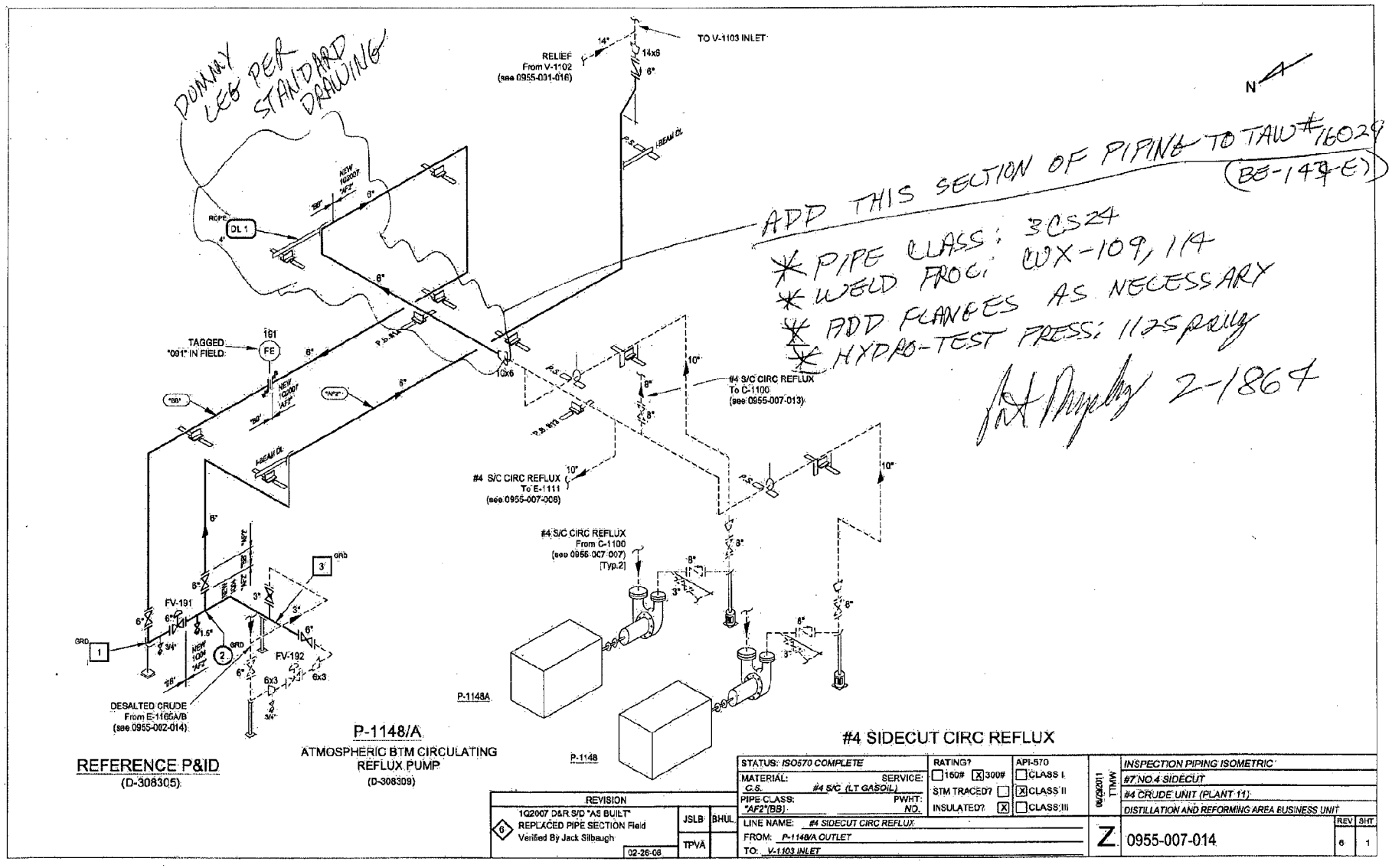
- **RT 5%** random on all butt welds.

- Insulate all new piping with "N18" per Chevron Standard Drawings **GD-N99993** & **GD-N99783**.
  - Use "N18" (3" Calcium Silicate with Aluminum Wrap)
- Re-use all the existing pipe hangers, shoes, and guides.

5.0 ATTACHMENTS

	Dwg No	Sheets
• **Welding Procedures**	**CVX-109, CVX-114**	**See Maintenance Personnel**
• **P&ID**	**D-308309-22**	**1**
• **Drawing**	**0955-007-008**	**1**
• **Pipe Spec**	**3CS24**	**3**
• **Std. Insulation for Hot Piping**	**GD-N99783**	**1**
• **Std. Insulation Item Numbers**	**GD-N99993**	**1**
• **Std. Steam Tracing Details**	**GF-L99888-1**	**2**



REFERENCE P&ID
(D-308305)

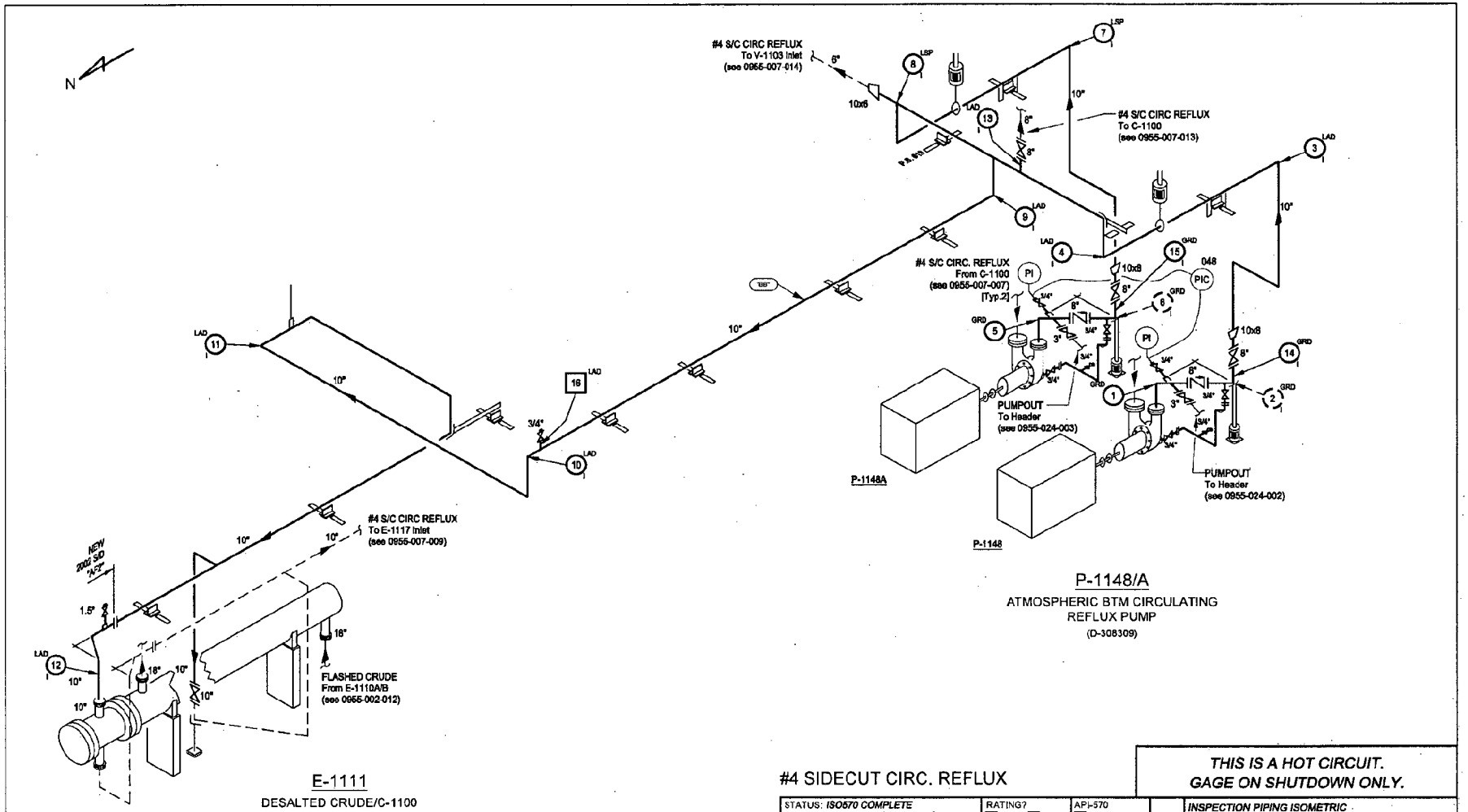
P-1148/A
ATMOSPHERIC BTM CIRCULATING REFLUX PUMP
(D-308309)

