RCRA 8 - TCLP/Asbestos / Dust Assessment

Panhandle Cleaning & Restoration

Weirton BOP Implosion

Debris Clean-up Project

Hazardous Materials Assessment (Dust)

Weirton, WV

SDI Project #190333-A-LM

Prepared By:

SDI Environmental

March 2019

March 18, 2019

RE: Weirton BOP Implosion

Debris Clean-up Project

Hazardous Materials Assessment (Dust)

Weirton, WV

To all concerned:

The following laboratory analyses on the settled dust as a result of the building implosion at the BOP plant in Weirton, WV, was ordered by management of Panhandle Cleaning and Restoration in order to assure the protection, health and safety of its workers for the remediation clean-up project currently underway.

We sampled settled dust at four locations post implosion. The structures are currently being remediated of the dust.

The locations sampled were:

1. 2418 Weir Avenue
2. 2415 Weir Avenue
3. 2506 Weir Avenue
4. 313 Howard Street

The Resource Recovery and Conservation Act (RCRA) lists and monitors a group of eight heavy metals which are commonly referred to as the RCRA 8. The reason being, each of these eight metals is extremely toxic at even small concentrations. In addition, asbestos content was screened on the dust samples.

The RCRA 8 metals are:

Arsenic (As),

Barium (Ba),

Cadmium (Cd),

Chromium (Cr),

Lead (Pb),

Mercury (Hg),

Selenium (Se), and

Silver (Ag).

All eight RCRA metals and asbestos were either non-detected or well below permissible limits. (See attached EMSL Laboratory reports)

Park View Professional Center - Suite 104 - 111 Park View Lane - Wheeling, WV 26003 304.233.3401 ▪ 800.797.3401 sdienvironmental.com - email - sdiairquality@aol.com

Based on this assessment no hazardous exposure conditions exist for the PCR remediation workers on this site project. It is still prudent to wear personal protective equipment (PPE) in accordance with the method type utilized for asbestos abatement projects.

The dust was also screened for the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP is a method used to simulate leaching through a landfill and analyzes the presence and volume of hazardous substances within waste. It may be disposed as common household waste based on the laboratory results.

No issues were determined as to the TCLP assessment of the dust.

This concluded the dust screening assessment for this project.

Please contact us should you have any questions on this report.

Thank you for allowing us to provide our services.

Respectfully submitted.

(b) (6), (b) (7)(C) (b) (6), (b) (7)(C)

Senior Environmental Practitioner
ACAC/CESB Board Certified Indoor Environmentalist #02259
EAA Board Certified Environmental Specialist #81111
EAA Board Certified Microbial Investigator #81111
ACAC/CESB Board Certified Residential Microbial Inspector #11909
ACGIH Industrial Hygienist #308569

The Council of ENGINEERING & SCIENTIFIC SPECIALTY BOARDS

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EMSL LABORATORY REPORTS

Park View Professional Center - Suite 104 - 111 Park View Lane - Wheeling, WV 26003 304.233.3401 •
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EMSL Analytical, Inc.
10801 Southern Loop Blvd, Pineville, NC 28134
Phone: (704) 525-2205 Fax: (704) 525-2382 Email: charlottelab@emsl.com

Attn: (b) (6), (b) (7)(C)

3/15/2019

S.D.I. Environmental
111 Park View Lane
Suite 104
Wheeling, WV 26003

Phone: (800) 797-3401
Fax: (304) 233-3401

The following analytical report covers the analysis performed on samples submitted to EMSL Analytical, Inc. on 3/13/2019. The results are tabulated on the attached data pages for the following client designated project:

PCR Weirton Project #190333-LM

The reference number for these samples is EMSL Order #411902318. Please use this reference when calling about these samples. If you have any questions, please do not hesitate to contact me at (704) 525-2205.

(b) (6), (b) (7)(C)

The samples associated with this report were received in good condition unless otherwise noted. This report relates only to those items tested as received by the laboratory. The QC data associated with the sample results meet the recovery and precision requirements established by the NELAP, unless specifically indicated. All results for soil samples are reported on a dry weight basis, unless otherwise noted. This report may not be reproduced except in full and without written approval by EMSL Analytical, Inc.

EMSL Analytical, Inc.
10801 Southern Loop Blvd, Pineville, NC 28134
Phone/Fax: (704) 525-2205 / (704) 525-2382
http://www.EMSL.com charlottelab@emsl.com

EMSL Order:	411902318
CustomerID:	SDIE78
CustomerPO:	
ProjectID:	

Attn: (b) (6), (b) (7)(C)
S.D.I. Environmental
111 Park View Lane
Suite 104
Wheeling, WV 26003

Phone: (b) (6), (b) (7)(C)
Fax:
Received: 03/13/19 9:15AM
Collected: 3/12/2019

Project: PCR Weirton Project #190333-LM

Analytical Results

Client Sample Description 002
2514 Weir

Collected: 3/12/2019 *Lab ID:* *411902318-0004*

Method	*Parameter*	*Result*	*RL Units*	*Prep Date*	*Analyst*	*Analysis Date*	*Analyst*
METALS							
TCLP 1311/6010C	Arsenic	ND D	0.10 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/6010C	Barium	ND D	0.50 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/6010C	Cadmium	0.02 D	0.10 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/6010C	Chromium	ND D	0.10 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/6010C	Lead	0.01 D	0.10 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/6010C	Selenium	ND D	0.10 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/6010C	Silver	ND D	0.10 mg/L	3/14/2019	KC	3/14/2019	KC
TCLP 1311/7470A	Mercury	ND D	0.002 mg/L	3/14/2019	OG	3/14/2019	OG

Definitions:
ND - indicates that the analyte was not detected at the reporting limit
RL - Reporting Limit (Analytical)
D - Dilution

EMSL Analytical, Inc.
10801 Southern Loop Blvd, Pineville, NC 28134
Phone/Fax: (704) 525-2205 / (704) 525-2382
http://www.EMSL.com charlottelab@emsl.com

EMSL Order:	411902319
CustomerID:	SDIE78
CustomerPO:	
ProjectID:	

Attn: (b) (6), (b) (7)(C)
S.D.I. Environmental
111 Park View Lane
Suite 104
Wheeling, WV 26003

Phone: (b) (6), (b) (7)(C)
Fax:
Received: 03/13/19 9:15 AM
Analysis Date: 3/13/2019
Collected: 3/12/2019

Project: PCR Weirton #190333-A

Test Report:Qualitative Asbestos Analysis by Transmission Electron Microscopy (TEM) and Filtration Technique

Sample	Description	TEM Result	Notes
001 *411902319-0001*	2418 Weir Avenue	None Detected	
002 *411902319-0002*	2415 Weir Avenue	None Detected	
003 *411902319-0003*	2506 Weir Avenue	None Detected	
004 *411902319-0004*	313 Howard Street	None Detected	

(b) (6), (b) (7)(C)

Analyst(s)
(b) (6), (b) (7)(C)

or other approved signatory

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. This is a qualitative screen only. Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Analytical, Inc. Pineville, NC

Initial report from 03/13/2019 13:54:07

EMSL Analytical, Inc.
10801 Southern Loop Blvd, Pineville, NC 28134
Phone/Fax: (704) 525-2205 / (704) 525-2382
http://www.EMSL.com charlottelab@emsl.com

EMSL Order:	411902318
CustomerID:	SDIE78
CustomerPO:	
ProjectID:	

Attn: (b) (6), (b) (7)(C)
S.D.I. Environmental
111 Park View Lane
Suite 104
Wheeling, WV 26003

Phone: (b) (6), (b) (7)(C)
Fax:
Received: 03/13/19 9:15AM
Collected: 3/12/2019

Project: PCR Weirton Project #190333-LM

Test Report: Lead by Flame AAS (SW 846 3050B/7000B)*

Client Sample Description	*Lab ID*	*Collected*	*Analyzed*	*Weight*	*Lead Concentration*
001	*411902318-0001* Site: 2418 Weir	3/12/2019	3/13/2019	0.5099 g	0.19 % wt
002	*411902318-0002* Site: 2415 Weir	3/12/2019	3/13/2019	0.5216 g	0.14 % wt
003	*411902318-0002* Site: 2506 Weir	3/12/2019	3/13/2019	0.5215 g	0.13 % wt
004	*411902318-0003* *Site: 313 Howard*	*3/12/2019*	3/13/2019	0.5092 g	0.17 % wt

(b) (6), (b) (7)(C)

or other approved signatory

Samples analyzed by EMSL Analytical, Inc. Pineville, NC

Initial report from03/14/2019 12:12:54

AIHA Laboratory Accreditation Programs, LLC

acknowledges that

EMSL Analytical, Inc.

10801 Southern Loops Blvd., Pineville, NC 28134

Laboratory ID: 192283

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2005 international standard, *General Requirements for the Competence of Testing and Calibration Laboratories* in the following:

LABORATORY ACCREDITATION PROGRAMS

✓ **INDUSTRIAL HYGIENE**	Accreditation Expires: September 01, 2020
✓ **ENVIRONMENTAL LEAD**	Accreditation Expires: September 01, 2020
✓ **ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: September 01, 2020
☐ **FOOD**	Accreditation Expires:
☐ **UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached **Scope of Accreditation.** Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2005 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached **Scope of Accreditation**. Please review the AIHA-LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

(b) (6), (b) (7)(C)

Chairperson, Analytical Accreditation Board

(b) (6), (b) (7)(C)

Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision 16: 03/21/2018

Date Issued: 08/31/2018

AIHA Laboratory Accreditation Programs, LLC
SCOPE OF ACCREDITATION

EMSL Analytical, Inc.
10801 Southern Loops Blvd., Pineville, NC 28134

Laboratory ID: **192283**
Issue Date: 08/31/2018

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

The EPA recognizes the AIHA-LAP, LLC ELLAP program as meeting the requirements of the National Lead Laboratory Accreditation Program (NLLAP) established under Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992 and includes paint, soil and dust wipe analysis. Air and composited wipes analyses are not included as part of the NLLAP.

Environmental Lead Laboratory Accreditation Program (ELLAP)

Initial Accreditation Date: 11/01/2013

Field of Testing (FoT)	Technology sub-type/ Detector	Method	Method Description *(for internal methods only)*
Paint		EPA SW-846 3050B	
		EPA SW-846 7000B	
Soil		EPA SW-846 3050B	
		EPA SW-846 7000B	
Settled Dust by Wipe		EPA SW-846 3050B	
		EPA SW-846 7000B	

A complete listing of currently accredited Environmental Lead laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

State of West Virginia

Bureau for Public Health
Office of Environmental Health Services
Radiation, Toxics and Indoor Air Division

This is to certify that

EMSL Analytical, Inc.

2500 Gateway Centre Blvd., Suite 600

Morrisville, NC 27560

Has complied with Chapter 16, Article 32, of the Asbestos Abatement Licensing Rules and Regulations and is hereby licensed as an Air & Bulk Sample Analytical Laboratory.

