Division
1751 Cong W.L.
Dickinson Drive
Montgomery, AL. 36109-2608

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Robert E. Gurley Jr.

Robert E. Gurley, Jr.
Vice President, Mfg

REG/dbm

BARRY PATTERN AND FOUNDRY

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SENDER:
- Complete items 1 and/or 2 for additional services.
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1. ☐ Addressee's Address
2. ☐ Restricted Delivery
Consult postmaster for fee.

3. Article Addressed to:
1751 Cong W.L. Dickinson Drive
Mont. AL 36109

4a. Article Number P340226544

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery 11/3/93

5. Signature (Addressee) J. Cason

6. Signature (Agent)

8. Addressee's Address (Only if requested and fee is paid)

PS Form 3811, December 1991 ☆U.S. GPO: 1992—323-402 DOMESTIC RETURN RECEIPT

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ENVIRONMENTAL TESTING LABORATORY

P.O. BOX 19667 439 INDUSTRIAL LANE
BIRMINGHAM, AL. 35219
(205) 940-7724

Client:	Barry Pattern and Foundry	Report Date:	September 10, 1993
Attention:	Mr. Bob Gurley	Reference #	1026
Address:	9333 35th Ave No.	P.O. #	verbal
	Birmingham, AL 35207	Project ID:	BHD and FS disposal

Sample Matrix:	solid	Analytical		Extraction	
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Analytical Chemist
Director, ASI

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Birmingham Office: (205) 940-7700 (205) 940-7701 Fax
Houston Office: (713) 939-7028 (205) 939-7029 Fax

CHAIN OF CUSTODY RECORD/ANALYSIS REQUEST

Client

Project: BARRY MNFG.

Samplers, (Signature): JOHN SUTHERLAND / ROBERT E. GURLEY JR

Date Delivered: 9/8/93

Analyses Requested: TCLP | TCLP | METALS ONLY

Send Report to: BARRY PATTERN & FOUNDRY; 3333 35TH AVE NO.; Phone 35207

Remarks: REF 1026

Sample #	Date Sampled	Time Sampled	Sample Description	No. of Containers							
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Relinquished by (Signature)	Date Time	Received by (Signature)	Relinquished by (Signature)	Date Time	Received by (Signature)
Relinquished by (Signature)	Date Time	Received by Laboratory by (Signature)	Indicate Special Hazards Here		

BarryCraft

MARGARET A. OLSON
ENVIRONMENTAL ENGINEER
RCRA ENFORCEMENT AND COMPLIANCE
UNITED STATE ENVIRONMENTL PROTECTION AGENCY
Sam Nunn Federal Center
61 Forsyth Street, S.W.
Atlanta, GA. 30303-8960

Ms. Olson,

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Please contact me if I can be of further assistance.

Yours Truly,

Robert E. Gurley Jr

Robert E. Gurley
V.P./ Mfg.

REG/dbm

ROBERT E. GURLEY, JR.
Vice-President
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BarryCraft

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Barry Craft

CLETHES STALLWORTH
Chief, Industrial Compliance Unit
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Fax 205-841-1972
E-Mail Barryfoundry@aol.com

REG/dbm

JEFFERSON COUNTY DEPARTMENT OF HEALTH
BUREAU OF ENVIRONMENTAL HEALTH
AIR POLLUTION CONTROL PROGRAM

Barry Pattern and Foundry Company, Inc.
FY 92 Annual Inspection Report

March 11, 1992

Executive Summary

A. Major Findings

Based on the FY 92 annual inspection conducted on December 12, 1991, Barry Pattern and Foundry Company, Inc. is in compliance with all applicable Jefferson County Board of Health Air Pollution Control Rules and Regulations.

B. Major Recommendations

An Air Permit was issued in February 1991 requiring the source to meet VOC regulations of 3.5 lb of VOC/gallon of paint applied to all castings. Barry Pattern painted castings from January 1992 to March 1, 1992. Effective March 1, 1992, Barry will begin supplying construction castings unpainted. Castings will be provided unpainted as a standard.

Introduction

Date of Inspection: December 12, 1991

Weather: Cool and Clear

In Attendance:

Jack Barry, Barry Pattern and Foundry Company
Robert E. Gurley, Jr., Barry Pattern & Foundry Company
Ralph Fulton, Jefferson County Department of Health
Walter Allen, Jefferson County Department of Health

Process Description and Background Information

Barry Pattern and Foundry Company operates a gray iron foundry and casting operation at 3333 - 35th Avenue, North, Birmingham. The plant operates under permit numbers 4-07-0040-8601 and -8602 issued October 17, 1986. The source is subject to the opacity limitations allowed by Section 6.1.1, particulate emissions allowed by Part 6.4, and VOC emissions allowed by Section 8.11.11 of the Jefferson County Board of Health Air Pollution Control Rules and Regulations. The source is not subject to PSD, NSPS, or NESHAPS regulations.