REVISION		
0	1Q2007 D&R S/D "AS BUILT" REPLACED PIPE SECTION Field Verified By Jack Silbaugh 02-26-08	JSLB / TPVA / BHUL

STATUS: ISO570 COMPLETE	RATING? ☐ 150# ☒ 300#	API-570 ☐ CLASS I	06/29/2011 TTMW
MATERIAL: C.S. / SERVICE: #4 S/C (LT GASOIL)	STM TRACED? ☐	☒ CLASS II	
PIPE CLASS: "AF2"(BB) / PWHT: NO.	INSULATED? ☒	☐ CLASS III	
LINE NAME: #4 SIDECUT CIRC REFLUX			
FROM: P-1148/A OUTLET			
TO: V-1103 INLET			

INSPECTION PIPING ISOMETRIC
#7 NO.4 SIDECUT
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT

Z 0955-007-014 | REV 6 | SHT 1



THIS IS A HOT CIRCUIT.
GAGE ON SHUTDOWN ONLY.

#4 SIDECUT CIRC. REFLUX

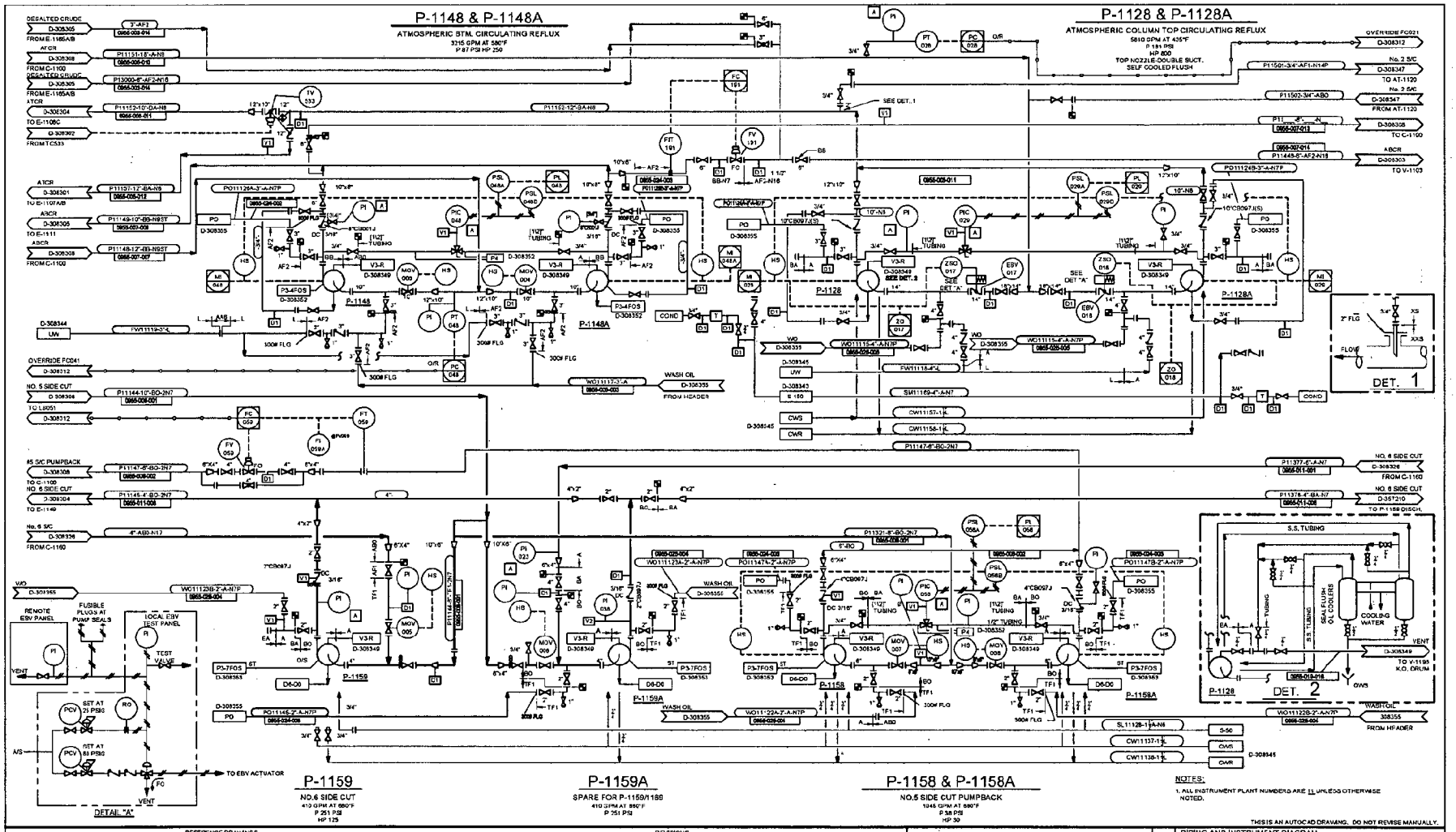
REVISION			
8	INSTALL 3/4" HIGH POINT VENT PIPING PER MOC# 16910 FIELD VERIFIED BY Richard Witmer 4/05/07	RWFU / TPVA	POST

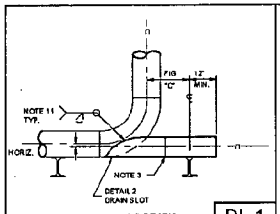
STATUS: ISO570 COMPLETE
MATERIAL: C.S. SERVICE: #4 S/C (LT GASOIL)
PIPE CLASS: AF2"(BB) PWHT: NO.
RATING? ☐ 150# ☒ 300#
STM TRACED? ☐ INSULATED? ☒
API-570 ☐ CLASS I ☒ CLASS II ☐ CLASS III
LINE NAME: #4 SIDECUT CIRC. REFLUX
FROM: P-1148/A
TO: E-1111