Asbestos Laboratory License Number:

LT000601

Issued: **10/01/2018** ***Expires:*** **10/31/2019**

(b) (6), (b) (7)(C)

Office of Environmental Health Services

SELLITTI, NOGAY & MCCUNE, P.L.L.C.
ATTORNEYS AT LAW
POST OFFICE DRAWER 3095
WEIRTON, WEST VIRGINIA 26062

JAMES J. SELLITTI *
MICHAEL EDWARD NOGAY *
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DANIEL L. McCUNE **
MAXIMILLIAN F. NOGAY ***

STREET ADDRESS
SUITE 7, PROFESSIONAL PLAZA
3125 PENNSYLVANIA AVENUE
WEIRTON, WEST VIRGINIA 26062

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*ADMITTED TO PRACTICE IN WEST VIRGINIA, PENNSYLVANIA & OHIO
**ADMITTED TO PRACTICE IN WEST VIRGINIA & PENNSYLVANIA
***ADMITTED TO PRACTICE IN WEST VIRGINIA

April 18, 2019

Eric P. Weisenborn
West Virginia Department of Environmental Protection
Division of Air Quality
131-A Peninsula Street
Wheeling, WV 26003

RECEIVED
APR 22 2019
By

RE: Weirton BOP Demolition

Dear Mr. Weisenborn:

In response to your letter of March 22, 2019, enclosed please find a report from PACE Analytical of samples collected by a chemist in a timely manner of the particulates spread by the demolition blast of the B.O.P. on March 9, 2019. Among other things, the results indicate that the particulate cloud sent by the demolition onto persons and property included the following, as well as other dangerous elements:

1) arsenic
2) cadmium
3) lead
4) mercury
5) silica.

We trust you will utilize this information to do what is necessary to protect those who were and continue to be exposed to these elements.

We await your response.

Sincerely yours,

SELLITTI, NOGAY & McCUNE, PLLC

BY: _____
James J. Sellitti

JJS/ac
Enc

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

April 15, 2019

[redacted]

RE: Project: Dust
Pace Project No.: 30286257

Dear [redacted]

Enclosed are the analytical results for sample(s) received by the laboratory on March 23, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

The samples were subcontracted to Particle Technology Labs, 555 Rogers Street, Downers Grove IL 60515 for Laser Diffraction Dry Suspension analysis.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

(b) (6), (b) (7)(C)

Enclosures

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: Dust
Pace Project No.: 30286257

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Long Island Certification IDs

575 Broad Hollow Rd, Melville, NY 11747
New York Certification #: 10478 Primary Accrediting Body
New Jersey Certification #: NY158
Pennsylvania Certification #: 68-00350
Connecticut Certification #: PH-0435
Maryland Certification #: 208
Rhode Island Certification #: LAO00340
Massachusetts Certification #: M-NY026
New Hampshire Certification #: 2997

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Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: Dust
Pace Project No.: 30286257

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30286257001	Dust	EPA 6010B	CTS	24	PASI-PA
		EPA 7471A	CTS	1	PASI-PA
		ASTM D2974-87	AK1	1	PASI-PA
		EPA 7196A	KM1	1	PASI-MV
		Trivalent Chromium Calculation	BKH	1	PASI-PA

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Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: Dust
Pace Project No.: 30286257

Method: EPA 6010B
Description: 6010 MET ICP
Client: Pace General
Date: April 15, 2019

General Information:
1 sample was analyzed for EPA 6010B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B with any exceptions noted below.

Initial Calibrations (Including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 336508

B: Analyte was detected in the associated method blank.
- BLANK for HBN 336508 [MPRP/254 (Lab ID: 1637700)
  - Chromium

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 336508

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 30286686001

MH: Matrix spike recovery and/or matrix spike duplicate recovery was above laboratory control limits. Result may be biased high.
- MS (Lab ID: 1637703)
  - Aluminum
  - Calcium
  - Magnesium
  - Manganese
  - Potassium

ML: Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.
- MS (Lab ID: 1637703)
  - Antimony
  - Iron

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Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: Dust
Pace Project No.: 30286257

Method: EPA 6010B
Description: 6010 MET ICP
Client: Pace General
Date: April 15, 2019

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 336508

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.
- DUP (Lab ID: 1637702)
  - Calcium
  - Magnesium

Additional Comments:

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: Dust
Pace Project No.: 30286257

Method: EPA 7471A
Description: 7471 Mercury
Client: Pace General
Date: April 15, 2019

General Information:
1 sample was analyzed for EPA 7471A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471A with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: Dust
Pace Project No.: 30286257

Method: EPA 7196A
Description: 7196 Chromium, Hexavalent
Client: Pace General
Date: April 15, 2019

General Information:
1 sample was analyzed for EPA 7196A. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3060A with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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Pace Analytical Services, LLC
1638 Rossytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: Dust
Pace Project No.: 30286257

Method: **Trivalent Chromium Calculation**
Description: Trivalent Chromium Calculation
Client: Pace General
Date: April 15, 2019

General Information:
1 sample was analyzed for Trivalent Chromium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Dust
Pace Project No.: 30286257

Sample: Dust Lab ID: 30286257001 Collected: 03/11/19 00:01 Received: 03/23/19 10:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.
Comments: • Sample composited by laboratory one sample collected 3/10/19 and the other collected 3/11/19 collection times were not listed.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010B Preparation Method: EPA 3050B							
Aluminum	8890	mg/kg	92.8	10	04/02/19 07:39	04/03/19 12:55	7429-90-5	
Antimony	ND	mg/kg	5.6	10	04/02/19 07:39	04/03/19 12:55	7440-36-0	
Arsenic	23.0	mg/kg	4.6	10	04/02/19 07:39	04/03/19 12:55	7440-38-2	
Barium	146	mg/kg	18.6	10	04/02/19 07:39	04/03/19 12:55	7440-39-3	
Beryllium	ND	mg/kg	1.9	10	04/02/19 07:39	04/03/19 12:55	7440-41-7	
Boron	46.8	mg/kg	46.4	10	04/02/19 07:39	04/03/19 12:55	7440-42-8	
Cadmium	39.8	mg/kg	2.8	10	04/02/19 07:39	04/03/19 12:55	7440-43-9	
Calcium	121000	mg/kg	1860	10	04/02/19 07:39	04/03/19 12:55	7440-70-2	
Chromium	362	mg/kg	4.6	10	04/02/19 07:39	04/03/19 12:55	7440-47-3	B
Cobalt	25.8	mg/kg	9.3	10	04/02/19 07:39	04/03/19 12:55	7440-48-4	
Copper	279	mg/kg	9.3	10	04/02/19 07:39	04/03/19 12:55	7440-50-8	
Iron	261000	mg/kg	92.8	10	04/02/19 07:39	04/03/19 12:55	7439-89-6	
Lead	7510	mg/kg	4.6	10	04/02/19 07:39	04/03/19 12:55	7439-92-1	
Magnesium	25100	mg/kg	464	10	04/02/19 07:39	04/03/19 12:55	7439-95-4	
Manganese	19900	mg/kg	9.3	10	04/02/19 07:39	04/03/19 12:55	7439-96-5	
Molybdenum	ND	mg/kg	18.6	10	04/02/19 07:39	04/03/19 12:55	7439-98-7	
Nickel	120	mg/kg	18.6	10	04/02/19 07:39	04/03/19 12:55	7440-02-0	
Potassium	676	mg/kg	464	10	04/02/19 07:39	04/03/19 12:55	7440-09-7	
Selenium	ND	mg/kg	7.4	10	04/02/19 07:39	04/03/19 12:55	7782-49-2	
Silver	ND	mg/kg	5.6	10	04/02/19 07:39	04/03/19 12:55	7440-22-4	
Sodium	ND	mg/kg	4640	10	04/02/19 07:39	04/03/19 12:55	7440-23-5	
Thallium	ND	mg/kg	18.6	10	04/02/19 07:39	04/03/19 12:55	7440-28-0	
Vanadium	105	mg/kg	9.3	10	04/02/19 07:39	04/03/19 12:55	7440-62-2	
Zinc	12800	mg/kg	9.3	10	04/02/19 07:39	04/03/19 12:55	7440-66-6	
7471 Mercury	Analytical Method: EPA 7471A Preparation Method: EPA 7471A							
Mercury	2.6	mg/kg	0.21	2	04/01/19 10:35	04/02/19 13:28	7439-97-6	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	3.8	%	0.10	1		04/04/19 14:13		
7196 Chromium, Hexavalent	Analytical Method: EPA 7196A Preparation Method: EPA 3060A							
Chromium, Hexavalent	ND	mg/kg	1.1	1	04/04/19 09:12	04/04/19 10:46	18540-29-9	M6
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation							
Chromium, Trivalent	362	mg/kg	1.0	1		04/12/19 16:47	16065-83-1	

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Dust
Pace Project No.: 30286257

QC Batch: 336354 | Analysis Method: EPA 7471A
QC Batch Method: EPA 7471A | Analysis Description: 7471 Mercury
Associated Lab Samples: 30286257001

METHOD BLANK: 1636982 | Matrix: Solid
Associated Lab Samples: 30286257001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.10	04/02/19 11:56	

LABORATORY CONTROL SAMPLE: 1636983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.2	0.21	107	80-120	

MATRIX SPIKE SAMPLE: 1636985

Parameter	Units	30286170001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	ND	0.58	0.67	108	80-120	

SAMPLE DUPLICATE: 1636984

Parameter	Units	30286170001 Result	Dup Result	RPD	Qualifiers
Mercury	mg/kg	ND	.042J		

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QUALITY CONTROL DATA

Project: Dust
Pace Project No.: 30286257

QC Batch: 336508 Analysis Method: EPA 6010B
QC Batch Method: EPA 3050B Analysis Description: 6010 MET
Associated Lab Samples: 30286257001

METHOD BLANK: 1637700 Matrix: Solid
Associated Lab Samples: 30286257001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum	mg/kg	ND	10.0	04/03/19 11:37	
Antimony	mg/kg	ND	0.60	04/03/19 11:37	
Arsenic	mg/kg	ND	0.50	04/03/19 11:37	
Barium	mg/kg	ND	2.0	04/03/19 11:37	
Beryllium	mg/kg	ND	0.20	04/03/19 11:37	
Boron	mg/kg	ND	5.0	04/03/19 11:37	
Cadmium	mg/kg	ND	0.30	04/03/19 11:37	
Calcium	mg/kg	ND	200	04/03/19 11:37	
Chromium	mg/kg	0.71	0.50	04/03/19 11:37	B
Cobalt	mg/kg	ND	1.0	04/03/19 11:37	
Copper	mg/kg	ND	1.0	04/03/19 11:37	
Iron	mg/kg	ND	10.0	04/03/19 11:37	
Lead	mg/kg	ND	0.50	04/03/19 11:37	
Magnesium	mg/kg	ND	50.0	04/03/19 11:37	
Manganese	mg/kg	ND	1.0	04/03/19 11:37	
Molybdenum	mg/kg	ND	2.0	04/03/19 11:37	
Nickel	mg/kg	ND	2.0	04/03/19 11:37	
Potassium	mg/kg	ND	50.0	04/03/19 11:37	
Selenium	mg/kg	ND	0.80	04/03/19 11:37	
Silver	mg/kg	ND	0.60	04/03/19 11:37	
Sodium	mg/kg	ND	500	04/03/19 11:37	
Thallium	mg/kg	ND	2.0	04/03/19 11:37	
Vanadium	mg/kg	ND	1.0	04/03/19 11:37	
Zinc	mg/kg	ND	1.0	04/03/19 11:37	