On April 23, 1986, Barry Pattern and Foundry Company submitted applications to install two, 4000-pound capacity electric induction furnaces. These furnaces were installed at the existing facility which, since 1977, had obtained its hot metal from Fairmont Foundry, a permitted facility located next door.

The induction furnaces operate on alternate weeks in an effort to extend lining life. The furnace to be operated on a particular week is charged with approximately 4000 lb of clean scrap. The scrap is stored inside the same building as the furnace. The scrap is magnetically sorted to prevent the charging of dusty, oily, or lead-bearing material. Any oily scrap that is discovered is run through a Pangborn table blast with a baghouse. The furnace cycle time is one hour and forty-five minutes from pour to pour. The capacity of each furnace is 1000 kwh or 2.2 TPH. The actual production rate is 1.26 T/hr based on 700 kwh power usage and the calculation below.

$$Pw = \frac{2.2 \text{ T/batch} \times 3 \text{ batches/day} = 6.6 \text{ T/day}}{1.75 \text{ hr/batch} \times 3 \text{ batches/day} = 5.25 \text{ hr/day}} = 1.26 \text{ T/hr}$$

When the metal reaches 2750°F, it is poured into a 800 or 1200-pound capacity ladle for transfer to the molding area. The molds are poured during the hours of 6 AM to 11 AM, and shakeout is done during the hours of 12:30 PM to 3:30 PM.

Meeting Prior to Inspection

At the preinspection meeting it was determined that no physical or process changes had taken place since the last annual inspection. The only alteration in procedures is the elimination of paint being applied to castings. Information being supplied to their customers indicates painting of construction castings is for the initial cosmetic appearance and does not add appreciable protection to the long term performance of the product. Gray iron castings are highly anticorrosive to most environmental elements in the "raw" condition.

Inspection

1. Two, 4000-lb, Pillar Electrical Induction Furnaces (Permit No. 8601 and 8602). The No. 1 induction furnace was operating at the time of inspection. The plant will operate four, eight-hour days per week with five hours of pouring per day the norm. There were minor fugitive emissions observed at the cover on top of the furnace and at the pouring spout. There are no air pollution control devices necessary for the furnaces; however, only clean scrap is to be charged and the furnace cover must be in place when possible to minimize fugitive furnace emissions. There is a panel wall exhauster approximately 15 feet from the induction furnaces. During the tap/pour stage of the furnace between 5%-10% opacity was observed. Two to three, two-ton pots are poured daily in 5.25 hours, or 1.26 T/hr. Batch time from pour to pour is 1.75 hours for 2.0 tons of iron.

2. Shotblast Machine, Shot Separator, and Pangborn Baghouse (No Permit). This equipment was relocated to the grinding area and was not in operation during the inspection. The baghouse is located outside behind the building.

3. Three (3), Gas-Fired, Aluminum Crucible Furnaces (No Permit). These furnaces melt clean aluminum ingots for casting. Presently, Barry uses two of the aluminum furnaces concurrently with the iron furnaces. The furnaces were not in operation at the time of inspection. All three furnaces have a 300-lb charging capacity, and each can produce from 112.5 lb/hr (3 charges/shift) to 150 lb/hr (4 charges/shift). No pollution controls are necessary for this process.

4. Grinding (No Permit). This process was observed in the mill room. Grinding was taking place, but the grinding operation was opposite to the hood enclosure configuration. In addition, the ductwork was not connected to the baghouse. Some fugitive emissions were noted.

5. Mold Sand System (No Permit). This system was in operation during the annual inspection. Barry uses a dry parting mixture of a natural calcite with a fatty (stearic) acid. In previous years Barry used a parting oil to keep the sand from sticking to the pattern. No air pollution emission problems at casting or mold makeup areas were observed.

6. Manual Paint Dip Tank (No Permit). The tank was covered and was not operating at time of inspection. The tank is approximately 10" wide x 4' long x 2' high. Castings are dipped into a thick, black paint (International CB-42), and a VOC-exempt thinner, 1,1,1 trichloroethane is added as required. Barry will submit manufacturer's paint and thinner specification sheets and 1991 production data, including gallons of paint used, gallons of thinner added to paint, gallons of thinner used for cleanup, etc., for compliance determination with VOC regulations of 3.5 lb VOC per gallon of paint and thinner delivered to the application system.

Prepared by:

Walter Allen

Walter Allen
Air Pollution Control Engineer
Air Pollution Control Program

/cdm