4/06/07 MHEE

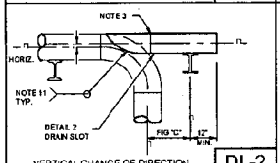
INSPECTION PIPING ISOMETRIC
#7 NO.4 SIDECUT
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT

Z 0955-007-008 REV 9 SHT 1

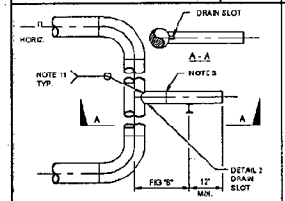

P-1148 & P-1148A
ATMOSPHERIC STM. CIRCULATING REFLUX
P-1128 & P-1128A
ATMOSPHERIC COLUMN TOP CIRCULATING REFLUX
DETAIL "A"
DET. 1
DET. 2
P-1159
NO.6 SIDE CUT
P-1159A
SPARE FOR P-1159/1199
P-1158 & P-1158A
NO.5 SIDE CUT PUMPBACK
NOTES:
1. ALL INSTRUMENT PLANT NUMBERS ARE 11 UNLESS OTHERWISE NOTED.
THESIS AN AUTOCAD DRAWING. DO NOT REVISE MANUALLY.
REFERENCE DRAWINGS
REVISIONS
Chevron
Richmond Refinery
PIPING AND INSTRUMENT DIAGRAM
P-1128/A, P-1148/A, P-1159/A, P-1158/A REFLUX & SIDE CUT PUMPS
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
D-308309-22



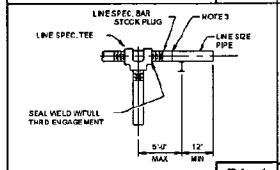
VERTICAL CHANGE OF DIRECTION DL-1



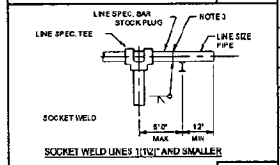
VERTICAL CHANGE OF DIRECTION DL-2



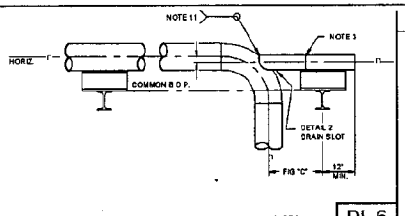
VERTICAL CHANGE OF DIRECTION DL-3



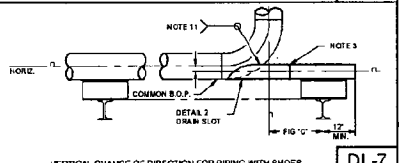
SCRD. LINES 1(1/2)" AND SMALLER DL-4



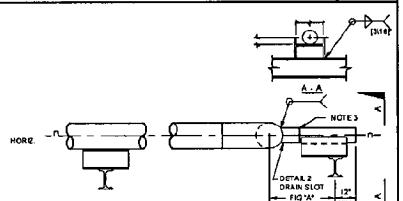
SOCKET WELD LINES 1(1/2)" AND SMALLER DL-5



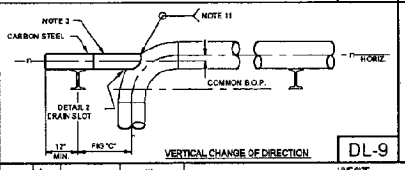
VERTICAL CHANGE OF DIRECTION FOR PIPING WITH SHOES DL-6



VERTICAL CHANGE OF DIRECTION FOR PIPING WITH SHOES DL-7

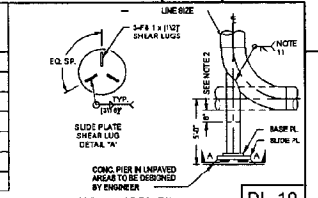


HORIZONTAL CHANGE OF DIRECTION FOR PIPING WITH SHOES DL-8



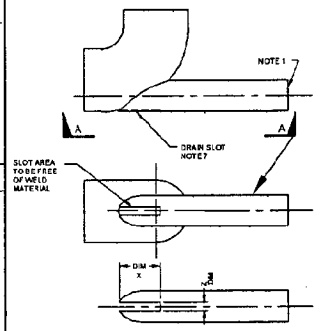
VERTICAL CHANGE OF DIRECTION DL-9

LINE SIZE	EXTENSION SIZE "A"	BASEPLATE SIZE	SLIDEPLATE SIZE
2"-4"	2"	[1/4"]x4"8	[3/8"]x8"8
6"	3"	[1/4"]x6"8	[3/8"]x10"8
8"-10"	4"	[3/8"]x8"8	[3/8"]x10"8
12"	6"	[3/8"]x8"8	[3/8"]x12"8
14"-16"	8"	[3/8"]x10"8	[3/8"]x14"8
18"	10"	[1/2"]x12"8	[1/2"]x16"8
20"-24"	12"	[1/2"]x14"8	[1/2"]x18"8



BASE EL. SUPPORT - VERTICAL/HORIZONTAL DL-10

DRAIN SLOTS



DETAIL 2

DRAIN SLOT SIZE		
PIPE SIZE	X DIM	Z DIM
2"	1"	[1/2]"
3"	1"	[1/2]"
4"	1-[1/2]"	[1/2]"
6"	1-[1/2]"	[1/2]"
8"	2"	[1/2]"
10"	2"	[1/2]"
12"	2"	[1/2]"
14"	2"	[1/2]"
16"	2[3/4]"	[1/2]"
18"	2[3/4]"	[1/2]"
20"	2[3/4]"	[1/2]"
22"	3"	[1/2]"
24"	3"	[1/2]"

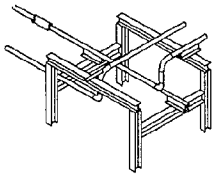


FIGURE D

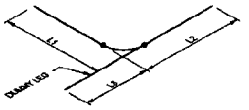


FIGURE A

PIPE SIZE	PIPE WALL	DUMMY LEG SIZE	DUMMY LEG WALL	L1	L2	L3
2"	.154	1.5"	.145	11'	11'	9'
3"	.216	2"	.218	15'	15'	9'
4"	.237	3"	.218	18'	18'	6'
6"	.280	4"	.237	19'	19'	7'
8"	.322	6"	.280	19'	19'	10'
10"	.365	8"	.322	22'	22'	12'
12"	.375	10"	.365	26'	26'	12'
14"	.375	12"	.375	27'	27'	12'
16"	.375	14"	.375	25'	25'	12'
18"	.375	16"	.375	24'	24'	12'
20"	.375	18"	.375	24'	24'	12'
24"	.375	20"	.375	20'	20'	12'

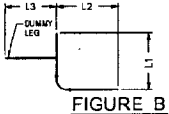


FIGURE B

PIPE SIZE	PIPE WALL	DUMMY LEG SIZE	DUMMY LEG WALL	L1	L2	L3
2"	.154	1.5"	.145	10'	8'	5'
3"	.216	2"	.218	10'	10'	5'
4"	.237	3"	.218	10'	15'	5'
6"	.280	4"	.237	12'	15'	5'
8"	.322	6"	.280	18'	25'	5'
10"	.365	8"	.322	18'	25'	7'
12"	.375	10"	.365	18'	25'	8'
14"	.375	12"	.375	18'	25'	8'
16"	.375	14"	.375	18'	20'	5'
18"	.375	16"	.375	14'	17'	5'
20"	.375	18"	.375	14'	15'	5'
24"	.375	20"	.375	10'	12'	5'