LABORATORY CONTROL SAMPLE: 1637701

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	500	495	99	80-120	
Antimony	mg/kg	50	50.4	101	80-120	
Arsenic	mg/kg	50	49.4	99	80-120	
Barium	mg/kg	50	50.4	101	80-120	
Beryllium	mg/kg	50	49.7	99	80-120	
Boron	mg/kg	50	47.5	95	80-120	
Cadmium	mg/kg	50	50.4	101	80-120	
Calcium	mg/kg	500	510	102	80-120	
Chromium	mg/kg	50	51.3	103	80-120	
Cobalt	mg/kg	50	50.6	101	80-120	
Copper	mg/kg	50	49.6	99	80-120	
Iron	mg/kg	500	503	101	80-120	

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QUALITY CONTROL DATA

Project: Dust
Pace Project No.: 30286257

LABORATORY CONTROL SAMPLE: 1637701

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Lead	mg/kg	50	49.4	99	80-120	
Magnesium	mg/kg	500	495	99	80-120	
Manganese	mg/kg	50	49.9	100	80-120	
Molybdenum	mg/kg	50	52.6	105	80-120	
Nickel	mg/kg	50	51.8	104	80-120	
Potassium	mg/kg	500	500	100	80-120	
Selenium	mg/kg	50	48.7	97	80-120	
Silver	mg/kg	25	24.8	99	80-120	
Sodium	mg/kg	500	506	101	80-120	
Thallium	mg/kg	50	50.3	101	80-120	
Vanadium	mg/kg	50	50.9	102	80-120	
Zinc	mg/kg	50	50.9	102	80-120	

MATRIX SPIKE SAMPLE: 1637703

Parameter	Units	30286086001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum	mg/kg	9770	552	12800	543	75-125	MH
Antimony	mg/kg	ND	55.2	22.1	40	75-125	ML
Arsenic	mg/kg	6.9	55.2	54.5	86	75-125	
Barium	mg/kg	68.5	55.2	127	106	75-125	
Beryllium	mg/kg	0.55	55.2	49.0	88	75-125	
Boron	mg/kg	ND	55.2	47.5	82	75-125	
Cadmium	mg/kg	ND	55.2	49.3	89	75-125	
Calcium	mg/kg	1600	552	7250	1020	75-125	MH
Chromium	mg/kg	12.2	55.2	61.9	90	75-125	
Cobalt	mg/kg	11.3	55.2	67.1	101	75-125	
Copper	mg/kg	14.5	55.2	61.7	86	75-125	
Iron	mg/kg	14100	552	14200	10	75-125	ML
Lead	mg/kg	16.5	55.2	69.0	95	75-125	
Magnesium	mg/kg	1610	552	4170	465	75-125	MH
Manganese	mg/kg	878	55.2	1060	321	75-125	MH
Molybdenum	mg/kg	2.2	55.2	58.8	102	75-125	
Nickel	mg/kg	11.0	55.2	58.8	87	75-125	
Potassium	mg/kg	1120	552	1900	141	75-125	MH
Selenium	mg/kg	ND	55.2	47.1	84	75-125	
Silver	mg/kg	ND	27.5	24.6	89	75-125	
Sodium	mg/kg	ND	552	517J	91	75-125	
Thallium	mg/kg	ND	55.2	49.9	90	75-125	
Vanadium	mg/kg	23.8	55.2	75.9	95	75-125	
Zinc	mg/kg	54.7	55.2	103	88	75-125	

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Dust
Pace Project No.: 30286257

SAMPLE DUPLICATE: 1637702

Parameter	Units	30286686001 Result	Dup Result	RPD	Qualifiers
Aluminum	mg/kg	9770	9610	2	
Antimony	mg/kg	ND	ND		
Arsenic	mg/kg	6.9	7.1	2	
Barium	mg/kg	68.5	67.1	2	
Beryllium	mg/kg	0.55	0.48	13	
Boron	mg/kg	ND	2.6J		
Cadmium	mg/kg	ND	.2J		
Calcium	mg/kg	1600	6180	118	D6
Chromium	mg/kg	12.2	11.9	2	
Cobalt	mg/kg	11.3	10.8	5	
Copper	mg/kg	14.5	14.5	1	
Iron	mg/kg	14100	14300	1	
Lead	mg/kg	16.5	16.1	3	
Magnesium	mg/kg	1610	3880	83	D6
Manganese	mg/kg	878	829	6	
Molybdenum	mg/kg	2.2	2.1J		
Nickel	mg/kg	11.0	10.9	1	
Potassium	mg/kg	1120	1110	1	
Selenium	mg/kg	ND	ND		
Silver	mg/kg	ND	ND		
Sodium	mg/kg	ND	ND		
Thallium	mg/kg	ND	ND		
Vanadium	mg/kg	23.8	23.9	0	
Zinc	mg/kg	54.7	52.9	3	

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QUALITY CONTROL DATA

Project: Dust
Pace Project No.: 30286257

QC Batch: 336952
QC Batch Method: ASTM D2974-87
Associated Lab Samples: 30286257001

Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture

SAMPLE DUPLICATE: 1639863

Parameter	Units	30286257001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	3.8	4.1	6	

SAMPLE DUPLICATE: 1640024

Parameter	Units	30286112001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	16.4	15.7	4	

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QUALITY CONTROL DATA

Project: Dust
Pace Project No.: 30286257

QC Batch: 108009
QC Batch Method: EPA 3060A
Associated Lab Samples: 30286257001

Analysis Method: EPA 7196A
Analysis Description: 7196 Chromium, Hexavalent

METHOD BLANK: 500497
Associated Lab Samples: 30286257001

Matrix: Solid

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	ND	1.0	04/04/19 10:45	

LABORATORY CONTROL SAMPLE: 500498

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	207	99.1	48	44-156	

MATRIX SPIKE SAMPLE: 500522

Parameter	Units	30286257001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	1020	508	50	85-115	M6

MATRIX SPIKE SAMPLE: 500523

Parameter	Units	30286257001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	4.26	4.4	104	85-115	

SAMPLE DUPLICATE: 500521

Parameter	Units	30286257001 Result	Dup Result	RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	ND		

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Dust
Pace Project No.: 30286257

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-MV	Pace Analytical Services - Long Island
PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
MH	Matrix spike recovery and/or matrix spike duplicate recovery was above laboratory control limits. Result may be biased high.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Dust
Pace Project No.: 30286257

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30286257001	Dust	EPA 3050B	336508	EPA 6010B	336639
30286257001	Dust	EPA 7471A	336354	EPA 7471A	336431
30286257001	Dust	ASTM D2974-87	336952		
30286257001	Dust	EPA 3060A	108009	EPA 7196A	108034
30286257001	Dust	Trivalent Chromium Calculation	338146		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT...

WO# : 30286257

30286257

Section A Required Client Information:
Company: [redacted]
Address: [redacted]
Email To: [redacted]
Phone: 304 670 2127 Fax:
Requested Due Date/TAT: 10 business day

Section B Required Project Information:
Report To: David Shaler
Copy To:
Purchase Order No.:
Project Name: Dust
Project Number: MNWA1

Section C Invoice Information:
Attention: (b) (6)
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

of

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER
Site Location STATE: PA

Section D Required Client Information
Valid Matrix Codes: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AIR; Other OT; Tissue TS

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes above)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End Date	Composite End Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analyses Test	TAL Metals	Hexavalent Chromium	Trivalent Chromium	Purgeable Gas	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Dust	SL	G						1	X									X	X	X	X		

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Samples can be combined for analysis				(b) (6) PALE	03/22/19		15.7	Y/N	N	Y
								03/22/19		

SAMPLER NAME AND SIGNATURE: [redacted]
PRINT Name of SAMPLER: [redacted]
SIGNATURE of SAMPLER: [redacted] DATE Signed (MM/DD/YY): 3-22-19

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 2-Feb-2007

Pace Analytical

30286257

Pace Analytical Services, LLC
1638 Roseytown Road
Suites 2,3 &4
Greensburg, PA 15601
Phone: 724-850-5600
Fax: 724-850-5601

Contact Information

Contact Name	[redacted]	Quote Number	00058314
Account Name	[redacted]	Prepared By	(b) (6), (b) (7)(C)
Phone	[redacted]	Email	
Email	[redacted]		

Project Information

Quote Name	Dust	Created Date	3/19/2019
Turn Around Time	10 business day		
Special Instructions	Particle Size subcontracted to Particle Technology Labs. Dry Dispersion 0.2 to 2000 microns.		

Address Information

Bill To Name	[redacted]	Ship To Name	(b) (6), (b) (7)(C)
Bill To	[redacted] Weirton, WV 26062		

Quote Details

Quantity	Method	Matrix	Analyte	Limit	Unit Price	Subtotal	Total Price
1.00	EPA 6010B/7471A	Soil/Solid	Target Analyte List (TAL) Metals (23) (waste)		$95.00	$95.00	$95.00
1.00	EPA 7196 + EPA 6010B	Soil/Solid	Chromium, Trivalent		$15.00	$15.00	$15.00
1.00	SM4500-Cr-D	Soil/Solid	Hexavalent Chromium (Cr VI) (soil)		$25.00	$25.00	$25.00
1.00		Soil/Solid	Miscellaneous	Particle Size Distribution	$312.00	$312.00	$312.00

Grand-Total [redacted] $447.00

3-22-19

Additional Pricing Considerations:

If you have specific questions about any conditions noted below, please contact your Pace Analytical Representative.

- Proposal expires 60 days from created date above, unless accepted, signed and returned.
- Quoted prices include standard Pace Analytical QA/QC, reporting limits, compound lists and standard report format unless noted otherwise.
- If project specific MS/MSD samples are submitted, they may be billable.
- TAT (Turn Around Time) is in working days unless otherwise specified above.
- To ensure requested TAT is available, please coordinate with your Pace Analytical representative at time of sample submittal.
- Any deviation from the above quoted scope of work, including sample arrival date and volume, may result in adjustment of prices.
- Please include Quote Number on Chain-of-custody to ensure proper billing.
- Pricing includes standard delivery of bottle/sample kits and coolers.
- Charges will apply for non-standard shipping and for projects where shipping exceeds 10% of the total analytical costs of the shipment.

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: [redacted] Proje# # 30286257

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Label mm
LIMS Login mm

Tracking #: 7841 9579 9754

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☐ yes ☑ no

Thermometer Used 9 Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp 15.7 °C Correction Factor: +0.1 °C Final Temp: 15.8 °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot# NA	Date and initials of person examining contents: 03/23/19 JLB
Chain of Custody Present:	✓			1.	
Chain of Custody Filled Out:	✓			2.	
Chain of Custody Relinquished:		✓		3.	
Sampler Name & Signature on COC:	✓			4.	
Sample Labels match COC: -Includes date/time/ID Matrix: S		✓		5. no time on COC/no time on samples – dates on bags are	
Samples Arrived within Hold Time:	✓			6. 03/10/19 + 03/11/19	
Short Hold Time Analysis (<72hr remaining):		✓		7.	
Rush Turn Around Time Requested:		✓		8.	
Sufficient Volume:	✓			9.	
Correct Containers Used:	✓			10.	
-Pace Containers Used:		✓			
Containers Intact:	✓			11.	
Orthophosphate field filtered			✓	12.	
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.	
Organic Samples checked for dechlorination:			✓	14.	
Filtered volume received for Dissolved tests			✓	15.	
All containers have been checked for preservation.			✓	16.	
All containers needing preservation are found to be in compliance with EPA recommendation.			✓		
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed: (b) (6), (b) (7)(C)	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			✓	17.	
Trip Blank Present:		✓		18.	
Trip Blank Custody Seals Present			✓		
Rad Samples Screened < 0.5 mrem/hr			✓	Initial when completed:	Date:

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in eraports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Chain of Custody

☐ Samples were sent directly to the Subcontracting Laboratory.