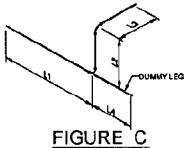


FIGURE C

PIPE SIZE	PIPE WALL	DUMMY LEG SIZE	DUMMY LEG WALL	L1	L2	L3	L4
2"	.154	1.5"	.145	10'	3'	10'	5'
3"	.216	2"	.218	13'	5'	13'	8'
4"	.237	3"	.218	18'	10'	18'	5'
6"	.280	4"	.237	20'	10'	20'	5'
8"	.322	6"	.280	20'	10'	20'	7'
10"	.365	8"	.322	23'	10'	23'	7'
12"	.375	10"	.365	22'	10'	22'	7'
14"	.375	12"	.375	20'	10'	20'	7'
16"	.375	14"	.375	17'	10'	17'	7'
18"	.375	16"	.375	15'	10'	15'	7'
20"	.375	18"	.375	13'	10'	13'	7'
24"	.375	20"	.375	10'	8'	11'	7'

NOTES

1. DUMMY LEGS LOCATED OVER WATER SHALL BE CAPPED DUMMY LEGS WITH NO DRAIN SLOT AND WITH END SEALED. 3" AND SMALLER WITH WELD CAP. 4" AND LARGER CAPPED WITH [1/4]" PLATE.
2. DUMMY LEGS SHALL BE FABRICATED WITH PIPE SPOOL AND STRESS RELIEVED WITH THE SPOOL WHEN REQUIRED.
3. DUMMY LEGS ATTACHED TO ALLOY PIPE SHALL HAVE THE FIRST 12" OF THE DUMMY LEG FABRICATED WITH THE SAME ALLOY MATERIAL AS THE PIPE.
4. LIVE DUMMY LEGS SHALL NOT BE USED, UNLESS A DEFINITE FUTURE EXTENSION HAS BEEN APPROVED BY THE ENGINEER. WHEN APPROVED, THE LINE IS TO BE TERMINATED WITH A BLIND FLANGE.
5. DUMMY LEGS ON INSULATED LINES ARE TO HAVE A SUPPORT SHOE ADDED TO THE DUMMY LEG.
6. SHOE HEIGHT WILL REQUIRE FIELD VERIFICATION ON REVAMP PROJECTS.
7. DRAIN SLOTS ARE TO BE GROUND AND DEBURRED TO INSURE DRAINAGE.
8. DUMMY LEGS ARE TO BE FABRICATED FROM THE PIPE SCHEDULE SHOWN SHOWN IN FIGURES A, B, C.
9. DUMMY LEGS ARE TO BE WELDED TO THE PIPE WITHOUT CUTTING A HOLE IN ELL. DUMMY LEGS ARE USED FOR SUPPORT ONLY.
10. DUMMY LEGS ARE TO EXTEND TO A MINIMUM OF 12" BEYOND THE EDGE OF THE SUPPORT.
11. FULL PENETRATION GROOVE WELDS JOINING DUMMY LEG AND PIPE SHALL CONFORM TO THE PREQUALIFIED JOINT DETAIL OF ASWD1.1 FIG 10.12F (STANDARD FLAT PROFILES FOR LIMITED THICKNESS) FIG 10.13 (TOE FILLET PROFILE FOR INTERMEDIATE THICKNESS) OR FIG 10.14 (CONCAVE IMPROVED PROFILE FOR HEAVY SECTIONS OR FATIGUE), AS DIRECTED BY ENGINEER.

ENGINEERING DESIGN BASES

THE FOLLOWING ENGINEERING CRITERIA WERE USED IN DEVELOPING THE DUMMY LEG SIZE AND SPANS AS SHOWN IN FIGURE A, B, & C

A. THE LINE HAS BEEN LOADED WITH WATER AT 62.4 LBS/CU. FT. AND A UNIFORM SEISMIC LATERAL LOAD EQUAL TO 0.42 TIMES THE FLUID AND PIPE WEIGHT APPLIED IN THE DIRECTION SHOWN.

B. THE ALLOWABLE SPANS SHOWN ARE ONLY VALID FOR THE PIPE SIZE AND WALL THICKNESSES SHOWN. DECREASING SOME SPANS MAY ALLOW FOR AN INCREASE IN THE OTHERS, SUBJECT TO REVIEW BY AN ENGINEER.

C. THE ALLOWABLE STRESS IN BENDING IS LESS THAN 20,000 PSI IN SOME CASES BECAUSE OF PUNCHING SHEAR AND DEFLECTION.

D. THE SPANS SHOWN IN FIGURE A, B, & C ARE SIMPLE SPANS, (NOT CONTINUOUS ACROSS PIPE SUPPORTS). CONTINUOUS SPANS MAY ALLOW AN INCREASE IN SPAN LENGTH SUBJECT TO REVIEW BY AN ENGINEER.

E. ALLOWABLE STRESSES AT THE JOINT BETWEEN LEG AND THE ELBOW ARE BASED ON AN ANALYSIS OF PUNCHING SHEAR PER AWS D1.1 USING THE FOLLOWING PERAMETERS:

- ANGLE BETWEEN CENTERLINES OF PIPE AND DUMMY LEG MUST NOT EXCEED 45 DEGREES MEASURED AT POINT OF INTERSECTION.
- CHORD OVALIZING PARAMETER IS 0.67.
- MAIN MEMBER STRESS INTERACTION TERM IS 0.044 "V.
- AXIAL LOAD IN DUMMY LEG IS ASSUMED TO BE ZERO, EXCEPT SEISMIC FORCE.

F. DUMMY LEG WELDS SHALL HAVE FULL PENETRATION WELDS PER AWS D1.1 OR THE APPLICABLE PIPING CODE.

G. WIDTH OF DUMMY LEG DRAIN SLOT SHALL NOT EXCEED ONE HALF INCH.

H. GUIDES MAY BE REQUIRED AT DUMMY LEG SUPPORT WHEN L1 IS PRECEDED BY A VERTICAL CHANGE IN DIRECTION.

I. THE FOLLOWING LINES REQUIRE A STRESS REVIEW:

- ALL ALLOY LINES, INCLUDING STAINLESS STEEL.

ALL STRESS RELIEVED LINES.

ALL LINES ATTACHED TO ROTATING EQUIPMENT OR DRIVERS.

ALL LINES SUPPORTED FROM STRESS RELIEVED VESSELS.

ALL LINES OVER 210°F.

THIS IS AN AUTOCAD DRAWING. DO NOT REVISE MANUALLY.