Pace Analytical®
www.pacelabs.com

Workorder: 30286257 Workorder Name: Dust

Cert. Needed: ☑ Yes ☐ No
Owner Received Date: 3/23/2019 Results Requested By: 4/8/2019

Report To:
Pace Analytical Pittsburgh
1638 Roseytown Road
Suites 2,3,4
Greensburg, PA 15601
Phone 724-850-5614

Subcontract To:
Pace Analytical Melville
575 Broad Hollow Road
Melville, NY 11747
Phone (631)694-3040

Requested Analysis

WO# : 7083866

7083866

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: MeCl	Hexachrome	LAB USE ONLY
1	Dust	PS	3/11/2019 00:01	30286257001	Solid	1	X	001
2								
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1		3/28/19		3/29/19 (80)
2				
3				

Comments

Cooler Temperature on Receipt 4.8 °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

WO#: 7083866

The Chain-of-Custody is a LEGAL DOCUMENT

PM: NNL Due Date: 04/10/19

CLIENT: PAGE-PA

of

Section A Required Client Information:
Company: [redacted]
Address: [redacted]
Email To: [redacted]
Phone: 304.670.2127 Fax:
Requested Due Date/TAT: 10 business day

Section B Required Project Information:
Report To: David Shuler
Copy To:
Purchase Order No.:
Project Name: Dust
Project Number: MNWAC

Section C Invoice Information:
Attention: David Shuler
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY: NPDES / GROUND WATER / DRINKING WATER / UST / RCRA / OTHER

Site Location STATE: PA

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analyses Test	Y/N	TN, Metals	Cyanide Chloride	Thiosulfate Chloride	Phenols Total	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Dust	SL	G						1	X										X	X	X	X		
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS: Samples can be combined for analysis

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
			PAGE	03/22/19		15.7	Y/N	N	Y
							03/22/19		

SAMPLER NAME AND SIGNATURE: [redacted]
PRINT Name of SAMPLER: [redacted]
SIGNATURE of SAMPLER: [redacted] DATE Signed (MM/DD/YY): 3-22-19

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 2-Feb-2007

Pace Analytical®

30286257

Pace Analytical Services, LLC
1638 Roseytown Road
Suites 2,3 &4
Greensburg, PA 15601
Phone: 724-850-5600
Fax: 724-850-5601

Contact Information

Contact Name	[redacted]	Quote Number	00058314
Account Name	[redacted]	Prepared By	(b) (6), (b) (7)(C)
Phone	[redacted]	Email	
Email	[redacted]		

Project Information

Quote Name	Dust	Created Date	9/18/2019
Turn Around Time	10 business day		
Special Instructions	Particle Size subcontracted to Particle Technology Labs. Dry Dispersion 0.2 to 2000 microns.		

Address Information

Bill To Name	[redacted]	Ship To Name	[redacted]
Bill To	[redacted] Weirton, WV 26062		

Quote Details

Quantity	Matrix	Test	Analyte Description	Site Approval	Price	Extended Price	Total Price
1.00	EPA 6010B/7471A	Soil/Solid	Target Analyte List (TAL) Metals (23) (waste)	✓	$96.00	$96.00	$96.00
1.00	EPA 7196 + EPA 6010B	Soil/Solid	Chromium, Trivalent	✓	$15.00	$15.00	$15.00
1.00	SM4500-Cr-D	Soil/Solid	Hexavalent Chromium (Cr VI) (soil)	✓	$25.00	$25.00	$25.00
1.00		Soil/Solid	Miscellaneous	Particle Size Distribution ✓	$312.00	$312.00	$312.00

Grand Total [redacted] $447.00

Additional Pricing Considerations:

If you have specific questions about any conditions noted below, please contact your Pace Analytical Representative.

- Proposal expires 60 days from created date above, unless accepted, signed and returned.
- Quoted prices include standard Pace Analytical QA/QC, reporting limits, compound lists and standard report format unless noted otherwise.
- If project specific MS/MSD samples are submitted, they may be billable.
- TAT (Turn Around Time) is in working days unless otherwise specified above.
- To ensure requested TAT is available, please coordinate with your Pace Analytical representative at time of sample submittal.
- Any deviation from the above quoted scope of work, including sample arrival date and volume, may result in adjustment of prices.
- Please include Quote Number on Chain-of-custody to ensure proper billing.
- Pricing includes standard delivery of bottle/sample kits and coolers.
- Charges will apply for non-standard shipping and for projects where shipping exceeds 10% of the total analytical costs of the shipment.

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: [redacted] Project # 30286257

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 7861 9579 9754

Label mm
LIMS Login mm

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals Intact: ☐ yes ☑ no

Thermometer Used 9 Type of Ice: Wet Blue None

Cooler Temperature Observed Temp 15.7 °C Correction Factor: 0.1 °C Final Temp: 15.8 °C

Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot#: N/A	Date and initials of person examining contents: 03/22/19 [illegible]
Chain of Custody Present:	✓			1.	
Chain of Custody Filled Out:	✓			2.	
Chain of Custody Relinquished:		✓		3.	
Sampler Name & Signature on COC:	✓			4.	
Sample Labels match COC: -Includes date/time/ID Matrix: SL		✓		5. not listed on COC / time on samples + dates on bags are 03/10/19 + 03/11/19	
Samples Arrived within Hold Time:	✓			6.	
Short Hold Time Analysis (<72hr remaining):		✓		7.	
Rush Turn Around Time Requested:		✓		8.	
Sufficient Volume:	✓			9.	
Correct Containers Used: -Pace Containers Used:	✓	✓		10.	
Containers Intact:	✓			11.	
Orthophosphate field filtered			✓	12.	
Hex Cr Aqueous Compliance/NPDES sample field filtered			✓	13.	
Organic Samples checked for dechlorination:			✓	14.	
Filtered volume received for Dissolved tests			✓	15.	
All containers have been checked for preservation. All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Phenolics			✓	16. Initial when completed (b) (6), (b) (7)(C) Date/time of preservation Lot # of added preservative	
Headspace in VOA Vials (>6mm):			✓	17.	
Trip Blank Present:		✓		18.	
Trip Blank Custody Seals Present			✓		
Rad Samples Screened < 0.5 mrem/hr			✓	Initial when completed: Date:	

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e., out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\Master\Document Management\Sample Mgt\Sample Condition Upon Receipt Pittsburgh (C056-8 5March2019)

Sample Condition Upon Receipt

Pace Analytical

Client Name: PACE-PA

Project WO#: 7083866

PM: NML Due Date: 04/10/19

CLIENT: PACE-PA

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other

Tracking #: 4267 4212 7771

Custody Seal on Cooler/Box Present: ☐ Yes ☒ No Seals intact: ☐ Yes ☒ No

Temperature Blank Present: ☐ Yes ☒ No

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ Ziploc ☒ None ☐ Other

Type of Ice: (Wet) Blue None

Thermometer Used: (TH091) Correction Factor: 0.0

☒ Samples on ice, cooling process has begun

Cooler Temperature (°C): 4.9 Cooler Temperature Corrected (°C): 4.9

Date/Time 5035A kits placed in freezer

Temp should be above freezing to 6.0°C

USDA Regulated Soil (☐ N/A, water sample)

Date and Initials of person examining contents: 04/13/19

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check map)? ☐ YES ☒ NO

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-LI-C-010) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present:	☒ Yes	☐ No		1.
Chain of Custody Filled Out:	☒ Yes	☐ No		2.
Chain of Custody Relinquished:	☒ Yes	☐ No		3.
Sampler Name & Signature on COC:	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time:	☒ Yes	☐ No		5.
Short Hold Time Analysis (<72hr):	☐ Yes	☒ No		6.
Rush Turn Around Time Requested:	☐ Yes	☒ No		7.
Sufficient Volume: (Triple volume provided for MS/MSD)	☒ Yes	☐ No		8.
Correct Containers Used:	☒ Yes	☐ No		9.
-Pace Containers Used:	☒ Yes	☐ No		
Containers Intact:	☒ Yes	☐ No		10.
Filtered volume received for Dissolved tests	☐ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container.
Sample Labels match COC:	☒ Yes	☐ No		12.
-Includes date/time/ID/Analysis Matrix: SL WT OIL				
All containers needing preservation have been checked	☐ Yes	☐ No	☒ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
pH paper Lot #				
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl, NaOH>9 Sulfide, NaOH>12 Cyanide). Exceptions: VOA, Coliform, TOC/DOC, Oil and Grease, DRO/8015 (water). Per Method, VOA pH is checked after analysis	☐ Yes	☐ No	☒ N/A	Sample #
				Initial when completed: / Lot # of added preservative: / Date/Time preservative added
Samples checked for dechlorination:	☐ Yes	☐ No	☒ N/A	14.
KI starch test strips Lot #				
Residual chlorine strips Lot #				Positive for Res. Chlorine? Y N
Headspace in VOA Vials (>6mm):	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Present:	☐ Yes	☐ No	☒ N/A	16.
Trip Blank Custody Seals Present	☐ Yes	☐ No	☒ N/A	
Pace Trip Blank Lot # (if applicable):				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

* PM (Project Manager) review is documented electronically in LIMS.

Particle Technology Labs

556 Rogers Street, Downers Grove, IL 60515
630-969-2703 ph 630-969-2745 fx
www.particletechlabs.com

THE PARTICLE EXPERTS

INTERPRETING YOUR MALVERN FINE PARTICLE ANALYSIS

INTRODUCTION

The particle size analysis of your sample(s) has been conducted on a Malvern® MasterSizer LASER diffractor. This instrument is considered an ensemble analyzer that calculates a volume distribution from the LASER (Light Amplification by Stimulated Emission of Radiation) diffraction pattern of a suspension of particles. This raw scatter data are then processed using a complex algorithm and presented on the basis of **EQUIVALENT SPHERICAL DIAMETER**. The Malvern equipment currently in use at Particle Technology Labs (PTL) are the *MasterSizer 2000 and the MasterSizer 3000.*

THE DATA

The header section contains various user-entered information including client name, sample identification, and analysis notes. Each project submitted to PTL is given a unique seven digit code (PTL Project #) which can be found on these data pages, although its location is dependent on the instrumentation used. On the MasterSizer 2000 and 3000 data, the PTL Project # appears at the bottom of the page and is identified as File Name or within the File. Please refer to this PTL Project # when contacting us with any questions regarding the analysis.

The data output also provides the parameters specific to the instrument being used, as well as the parameters specific to the analysis. The optical model (composed of the sample's refractive index as well as the imaginary absorption value) is required if determining the particle size using Mie theory. This theory can be used on any size particles, but is specifically recommended over the use of the Fraunhofer approximation according to ISO 13320:2009 for material in the size region less than approximately 50 µm. Please note that, unless otherwise requested or provided by the client, the analysis of an unknown material is generally conducted using the standard instrument default optical values as detailed below.

SYSTEM DEFAULT VALUES

SETTINGS	MASTERSIZER 2000 / MASTERSIZER 3000	
	WET	DRY
Analysis Model	General Purpose	General Purpose
Presentation	Default	Default
Sample RI Value	1.520	1.520

The Fraunhofer approximation, which does not require specific knowledge of the optical properties of the sample, can be applied for large particles if a known refractive index of the material is not available or the sample is composed of multiple components. If the actual RI of the sample material is provided at a later date, the raw data can be recalculated to adjust for the refractive index.