REFERENCE DRAWINGS

REVISIONS

REVISED NOTES 4, & 7, AND ENGINEERING DESIGN BASES D, H, AND I.	07-03-95	WW RRR

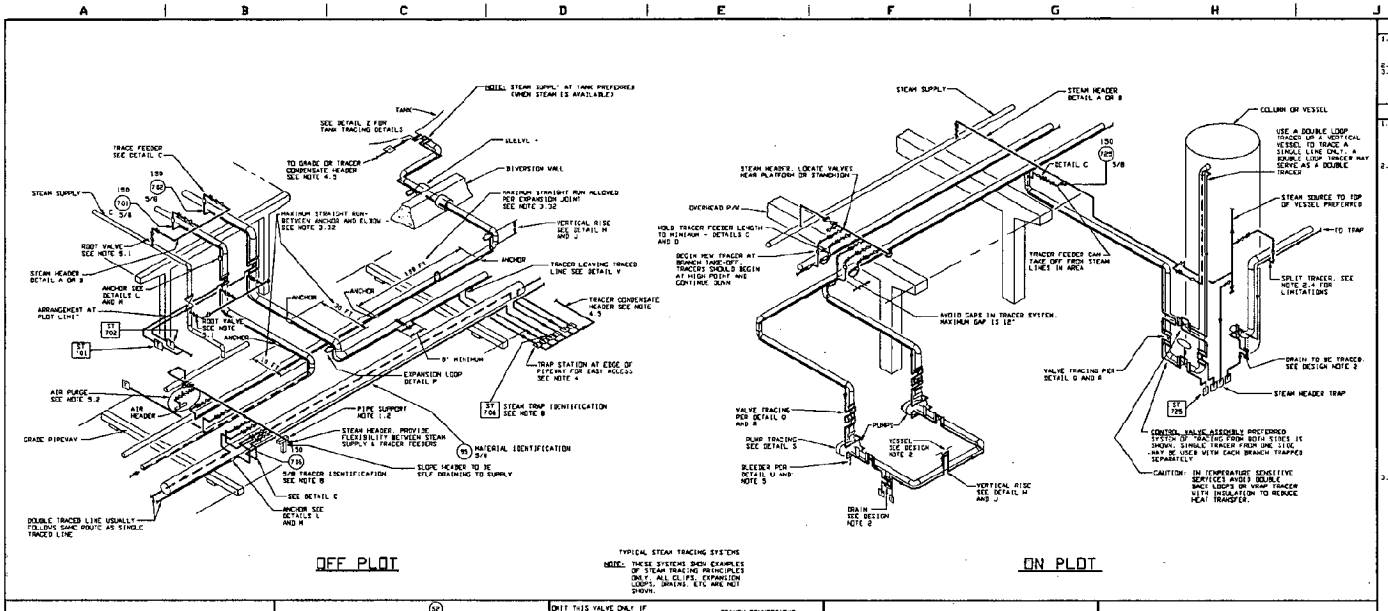
Chevron
Richmond Refinery

SCALE NONE DR CDW DR. APP. JRR DATE 04/22/2003
ENGR. RRR ENGR. DEPT. J/R APPROVED JPG
DRFTG DEPT. JRR, DLH

DETAILS
STANDARD DRAWING
TECHNICAL DIVISION

M W.O. ____ S.O. ____ D-604532-1

CUSA-CSB-0001312
EPA



DESIGN NOTES

1. IT IS IMPORTANT TO NOTE THAT THESE TYPICAL DETAILS ARE PRESENTED AS SAMPLES. ALL INSTALLATIONS SHALL FOLLOW UTL-OU-5993, STEAM TRACING, SIJI-N-5108, SAFETY IN DESIGN AND INSTALLATION STANDARDS AS PRECEDENCE
2. SEE DRAWING GB-J-866.
3. TRACING OF VENT AND DRAIN VALVES, VESSEL NOZZLES, AND CLEAN-OUT CONNECTIONS IS NORMALLY NOT REQUIRED. THE PROJECT ENGINEER IS TO SPECIFY WHEN IT IS REQUIRED. STEAM TRACING DRAWINGS ARE TO CLEARLY NOTE THESE INSTANCES.

CONSTRUCTION NOTES

1. GENERAL:
   1.1 INSTALL TRACERS AS SHOWN ON THE STEAM TRACING PIPING DRAWINGS.
   1.8 SUPPORT STEAM AND CONDENSATE LINES IN FIELD; MAXIMUM UNSUPPORTED LENGTH FOR 1/2" AND 3/4" STEEL PIPE TO BE 10 FT.
2. STEAM SUPPLY LINES:
   2.1 STEAM HEADER - SEE DETAILS A AND B.
      2.11 THE HEADER BLOCK VALVE IN DETAIL A MAY ALSO SERVE AS THE MANIFOLD BLOCK VALVE IF THE SUPPLY IS ACCESSIBLE FROM THE MANIFOLD LOCATION. IF NOT, TWO VALVES SHOULD BE USED. NOTE ADDITIONAL BLOCK VALVES MAY BE REQUIRED FOR PIPING CLASS A0B, 300 AND ABOVE. REFER TO FPM-BU-15.16 EQUIPMENT INSULATION AND DEPRESSURIZATION
      2.12 IF TRACER FEEDERS CANNOT BE MANIFOLDED TOGETHER AS IN DETAIL A AND B PROVIDE INDIVIDUAL HEADER BLOCK VALVES AND RUN TRACER FEEDERS AS IN DETAIL C.
      2.13 THE HEADER SHOULD BE SLOPED BACK TOWARD THE SUPPLY, TO MAKE IT SELF DRAINING. IN CASES WHERE THE HEADER IS LONGER THAN THE SUPPLY, A DRAIN LINE AND STEAM TRAP MUST BE SUPPLIED AT THE END OF THE HEADER FOR CONDENSATE DRAINAGE.
   2.2 TRACER FEEDERS - SEE DETAILS C AND D.
      2.21 TRACER FEEDER SIZES:
         NOT LESS THAN TRACER SIZE WITH A MINIMUM OF 3/4".
      2.22 PROVIDE A SEPARATE FEEDER FOR EACH TRACER.
      2.23 TRACER FEEDERS SHOULD HAVE THEIR ORIGINS MANIFOLDED TOGETHER ALONG COMMON SUPPLY HEADERS FOR EASE OF MAINTENANCE.
   2.3 TRACER CONNECTION TO TRACED LINE - SEE DETAILS C AND D.
   2.4 SPLIT TRACER - SEE DETAIL I.
      2.41 MAY ONLY BE USED WHEN ONE BRANCH IS LESS THAN 20 FT. LONG. ALSO, BOTH BRANCHES MUST SERVE THE SAME LINE OR PIECE OF EQUIPMENT.
      2.42 TRAP EACH BRANCH SEPARATELY.
      2.43 INSTALL SPLIT TRACERS SPARINGLY; THEY ARE CONFUSING TO OPERATE AND MAINTAIN AND SHOULD BE AVOIDED.
3. TRACERS:
   3.1 ROUTING - SEE STEAM TRACING PIPING DRAWINGS.
      3.11 ATTACH TRACERS PARALLEL TO PROCESS LINES. DO NOT WRAP TRACERS AROUND PROCESS LINES.
      3.12 EACH TRACER SHOULD CONTINUOUSLY FOLLOW THE LINE TO PROGRESSIVELY LOWER ELEVATIONS AND TERMINATE WITH A TRAP AT THE LOW POINT.
      3.13 NO SPLIT TRACERS ALLOWED, EXCEPT AS NOTED IN 2.4.
      3.14 AVOID VERTICAL RISES IF POSSIBLE. WHEN UNAVOIDABLE HANDLE AS SHOWN ON DETAIL M AND J.
      3.15 SEAL VOID ALL STEEL FITTINGS THAT WILL BE INSULATED WITH TRACER LINES.
      3.16 USE TUBING FITTINGS, SWAGELOK OR EQUAL, AS APPROVED BY SYSTEM DESIGNER.
      3.17 INSTALL ALL UNIONS OUTSIDE OF INSULATION AND DO NOT SEAL WELD.
   3.2 ATTACHMENT - SEE DETAIL P AND NOTE 8.
      3.21 SPOT PROTECTION IF REQUIRED WILL BE NOTED ON THE STEAM TRACING DRAWINGS WHERE SPECIFIED. SEPARATE TRACER FROM LINE BY INSTALLING A CONTINUOUS STRIP OF THERMAL INSULATION.
      3.22 PROVIDE AND LOCATE GUIDES AS FOLLOWS:
         - ALONG STRAIGHT RUNS OF PROCESS LINE AT INTERVALS OF 30 FT. MAXIMUM.
         - ON EACH SIDE OF ELLS OR EXPANSION LOOPS.
         - AT VALVES AND FLANGES.
         - AS NEEDED TO RESTRAIN TRACER FROM DAMAGING THE INSULATION.
         - SEE DETAIL L AND M FOR GUIDES AND EXCEPTION.
      3.23 PROVIDE AND LOCATE ANCHORS AS FOLLOWS:
         - MIDWAY BETWEEN EXPANSION LOOPS.
         - AT ALL POINTS WHERE TRACER ENTERS AND LEAVES THE INSULATION EXCEPT AT EXPANSION LOOPS.
         - SEE DETAIL L AND M.
   3.3 EXPANSION - SEE DETAIL P. (LOOPS NOT REQUIRED WHEN HEAT TRANSFER CEMENT IS USED.)
      3.31 MINIMIZE THE NUMBER OF LOOPS BY CAREFUL CONSIDERATION OF EACH TRACER.
      3.32 THE FOLLOWING SHALL BE USED IN INSTALLING LOOPS: MAXIMUM STRAIGHT RUN BETWEEN ANCHOR AND ELL WHEN EXPANSION LOOP IS 30 FT. WITH NO EXPANSION LOOP IF IS 10 FT. MAXIMUM STRAIGHT RUN ALLOWED PER EXPANSION LOOP IS 100 FT. MAXIMUM STRAIGHT RUN ALLOWED WITHOUT EXPANSION LOOP IS 20 FT. EXCEPT NO CHECKED LOOPS FOR TUBING ARE REQUIRED WHEN HEAT TRANSFER CEMENT IS USED.
      3.33 LOCATE EXPANSION LOOPS TO PREVENT DAMAGE TO INSULATION.
      3.34 LOCATE AT THE POINT WHERE TRACER MODERATES LINE INSULATION, WHICH GIVES THE BEST PROTECTION FROM THE WEATHER.
      3.35 LOCATE LOOPS AT ELLS OR ABOVE THE LINE TO CREATE THE LEAST NUMBER OF LOW POINTS.
      3.36 PROVIDE SUFFICIENT LINE INSULATION TO ALLOW FOR DIFFERENTIAL EXPANSION.
      3.37 INSULATE LOOPS.
   3.4 STEAM TRACING VALVES AND EQUIPMENT
      3.41 TRACE THE FOLLOWING ITEMS PER THE INDICATED DETAILS:
         SCREWED VALVES DETAIL Q SHT 2
         (FOR CONTINUATION SEE DRAWING GF-L99888-7 SHT. 2)

REFERENCE DRAWINGS				
STD PIPE SHOES & PIPE SHOE ANCHORS	KB-999633	STD STM TRACING DESIGN & DRAFTING PRACTICE	GB-L1666	EQUIPMENT INSULATION AND DEPRESSURING GUIDE FPM-BU-15.16
STEAM TRAP SCHEDULE	UTL-CF-302-A	STANDARD STEAM TRAP MANIFOLDS	GB-L99396	
		STEAM TRACING FOR PRESSURE INSTRUMENTS	GB-J1217	
LIST OF MATERIAL	UTL-5934.BAC	STEAM TRACING	UTL-OU-5995	
SAFETY IN DESIGNS	SIJI-N-5108	THERMAL INSULATION FOR HOT LINES, VESSELS AND EQUIPMENT	IBM-BU-1381	

REVISIONS

4	UPDATED REF DWGS. DESIGN NOTES & NOTE 2.11, 3.23. MODIFIED DET F & C. CHANGED CHEVRON LOGO.	10-23-97	RJR	LD
3	REVISED SET A,B,C,D,E MANIFOLDS AT DRAFOUT & DRYOUT PIPEWAYS. ADDED NOTES 2.11, 2.12, 2.13, 2.23, AND 2.43.	7-7-81	JKG	JHL JCS
2	REVIEWED DURING MANUAL RESTRUCTURING. CHANGED CHEVRON DECAL.	12-1-89	JJ	JHL
1	CHANGED CHEVRON DECAL.	12-31-96	TAY	L.L.

DRAWN NONE CK JHL
DATE 7-3-80 DR. RFT
DR APPR. LCE ENG. GH
CHEV. REP. APPROVED
ENG. REP. TJB
CHEV. REP. DLV

Chevron

STEAM TRACING DETAILS

SHEET 1

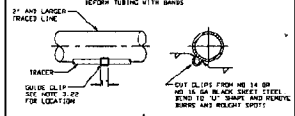
L D.C. 8.0. GF-L99888 7

STANDARD DRAWING

GUIDE CLIPS	
SIZE	TRACER
1"x1 3/8"	3/8" NOM (1/2" OD) COPPER TUBE
1"x2 1/8"	5/8" NOM (3/4" OD) COPPER TUBE
1"x2 1/8"	3/4" NOM (7/8" OD) COPPER TUBE

ANCHORS:
GUIDE CLIP BECOMES ANCHOR BY YELDING (WITH STEEL PIPE) OR BRAZING WITH COPPER TUBING) TRACER TO GUIDE CLIP. SEE NOTE 3.23 FOR LOCATION

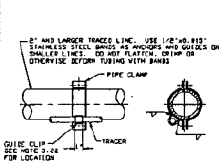
FOR TRACING SYSTEMS USING HEAT TRANSFER CEMENT, GUIDE CLIPS AND ANCHORS ARE NOT REQUIRED. TRACER CHANNEL AND BANDING ARE REQUIRED. USE (7/8"x1.015" STAINLESS STEEL BAND) AS ANCHORS AND GUIDES ON SMALLER LINES. DO NOT FLATTEN, CRIMP OR OTHERWISE DEFORM TUBING WITH BANDS



L

GUIDE AND ANCHOR CLIPS FOR CARBON STEEL LINES

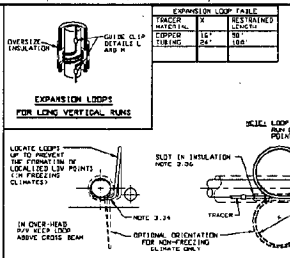
FOR ANCHOR NOTE AND GUIDE CLIPS SEE DETAIL L

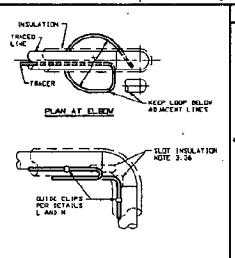


M

GUIDE AND ANCHOR FOR ALLOY AND STRESS RELIEVED LINES

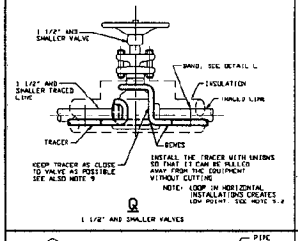
EXPANSION LOOP TABLE		
TRACER MATERIAL	X	RESTRAINED LENGTH
COPPER TUBING	16"	90'
	24"	108'