Please note the following commonly reported values when reviewing your data:

- **TABULATED DATA:** ALWAYS appears as a Cumulative % less than (*Volume Under %*) unless otherwise requested.
- **SPAN:** Value related to the width of the curve, expressed as $\frac{[Dv(90)-Dv(10)]}{Dv(50)}$ or $\frac{d(0.9)-d(0.1)}{d(0.5)}$ depending on the instrument.
- **D[3,2]:** Surface-weighted mean diameter (Sauter diameter)
- **D[4,3]:** Volume-weighted MEAN
- **10%, 50%, 90% size values:** Indicates the size median which 10%, 50%, or 90% of the particles within the distribution is smaller than (example: Dv(90) or d(0.9): 140 µm, this means that 90% of the particulate is smaller than 140 µm on a volume basis).
- **Specific Surface Area:** If a calculated Specific Surface Area value is reported, consider this value only as an approximate surface area since calculations are based upon **non-porous spheres.** It is not a replacement for a result produced from an actual gas adsorption instrument due to the above assumption.

Also included is the Particle Size Distribution DIFFERENTIAL HISTOGRAM. This histogram shows the Tabulated Data as a **Differential Volume Percent Less Than Indicated Size.** Please note that the histogram for the *MasterSizer 3000* also generally includes a CUMULATIVE Curve representative of the Tabulated Data.

For additional questions specific to your sample results, please contact us directly.

Particle Technology Labs

LASER DIFFRACTION

Mastersizer 3000 Analysis

Result < 1700 µm

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Information

Client	PACE ANALYTICAL SERVICES LLC
Test Method	N/A
Operator Name	bsprys
SOP File Name	AeroS.cfg
Carrier	Air
Notes	N/A

Information

Sample Name	Dust
Sample ID	Dust
PTL ID	261140-49
Measurement Date Time	4/11/2019 11:16:37 AM
Analysis Date Time	4/11/2019 11:16:37 AM
Result Source	Measurement

Measurement Details

Particle Name	Default
Particle Refractive Index	1.520
Particle Absorption Index	1.000
Weighted Residual	0.21 %
Laser Power	72.11 %
Laser Obscuration	4.05 %
Accessory Name	Aero S
Air Pressure Achieved	0.0 barg

Measurement Details

Dispersant Name	Dry dispersion
Dispersant Refractive Index	1.000
Analysis Model	General Purpose
Analysis Sensitivity	
Are particles non-spherical?	Yes
Scattering Model	Mie
Accessory Serial No.	MAL1162178
Instrument Serial No.	MAL1139295
Venturi Type	Standard venturi disperser

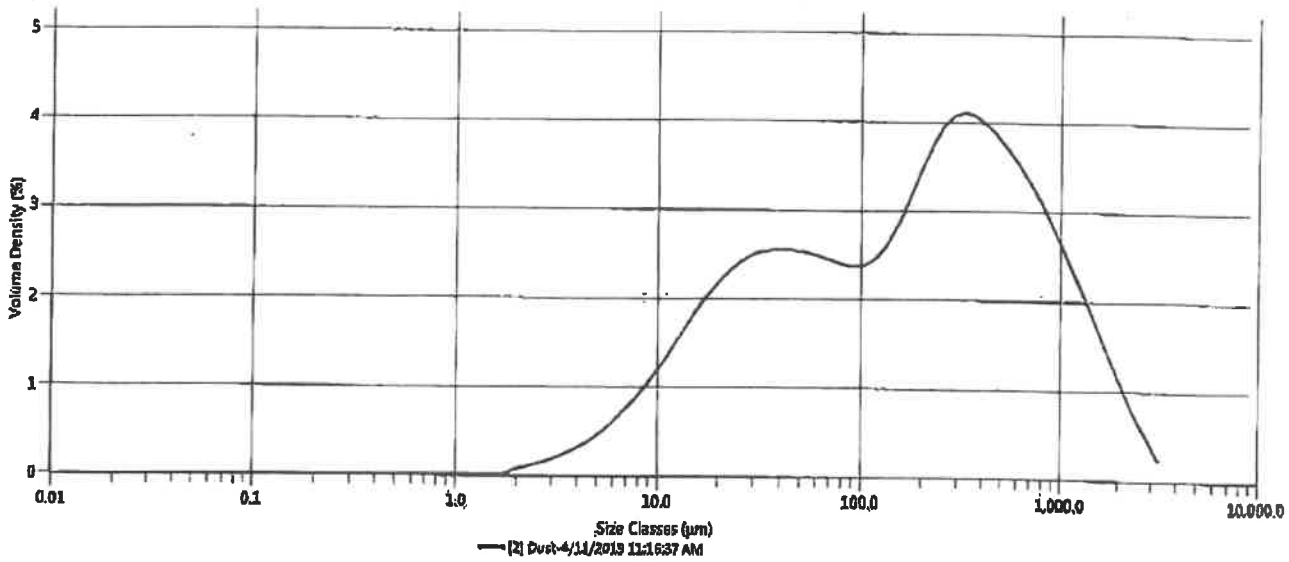
Analysis Results

Dv (10)	16.6 µm
Dv (50)	193 µm
Dv (90)	1050 µm

Analysis Results

D [4,3]	388 µm
Span	5.343

Frequency (compatible)



Measurement Details

File Path	R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number	2
Average Result Records	

BS 2019-04-11
JLC 2019-04-11

44454-49

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name AeroS.cfg
Carrier Air
Notes N/A

Measurement Details

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 11:16:37 AM
Measurement Date Time 4/11/2019 11:16:37 AM
Result Source Measurement

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
0.0100	0.00	0.166	0.00	2.75	0.25	45.6	25.72	756	83.90
0.0114	0.00	0.188	0.00	3.12	0.39	51.8	27.83	859	86.47
0.0129	0.00	0.214	0.00	3.55	0.57	58.9	29.93	976	88.83
0.0147	0.00	0.243	0.00	4.03	0.80	66.9	31.99	1110	90.96
0.0167	0.00	0.276	0.00	4.58	1.09	76.0	34.02	1260	92.86
0.0189	0.00	0.314	0.00	5.21	1.45	86.4	36.01	1430	94.52
0.0215	0.00	0.357	0.00	5.92	1.89	98.1	37.97	1630	95.95
0.0244	0.00	0.405	0.00	6.72	2.43	111	39.95	1850	97.15
0.0278	0.00	0.460	0.00	7.64	3.07	127	41.99	2100	98.13
0.0315	0.00	0.523	0.00	8.68	3.84	144	44.16	2390	98.89
0.0358	0.00	0.594	0.00	9.86	4.74	163	46.53	2710	99.45
0.0407	0.00	0.675	0.00	11.2	5.79	186	49.14	3080	99.82
0.0463	0.00	0.767	0.00	12.7	7.00	211	52.02	3500	100.00
0.0526	0.00	0.872	0.00	14.5	8.36	240	55.13		
0.0597	0.00	0.991	0.00	16.4	9.88	272	58.42		
0.0679	0.00	1.13	0.00	18.7	11.55	310	61.81		
0.0771	0.00	1.28	0.00	21.2	13.35	352	65.24		
0.0876	0.00	1.45	0.00	24.1	15.27	400	68.63		
0.0995	0.00	1.65	0.00	27.4	17.28	454	71.94		
0.113	0.00	1.88	0.00	31.1	19.35	516	75.14		
0.128	0.00	2.13	0.06	35.3	21.46	586	78.22		
0.146	0.00	2.42	0.14	40.1	23.59	666	81.15		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 2
Average Result Records

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Information

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name AeroS.cfg
Carrier Air
Notes N/A

Information

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:23:08 AM
Analysis Date Time 4/11/2019 11:23:08 AM
Result Source Measurement

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.22 %
Laser Power 72.11 %
Laser Obscuration 4.61 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

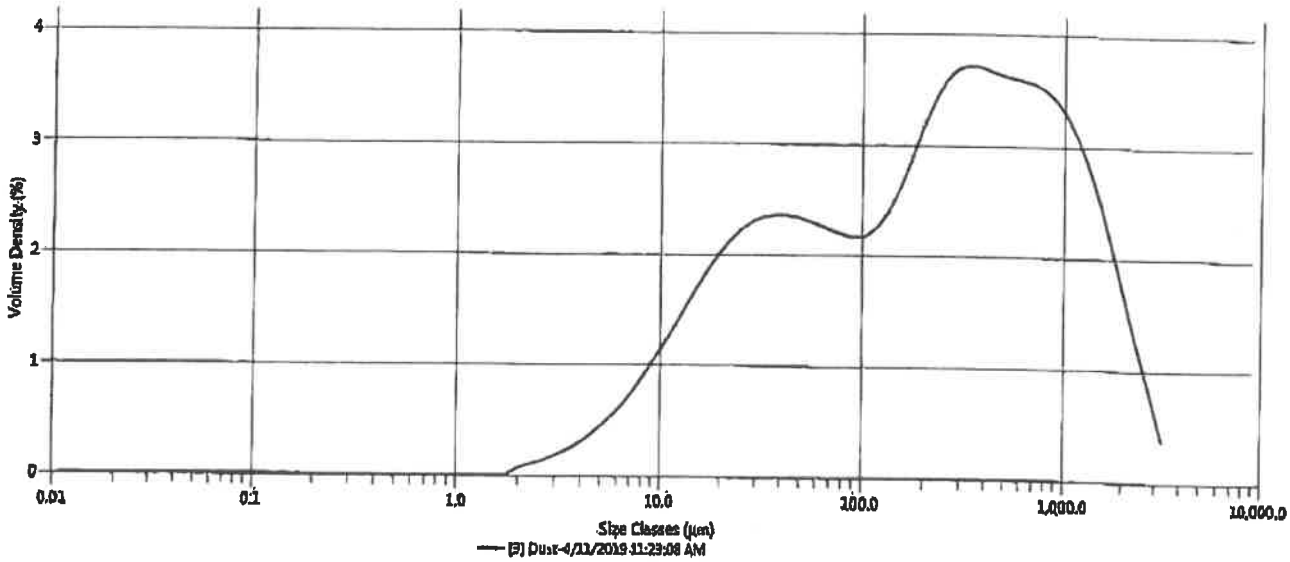
Analysis Results

Dv (10) 17.2 µm
Dv (50) 229 µm
Dv (90) 1300 µm

Analysis Results

D [4,3] 468 µm
Span 5.618

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 3
Average Result Records

BS 2019-04-11
JK 2019-04-11

44454-49

Malvern

Malvern Instruments Ltd.
www.malvern.com

Mastersizer - v3.72
Page 1 of 2

CreBagb 8/16/2016
Printed: 4/11/2019 2:07 PM

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name AeroS.cfg
Carrier Air
Notes N/A

Measurement Details

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 11:23:08 AM
Measurement Date Time 4/11/2019 11:23:08 AM
Result Source Measurement

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
0.0100	0.00	0.166	0.00	2.75	0.25	45.6	24.11	756	78.36
0.0114	0.00	0.188	0.00	3.12	0.39	51.8	26.06	859	81.28
0.0129	0.00	0.214	0.00	3.55	0.57	58.9	27.98	976	84.13
0.0147	0.00	0.243	0.00	4.03	0.79	66.9	29.87	1110	86.85
0.0167	0.00	0.276	0.00	4.58	1.07	76.0	31.72	1260	89.39
0.0189	0.00	0.314	0.00	5.21	1.43	86.4	33.54	1430	91.72
0.0215	0.00	0.357	0.00	5.92	1.85	98.1	35.34	1630	93.78
0.0244	0.00	0.405	0.00	6.72	2.37	111	37.15	1850	95.56
0.0278	0.00	0.460	0.00	7.64	3.00	127	39.02	2100	97.04
0.0315	0.00	0.523	0.00	8.68	3.73	144	41.01	2390	98.23
0.0358	0.00	0.594	0.00	9.86	4.60	163	43.18	2710	99.11
0.0407	0.00	0.675	0.00	11.2	5.59	186	45.58	3080	99.70
0.0463	0.00	0.767	0.00	12.7	6.73	211	48.20	3500	100.00
0.0526	0.00	0.872	0.00	14.5	8.01	240	51.03		
0.0597	0.00	0.991	0.00	16.4	9.43	272	54.01		
0.0679	0.00	1.13	0.00	18.7	10.99	310	57.09		
0.0771	0.00	1.28	0.00	21.2	12.67	352	60.19		
0.0876	0.00	1.45	0.00	24.1	14.45	400	63.29		
0.0995	0.00	1.65	0.00	27.4	16.31	454	66.35		
0.113	0.00	1.88	0.00	31.1	18.23	516	69.38		
0.128	0.00	2.13	0.06	35.3	20.18	586	72.39		
0.146	0.00	2.42	0.14	40.1	22.15	666	75.39		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 3
Average Result Records

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Information

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name Aero5.cfg
Carrier Air
Notes N/A

Information

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:29:08 AM
Analysis Date Time 4/11/2019 11:29:08 AM
Result Source Measurement

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.21 %
Laser Power 72.11 %
Laser Obscuration 4.13 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

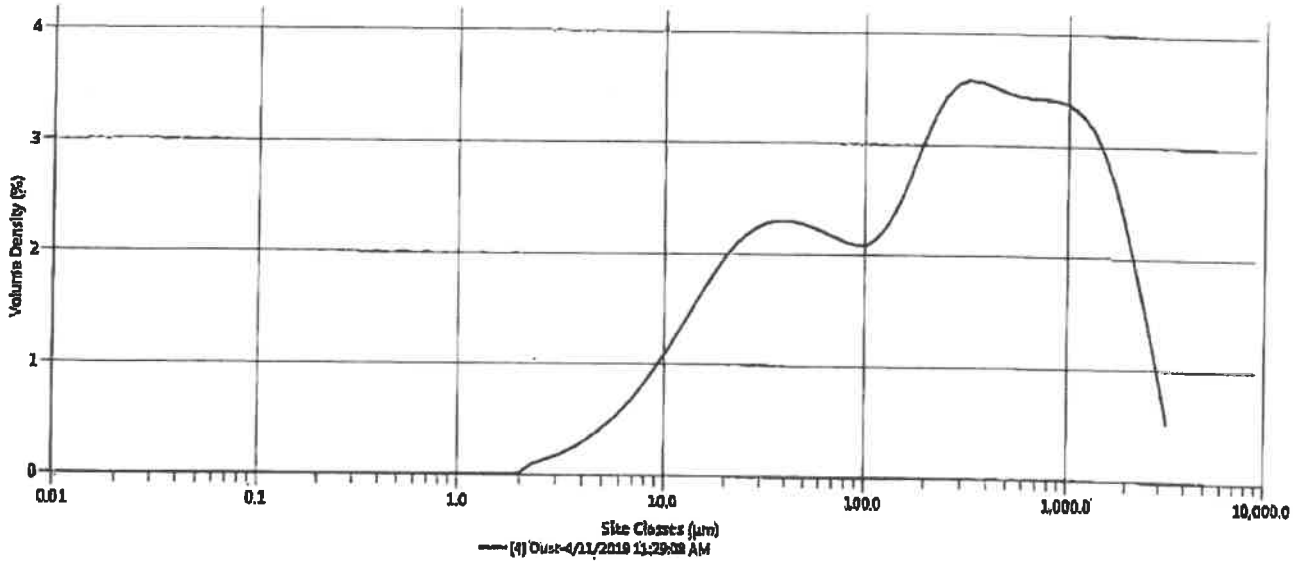
Analysis Results

Dv (10) 17.3 µm
Dv (50) 248 µm
Dv (90) 1490 µm

Analysis Results

D [4,3] 520 µm
Span 5.921

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 4
Average Result Records

BS 2019-04-11
JK 2019-04-11

44454-49

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name AeroS.cfg
Carrier Air
Notes N/A

Measurement Details

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 11:29:08 AM
Measurement Date Time 4/11/2019 11:29:08 AM
Result Source Measurement

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
0.0100	0.00	0.166	0.00	2.75	0.18	45.6	23.28	756	75.43
0.0114	0.00	0.188	0.00	3.12	0.32	51.8	25.18	859	78.27
0.0129	0.00	0.214	0.00	3.55	0.49	58.9	27.05	976	81.11
0.0147	0.00	0.243	0.00	4.03	0.71	66.9	28.89	1110	83.91
0.0167	0.00	0.276	0.00	4.58	0.98	76.0	30.68	1260	86.64
0.0189	0.00	0.314	0.00	5.21	1.31	86.4	32.44	1430	89.26
0.0215	0.00	0.357	0.00	5.92	1.73	98.1	34.17	1630	91.72
0.0244	0.00	0.405	0.00	6.72	2.22	111	35.91	1850	93.95
0.0278	0.00	0.460	0.00	7.64	2.82	127	37.71	2100	95.89
0.0315	0.00	0.523	0.00	8.68	3.57	144	39.62	2390	97.50
0.0358	0.00	0.594	0.00	9.86	4.35	163	41.70	2710	98.74
0.0407	0.00	0.675	0.00	11.2	5.30	186	43.89	3080	99.57
0.0463	0.00	0.767	0.00	12.7	6.40	211	46.51	3500	100.00
0.0526	0.00	0.872	0.00	14.5	7.63	240	49.22		
0.0597	0.00	0.991	0.00	16.4	9.00	272	52.08		
0.0679	0.00	1.13	0.00	18.7	10.50	310	55.04		
0.0771	0.00	1.28	0.00	21.2	12.13	352	58.02		
0.0876	0.00	1.45	0.00	24.1	13.86	400	61.00		
0.0995	0.00	1.65	0.00	27.4	15.67	454	63.94		
0.113	0.00	1.88	0.00	31.1	17.54	516	66.84		
0.128	0.00	2.13	0.00	35.3	19.45	586	69.71		
0.146	0.00	2.42	0.08	40.1	21.37	666	72.57		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 4
Average Result Records

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Information

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name AeroS.cfg
Carrier Air
Notes N/A

Information

Sample Name Average of 'Dust'
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:16:37 AM
Analysis Date Time 4/11/2019 11:16:37 AM
Result Source Averaged

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.21 %
Laser Power 72.11 %
Laser Obscuration 4.26 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

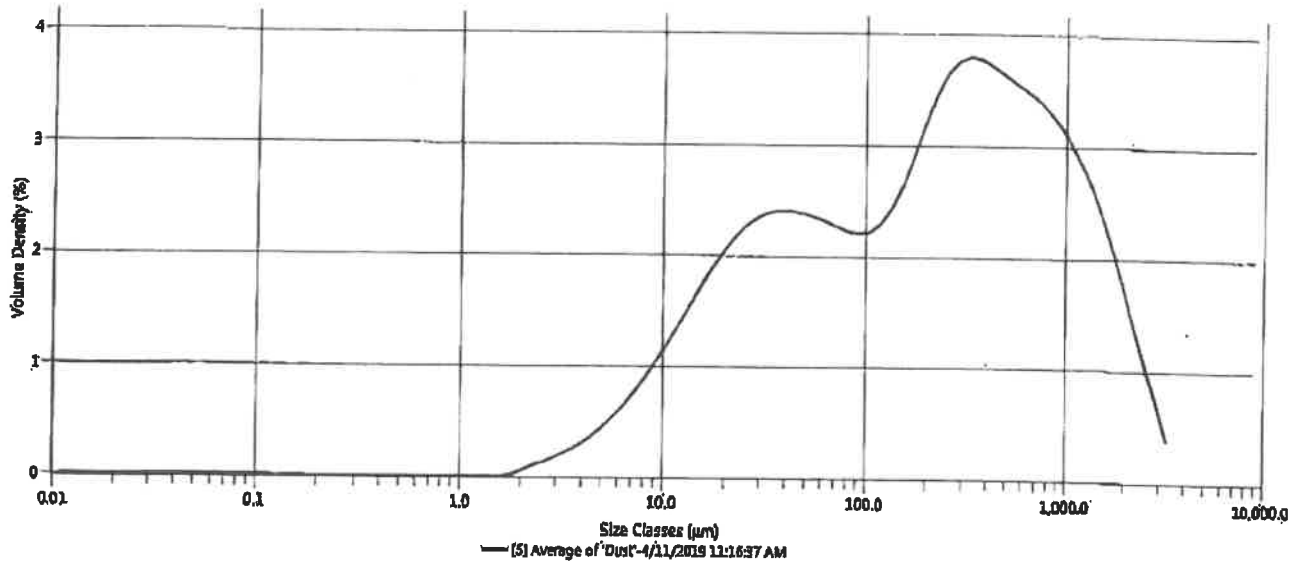
Analysis Results

Dv (10) 17.2 µm
Dv (50) 222 µm
Dv (90) 1290 µm

Analysis Results

D [4,3] 459 µm
Span 5.736

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 5
Average Result Records 2, 3, 4

BS 2019-04-11
JK 2019-04-11

44454-49

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Particle Technology Labs

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Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name AeroS.cfg
Carrier Air
Notes N/A

Measurement Details

Sample Name Average of 'Dust'
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 11:16:37 AM
Measurement Date Time 4/11/2019 11:16:37 AM
Result Source Averaged

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
0.0100	0.00	0.166	0.00	2.75	0.23	45.6	24.37	756	79.23
0.0114	0.00	0.188	0.00	3.12	0.37	51.8	26.36	859	82.01
0.0129	0.00	0.214	0.00	3.55	0.54	58.9	28.32	976	84.69
0.0147	0.00	0.243	0.00	4.03	0.77	66.9	30.25	1110	87.24
0.0167	0.00	0.276	0.00	4.58	1.05	76.0	32.14	1260	89.63
0.0189	0.00	0.314	0.00	5.21	1.40	86.4	33.99	1430	91.83
0.0215	0.00	0.357	0.00	5.92	1.82	98.1	35.83	1630	93.82
0.0244	0.00	0.405	0.00	6.72	2.34	111	37.67	1850	95.55
0.0278	0.00	0.460	0.00	7.64	2.96	127	39.57	2100	97.02
0.0315	0.00	0.523	0.00	8.68	3.70	144	41.60	2390	98.21
0.0358	0.00	0.594	0.00	9.86	4.56	163	43.81	2710	99.10
0.0407	0.00	0.675	0.00	11.2	5.56	186	46.24	3080	99.70
0.0463	0.00	0.767	0.00	12.7	6.71	211	48.91	3500	100.00
0.0526	0.00	0.872	0.00	14.5	8.00	240	51.79		
0.0597	0.00	0.991	0.00	16.4	9.44	272	54.84		
0.0679	0.00	1.13	0.00	18.7	11.02	310	57.98		
0.0771	0.00	1.28	0.00	21.2	12.72	352	61.15		
0.0876	0.00	1.45	0.00	24.1	14.53	400	64.31		
0.0995	0.00	1.65	0.00	27.4	16.42	454	67.41		
0.113	0.00	1.88	0.00	31.1	18.37	516	70.46		
0.128	0.00	2.13	0.04	35.3	20.36	586	73.44		
0.146	0.00	2.42	0.12	40.1	22.37	666	76.37		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 5
Average Result Records 2, 3, 4