P

EXPANSION LOOPS - SEE NOTE 3.3

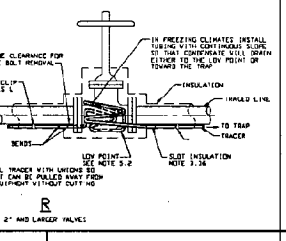


Q

1 1/2" AND SMALLER VALVES

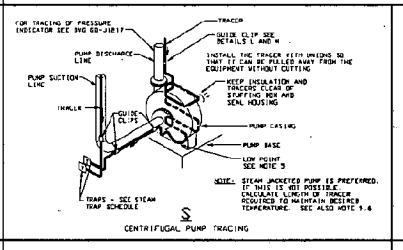
MINIMUM TRACING FOR FLANGED VALVES	
VALVE SIZE	FEET OF TUBING
2"	2'-6"
3"	3'-6"
4"	5'-0"
6"	8'-0"
8"	11'-0"
10"	14'-0"
12"	16'-0"
14"	19'-0"
16"	23'-0"
18"	27'-0"
20"	30'-0"
24"	36'-0"

FOR MULTIPLE TRACERS MULTIPLY THE LENGTH IN THE ABOVE TABLE BY THE NUMBER OF TRACERS ON THE LINE



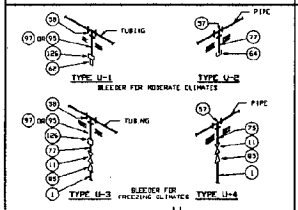
R

2" AND LARGER VALVES



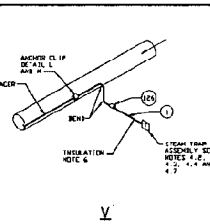
S

CENTRIFUGAL PUMP TRACING



U

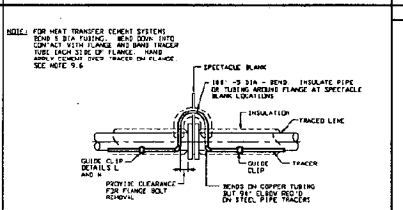
BLEEDER CONNECTIONS - NOTE 9.2



V

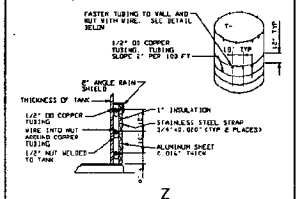
TRACER LEAVING TRACED LINE - NOTE 4

NOTE: FOR HEAT TRANSFER CEMENT SYSTEMS BEND 5 DIA TUBING. BEND DOWN INTO CONTACT WITH FLANGE AND BAND TRACER TUBE (ACH 2) DE OF FLANGE. HAND FORM TUBE OVER TRACER ON FLANGE. SEE NOTE 9.6



X

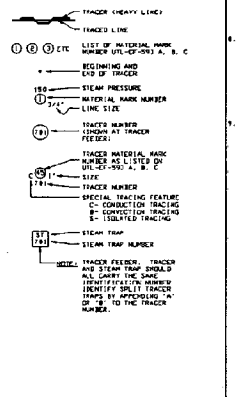
AT FLANGED LOCATIONS



Z

TANK TRACER INSTALLATION

LEGEND FOR STEAM TRACING DRAWINGS



CONSTRUCTION NOTES

FLANGED VALVES — DETAIL E
CENTRIFUGAL PUMPS — DETAIL F
FLANGES — DETAIL G

3.42 SEE NOTE 9.4 FOR HEAT TRANSFER CEMENT REQUIREMENTS.

3.5 CONDENSATE REMOVAL

3.51 FOR ALL TRACER INSTALLATIONS:
- INSTALL STEAM TRAP AT END OF TRACER. SEE NOTE 4.
- INSTALL THERMOSTATIC VENT TRAPS AS REQUIRED PER DETAIL J.

4. STEAM TRAP INSTALLATION

4.1 STEAM TRAPS (ELECTED ARE TO BE INSTALLED PER DETAIL SHEET OF STEAM TRAP SCHEDULE UTL-CF-302A AND CONSTRUCTION NOTES THEREON.

4.2 LOCATE STEAM TRAPS AS NOTED ON STEAM TRACING PIPING DRAWING.

4.3 ARRANGE STEAM TRAPS AS SHOWN ON DRAWING CD-L99396.

4.4 TRAP EACH TRACER OR BRANCH TRACER SEPARATELY.

4.5 DISPOSE OF CONDENSATE AS NOTED ON STEAM TRACING PIPING DRAWINGS AND DETAIL SHEETS OF STEAM TRAP SCHEDULE UTL-CF-302A.

4.6 FOR DETAIL OF TRACER LEAVING TRACED LINE SEE DETAIL V.

4.7 IN NON-FREEZING CLIMATES INSULATE CONDENSATE DISCHARGE LINE FROM TRAP FOR PERSONNEL PROTECTION ONLY. DO NOT INSULATE TRAP UNLESS OTHERWISE NOTED.

4.8 LINE SIZE FROM TRACER TO TRAP IS SAME SIZE AS TRACER BUT NOT LESS THAN 3/4".

5. FOR FREEZING CLIMATE

5.1 ALL VALVES SHOULD BE LOCATED IN HORIZONTAL PIPING IN ORDER TO BE SELF DRAINING, EXCEPT THOSE AT TRAP MANIFOLDS AND HEADER BLOCK VALVES ON HEADERS OF DIAMETER 1-1/2" OR SMALLER WHICH TAKE OFF VERTICALLY FROM THE SUPPLY LINE.

5.2 DEPENDING ON OPERATOR PREFERENCE PROVIDE FOR AIR PURGE OR LOW POINT DRAINS TO INPUT TRACERS OF PATCH.

THE CHOICE BETWEEN TEMPORARY AND PERMANENT AIR PURGES SHOULD BE MADE WITH OPERATOR INPUT. DETAIL L ILLUSTRATES THE PERMANENT AIR PURGE ARRANGEMENT. TEMPORARY AIR PURGE CONNECTIONS MAY CONSIST OF A TEE AND PLUG AS IN DETAIL C, OR OF A 1/4 INCH VALVE AND HOSE FITTING AS IN DETAIL B.

DETAIL U SHOWS LOW POINT BLEEDER ARRANGEMENTS. VALVES MUST BE KEPT AS CLOSE TO THE LINE AS POSSIBLE AND INSULATED TO PREVENT FREEZING.