Particle Technology Labs

LASER DIFFRACTION

Mastersizer 3000 Analysis

Sieve Blended Results

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Information

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name AeroS.cfg
Carrier Air
Notes Sieve Blend

Information

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:16:37 AM
Analysis Date Time 4/11/2019 1:59:28 PM
Result Source Edited

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.21 %
Laser Power 72.11 %
Laser Obscuration 4.05 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

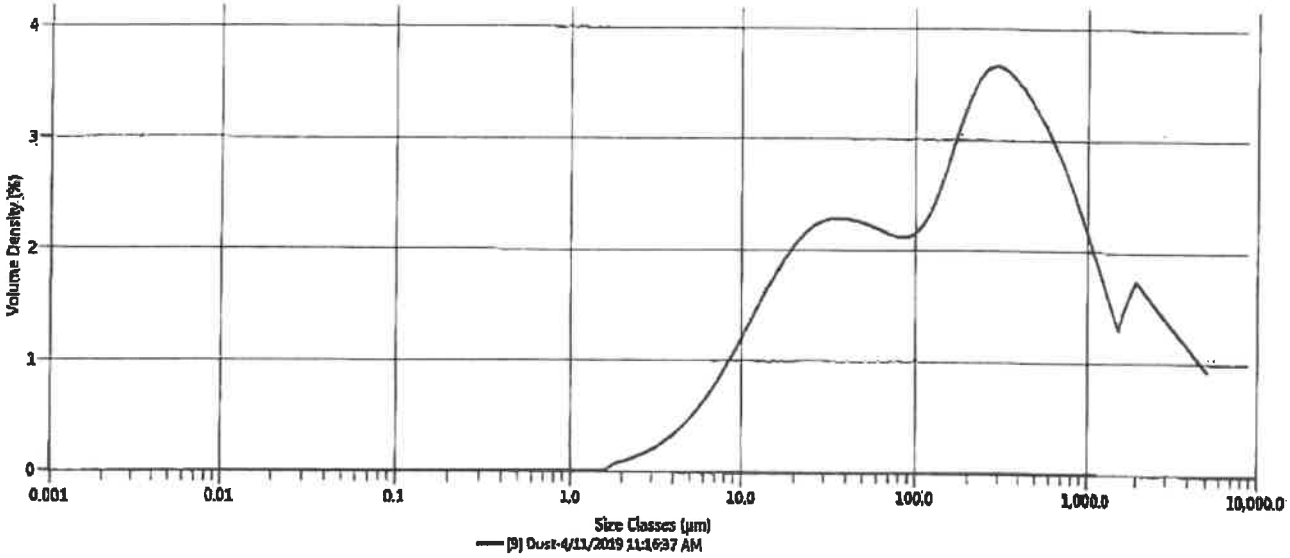
Analysis Results

Dv (10) 16.4 µm
Dv (50) 223 µm
Dv (90) 2220 µm

Analysis Results

D [4,3] 814 µm
Span 9.870

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 9
Average Result Records

BS 2019-04-11

BF 2019-04-12 44454-49

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Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name Aero5.cfg
Carrier Air
Notes Sieve Blend

Measurement Details

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 1:59:28 PM
Measurement Date Time 4/11/2019 11:16:37 AM
Result Source Edited

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
1.00	0.00	7.59	3.26	57.5	27.90	436	65.72	3310	92.71
1.10	0.00	8.32	3.81	63.1	29.22	479	67.76	3630	93.26
1.20	0.00	9.12	4.42	69.2	30.52	525	69.74	3980	93.82
1.32	0.00	10.0	5.10	75.9	31.81	575	71.64	4360	94.37
1.45	0.00	11.0	5.87	83.2	33.08	631	73.47	4790	94.92
1.58	0.00	12.0	6.69	91.2	34.35	692	75.23	5250	95.47
1.74	0.01	13.2	7.58	100	35.62	759	76.88	5750	96.02
1.91	0.05	14.5	8.56	110	36.93	832	78.44	6310	96.57
2.09	0.10	15.8	9.61	120	38.30	912	79.90	6920	97.12
2.29	0.17	17.4	10.72	132	39.72	1000	81.28	7590	97.67
2.51	0.24	19.1	11.88	145	41.25	1100	82.50	8320	98.22
2.75	0.35	20.9	13.11	158	42.89	1200	83.64	9120	98.77
3.02	0.44	22.9	14.38	174	44.65	1320	84.68	10000	99.32
3.31	0.57	25.1	15.69	191	46.50	1450	85.60		
3.63	0.71	27.5	17.02	209	48.50	1580	86.40		
3.98	0.90	30.2	18.38	229	50.58	1740	87.21		
4.37	1.11	33.1	19.74	251	52.72	1910	88.26		
4.79	1.35	36.3	21.11	275	54.91	2090	89.30		
5.25	1.64	39.8	22.49	302	57.12	2290	90.35		
5.75	1.97	43.6	23.85	331	59.32	2510	91.06		
6.31	2.35	47.9	25.22	363	61.50	2750	91.61		
6.92	2.77	52.5	26.57	398	63.63	3020	92.16		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 9
Average Result Records

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Information

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name AeroS.cfg
Carrier Air
Notes Sieve Blend

Information

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:23:08 AM
Analysis Date Time 4/11/2019 2:03:09 PM
Result Source Edited

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.22 %
Laser Power 72.11 %
Laser Obscuration 4.61 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

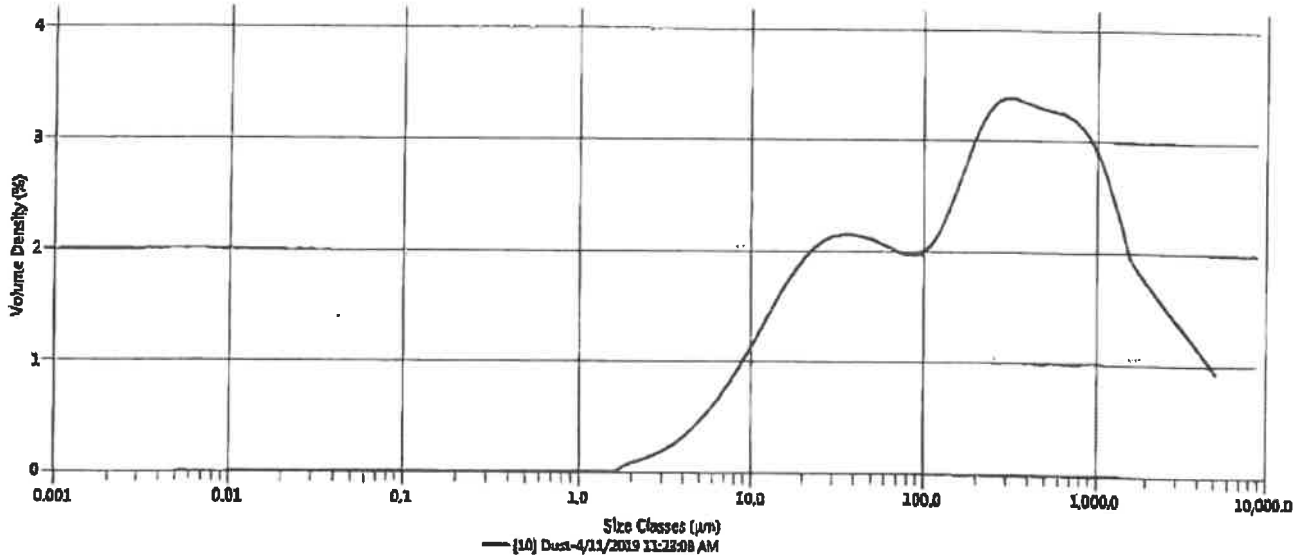
Analysis Results

Dv (10) 17.2 µm
Dv (50) 261 µm
Dv (90) 2220 µm

Analysis Results

D [4,3] 857 µm
Span 8.453

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 10
Average Result Records

BS 2019-04-11

EF 2019-04-12 44454-49

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Malvern 3000 Dry Analysis v.2

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Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name Aero5.cfg
Carrier Air
Notes Sieve Blend

Measurement Details

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 2:03:09 PM
Measurement Date Time 4/11/2019 11:23:08 AM
Result Source Edited

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
1.00	0.00	7.59	3.12	57.5	26.26	436	61.32	3310	92.71
1.10	0.00	8.32	3.64	63.1	27.50	479	63.31	3630	93.26
1.20	0.00	9.12	4.21	69.2	28.72	525	65.29	3980	93.82
1.32	0.00	10.0	4.87	75.9	29.91	575	67.26	4360	94.37
1.45	0.00	11.0	5.58	83.2	31.10	631	69.22	4780	94.92
1.58	0.00	12.0	6.35	91.2	32.28	692	71.17	5250	95.47
1.74	0.00	13.2	7.20	100	33.47	759	73.09	5750	96.02
1.91	0.04	14.5	8.12	110	34.69	832	74.98	6310	96.57
2.09	0.09	15.8	9.10	120	35.94	912	76.84	6920	97.12
2.29	0.15	17.4	10.13	132	37.25	1000	78.63	7590	97.67
2.51	0.22	19.1	11.23	145	38.67	1100	80.33	8320	98.22
2.75	0.31	20.9	12.38	158	40.18	1200	81.94	9120	98.77
3.02	0.41	22.9	13.57	174	41.77	1320	83.47	10000	99.32
3.31	0.53	25.1	14.79	191	43.49	1450	84.83		
3.63	0.68	27.5	16.05	209	45.32	1580	86.07		
3.98	0.86	30.2	17.33	229	47.22	1740	87.21		
4.37	1.06	33.1	18.61	251	49.18	1910	88.26		
4.79	1.29	36.3	19.90	275	51.20	2090	89.30		
5.25	1.57	39.8	21.19	302	53.23	2290	90.35		
5.75	1.89	43.6	22.47	331	55.27	2510	91.06		
6.31	2.24	47.9	23.75	363	57.30	2750	91.61		
6.92	2.65	52.5	25.01	398	59.32	3020	92.16		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 10
Average Result Records

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Information

Client FACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name AeroS.cfg
Carrier Air
Notes Sieve Blend

Information

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:29:08 AM
Analysis Date Time 4/11/2019 2:06:32 PM
Result Source Edited

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.21 %
Laser Power 72.11 %
Laser Obscuration 4.13 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

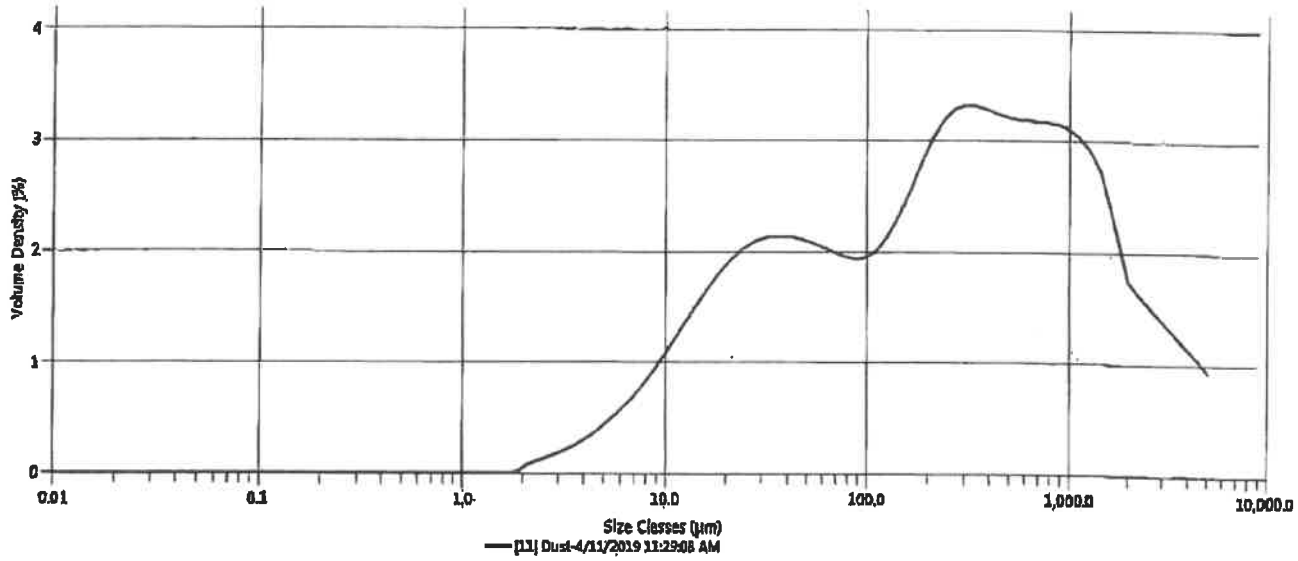
Analysis Results

Dv (10) 17.9 µm
Dv (50) 276 µm
Dv (90) 2220 µm

Analysis Results

D [4,3] 876 µm
Span 7.987

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 11
Average Result Records

BS 2019-04-11

EF 2019-04-12 44454-49

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Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name AeroS.cfg
Carrier Air
Notes Sieve Blend

Measurement Details

Sample Name Dust
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 2:06:32 PM
Measurement Date Time 4/11/2019 11:29:08 AM
Result Source Edited

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
1.00	0.00	7.59	2.90	57.5	25.66	436	59.90	3310	92.71
1.10	0.00	8.32	3.39	63.1	26.89	479	61.84	3630	93.26
1.20	0.00	9.12	3.94	69.2	28.09	525	63.77	3980	93.82
1.32	0.00	10.0	4.57	75.9	29.28	575	65.70	4360	94.37
1.45	0.00	11.0	5.25	83.2	30.45	631	67.62	4790	94.92
1.58	0.00	12.0	5.99	91.2	31.61	692	69.53	5250	95.47
1.74	0.00	13.2	6.81	100	32.78	759	71.44	5750	96.02
1.91	0.00	14.5	7.70	110	33.97	832	73.35	6310	96.57
2.09	0.02	15.8	8.65	120	35.18	912	75.25	6920	97.12
2.29	0.08	17.4	9.66	132	36.46	1000	77.13	7590	97.67
2.51	0.15	19.1	10.74	145	37.83	1100	78.98	8320	98.22
2.75	0.23	20.9	11.86	158	39.27	1200	80.80	9120	98.77
3.02	0.33	22.9	13.03	174	40.80	1320	82.56	10000	99.32
3.31	0.44	25.1	14.25	191	42.48	1450	84.23		
3.63	0.59	27.5	15.49	209	44.24	1580	85.82		
3.98	0.75	30.2	16.75	229	46.08	1740	87.21		
4.37	0.94	33.1	18.03	251	48.00	1910	88.26		
4.79	1.17	36.3	19.32	275	49.97	2090	89.30		
5.25	1.43	39.8	20.60	302	51.96	2290	90.35		
5.75	1.73	43.6	21.88	331	53.96	2510	91.06		
6.31	2.06	47.9	23.15	363	55.95	2750	91.61		
6.92	2.46	52.5	24.41	398	57.93	3020	92.16		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 11
Average Result Records

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Particle Technology Labs

Information

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Operator Name bsprys
SOP File Name AeroS.cfg
Carrier Air
Notes Sieve Blend

Information

Sample Name Average of 'Dust'
Sample ID Dust
PTL ID 261140-49
Measurement Date Time 4/11/2019 11:16:37 AM
Analysis Date Time 4/11/2019 1:59:28 PM
Result Source Averaged

Measurement Details

Particle Name Default
Particle Refractive Index 1.520
Particle Absorption Index 1.000
Weighted Residual 0.21 %
Laser Power 72.11 %
Laser Obscuration 4.26 %
Accessory Name Aero S
Air Pressure Achieved 0.0 barg

Measurement Details

Dispersant Name Dry dispersion
Dispersant Refractive Index 1.000
Analysis Model General Purpose
Analysis Sensitivity
Are particles non-spherical? Yes
Scattering Model Mie
Accessory Serial No. MAL1162178
Instrument Serial No. MAL1139295
Venturi Type Standard venturi disperser

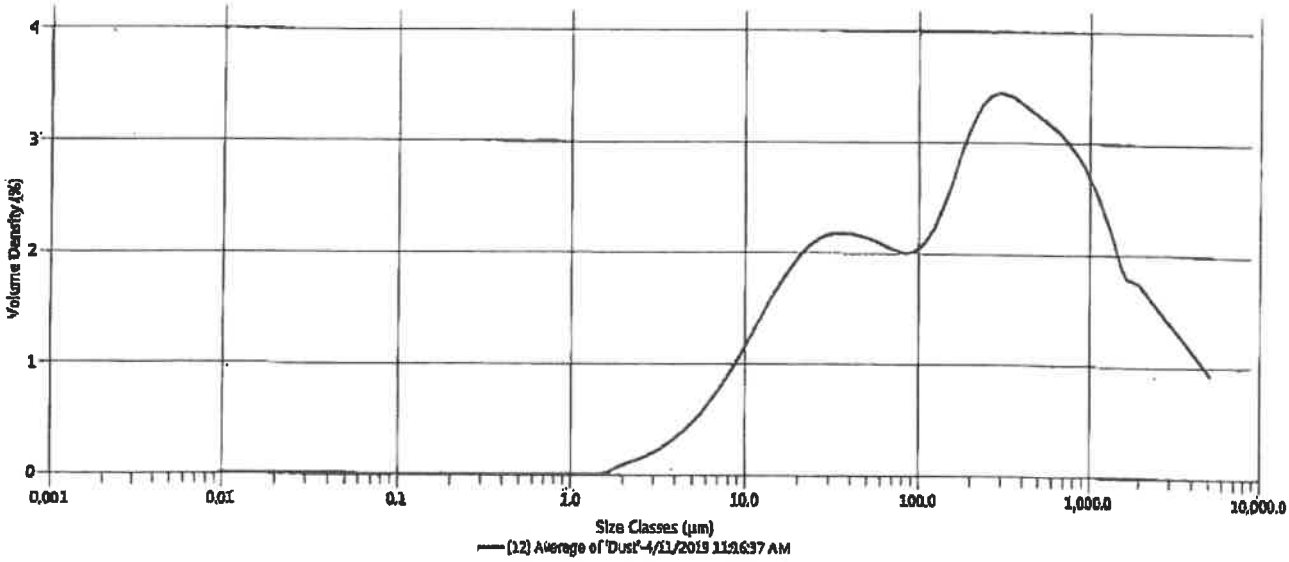
Analysis Results

Dv (10) 16.8 µm
Dv (50) 248 µm
Dv (90) 2220 µm

Analysis Results

D [4,3] 646 µm
Span 8.883

Frequency (compatible)



Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 12
Average Result Records 9, 10, 11

BS 2019-04-11

BF 2019-04-12

44454-49

Malvern

Malvern Instruments Ltd.
www.malvern.com

Mastersizer - v3.72

Created: 4/10/2016
Printed: 4/11/2019 2:07 PM

Malvern 3000 Dry Analysis v.2

Particle Technology Labs

Measurement Details

Client PACE ANALYTICAL SERVICES LLC
Test Method N/A
Chemist BS
SOP File Name AeroS.cfg
Carrier Air
Notes Sieve Blend

Measurement Details

Sample Name Average of 'Dust'
Sample ID Dust
PTL ID 261140-49
Analysis Date Time 4/11/2019 1:59:28 PM
Measurement Date Time 4/11/2019 11:16:37 AM
Result Source Averaged

Result

Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under	Size (µm)	% Volume Under
1.00	0.00	7.59	3.19	57.5	26.81	436	62.58	3310	92.71
1.10	0.00	8.32	3.73	63.1	28.06	479	64.57	3630	93.26
1.20	0.00	9.12	4.32	69.2	29.30	525	66.52	3980	93.82
1.32	0.00	10.0	4.98	75.9	30.51	575	68.44	4360	94.37
1.45	0.00	11.0	5.71	83.2	31.72	631	70.34	4790	94.92
1.58	0.00	12.0	6.51	91.2	32.92	692	72.20	5250	95.47
1.74	0.01	13.2	7.37	100	34.13	759	74.02	5750	96.02
1.91	0.03	14.5	8.31	110	35.37	832	75.79	6310	96.57
2.09	0.08	15.8	9.32	120	36.66	912	77.52	6920	97.12
2.29	0.15	17.4	10.38	132	38.01	1000	79.19	7590	97.67
2.51	0.22	19.1	11.50	145	39.45	1100	80.76	8320	98.22
2.75	0.31	20.9	12.68	158	41.01	1200	82.25	9120	98.77
3.02	0.42	22.9	13.89	174	42.67	1320	83.66	10000	99.32
3.31	0.55	25.1	15.14	191	44.42	1450	84.96		
3.63	0.69	27.5	16.42	209	46.31	1580	86.13		
3.98	0.88	30.2	17.72	229	48.26	1740	87.21		
4.37	1.09	33.1	19.03	251	50.27	1910	88.26		
4.79	1.32	36.3	20.34	275	52.33	2090	89.30		
5.25	1.60	39.8	21.65	302	54.41	2290	90.35		
5.75	1.93	43.6	22.96	331	56.48	2510	91.06		
6.31	2.30	47.9	24.25	363	58.54	2750	91.61		
6.92	2.71	52.5	25.54	398	60.58	3020	92.16		

Measurement Details

File Path R:\Malvern 3000\Measurement Data\44454-49.mmes
Record Number 12
Average Result Records 9, 10, 11

Merchant: Pace Analytical Services Inc.

1700 Elm St. SE Suite 200
Minneapolis, MN 55414
US

(612) 607-6434

Order Information

Description: 30286257 Dust
Order Number:
P.O. Number:
Customer ID: 30-365675
Invoice Number: 1930175964

Billing Information

David Shuler
David Shuler
26062

Phone: 304-670-2127

Shipping Information

Shipping:	0.00
Tax:	0.00
Total:	**USD 447.00**

Payment Information

Date/Time:	15-Apr-2019 13:10:27 MDT
Transaction ID:	41296944325
Transaction Type:	Authorization w/ Auto Capture
Transaction Status:	Captured/Pending Settlement
Authorization Code:	00841Z
Payment Method:	(b) (6), (b) (7)(C)