5.3 INSULATE AND HEAT TRACE IF NECESSARY. ALL BUCKET AND FLOAT TRAPS TO PREVENT FREEZE-UP.

6. INSULATION

6.1 THIS DRAWING COVERS TRACER INSTALLATION ONLY. FOR DETAILS OF INSULATION SEE IRM-SU-1391.

6.2 SEE NOTES 3.36, 3.37, AND 4.7 FOR SPECIAL INSULATION INSTRUCTIONS.

6.3 INSULATE STEAM HEADER, TRACER FEEDERS AND LINE FROM TRACER TO TRAP.

7. TRACER TESTING

7.1 TEST TRACER SYSTEM BEFORE INSULATION IS INSTALLED.

7.2 THERMOLANCE BLOW OUT TRACER WITH STEAM AT MAXIMUM POSSIBLE RATE BEFORE TRAP IS INSTALLED TO REMOVE DIRT, ETC.

7.3 TEST TRACER WITH TRAP INSTALLED USING STEAM AT OPERATING PRESSURE.

7.4 IF STEAM IS NOT AVAILABLE FOR 7.2 AND 7.3 USE CLEAN WATER, HYDROSTATICALLY TEST TO 1-1/2 TIMES STEAM OPERATING PRESSURE.

7.5 REPAIR AND RETEST UNTIL SYSTEM IS PROVED PRESSURE TIGHT.

7.6 AIR SHOULD BE USED FOR TESTING IF FREEZING TEMPERATURES ARE EXPECTED DURING TESTING.

8. PERMANENT IDENTIFICATION OF TRACERS

8.1 PROVIDE THE POINT OF ORIGIN AND THE TRAP FOR EACH TRACER WITH ID TAG OF 18-GAGE BRASS 2"x50" TAGS SHALL BE AFFIXED TO THE SUPPORT STRUCTURES SINCE TRAPS AND VALVES ARE REMOVED FOR MAINTENANCE. TAG TO SHOW STAMPED NUMBER CORRESPONDING TO TRACER NUMBER SHOWN ON STEAM TRACING PIPING DRAWINGS. SEE LEGEND ON LEFT.

8.2 MARK TRAPS AND SUPPLY VALVES WITH PAINT TO DISTINGUISH BETWEEN "YEAR ROUND" OR "WINTER" TRACERS. PAINT ONE TYPE ONLY.

9. HEAT TRANSFER CEMENT

9.1 WHEN HEAT TRANSFER CEMENT IS SPECIFIED, IT SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTION.

9.2 THE HEAT TRANSFER CEMENT SHALL NOT BE APPLIED UNTIL AFTER THE TRACER HAS BEEN TESTED PER NOTE 7.

9.3 INSTALLATION OF HEAT TRANSFER CEMENT TRACED SYSTEMS WILL GENERALLY REQUIRE THE FOLLOWING STEPS:

9.31 THE MECHANICAL CONTRACTOR WILL INSTALL, FLUSH AND TEST THE TRACER WITHOUT TRACER CHANNEL. THE TRACER SHALL BE FIRMLY BUT TEMPORARILY WIRED (USE 14 GA STEEL WIRE) IN PLACE.

9.32 THE INSULATING CONTRACTOR WILL INSTALL THE HEAT TRANSFER CEMENT AND TRACER CHANNEL, BANDING IT TIGHTLY ON PLACE. ONCE THE TRACER AFTER REMOVING THE TEMPORARY TIE WIRE. THE TRACED LINE WILL THEN BE INSULATED.

9.4 PRIOR TO INSTALLATION OF THE HEAT TRANSFER CEMENT, THE PIPE, VALVE, EQUIPMENT, ETC. SURFACE SHALL BE CLEANED OF DIRT, LOOSE SCALE, OIL, GREASE, PAINTS, AND VARNISH.

9.5 THE HEAT TRANSFER CEMENT SHALL NOT BE APPLIED TO WET SURFACES AND UNTIL INSULATED SHALL BE PROTECTED FROM RAIN AND OTHER WATER SOURCES. A SHIELD OF POLYETHYLENE FILM IS SUFFICIENT.

9.6 VALVES, FITTINGS, FLANGES, AND EQUIPMENT ITEMS SHALL HAVE THE HEAT TRANSFER CEMENT APPLIED TO A THICKNESS NOT LESS THAN 1/4". COVERAGE OVER THE TRACER OD OF THE ENTIRE ITEM IS NOT CONSIDERED WITH HEAT TRANSFER CEMENT IT SHALL AT LEAST COVER AN AREA EQUAL TO 3 TIMES THE TRACER OD. TRACERS OR TRACER LOOPS SHALL NOT BE SPACED CLOSER THAN 3 TIMES TRACER OD.

REFERENCE DRAWINGS	
SEE SHEET 1 FOR REFERENCES	GF-L99881

REVISIONS				
1	MODIFIED DETS. P, Q, R, & S. UPDATED LEGEND, NOTES 4.1, 6.1, & 8.1.1.3. CHANGED CHEVRON LOGO. 10-25-07	RJR	LO	
2	CHANGED TRACER ROUTING IN DET F.2.1.B. DELETED NOTE 3.32; ADDED FREEZING CLIMATE NOTE 5. REVISED & RENUMBERED SUBSEQUENT NOTES & DET. U. 7-2-01	JMA	TFB	JHB JCS
3	REVIEWED DURING MANUAL RESTRUCTURING. CHANGED CHEVRON DECAL. 12-1-09	JH		
4	CHANGED CHEVRON DECAL. 12-31-96	TAV	LIL	

SCALE NONE — CK.BY
DATE 7-5-88 DR. RPA
DR APPR. ACC. ENG. ___ DIST.
DATE ___ APPROVED
DATE ___ DWG. NO. GF-L99888 — T.B.

Chevron

STEAM TRACING DETAILS

SHEET 2

L — G.C. ___ — B.O. ___ — GF-L99888 — 7

STANDARD DRAWING

ITEM NO.	DESCRIPTION
	MODERATE TEMPERATURE PIPE INSULATION - SEE NOTE 1A1
N1	1" THICK SECTIONAL TYPE
N2	1 1/2" THICK SECTIONAL TYPE
N3	2" THICK SECTIONAL TYPE
	HIGH TEMPERATURE PIPE INSULATION - SEE NOTE 1A2
N14	1" THICK SECTIONAL TYPE
N15	1 1/2" THICK SECTIONAL TYPE
N16	2" THICK SECTIONAL TYPE
N17	2 1/2" THICK SECTIONAL TYPE
N18	3" THICK SECTIONAL TYPE
N19	3 1/2" THICK SECTIONAL TYPE, DOUBLE LAYER
N20	4" THICK SECTIONAL TYPE, DOUBLE LAYER
	VERY HIGH TEMPERATURE PIPE INSULATION - SEE NOTE 1A3
N21	1" THICK TYPE
N22	1 1/2" THICK TYPE
N23	2" THICK TYPE
N24	2 1/2" THICK TYPE
N25	3" THICK TYPE
N26	3 1/2" THICK TYPE, DOUBLE LAYER
N27	4" THICK TYPE, DOUBLE LAYER
N28	4 1/2" THICK TYPE, DOUBLE LAYER
N29	5" THICK TYPE, DOUBLE LAYER
	INSULATION FOR SMALL STEAM TRACER SUPPLY LINES AND STEAM TRAP RETURN LINES
N100	PREINSULATED TUBING - FURON, DEKORON/UNITHERM DIV. OR THERMON
	HIGH TEMPERATURE EQUIPMENT INSULATION - SEE NOTE 1A2
N42	1 1/2" THICK BLOCK TYPE
N43	2" THICK BLOCK TYPE
N44	2 1/2" THICK BLOCK TYPE
N45	3" THICK BLOCK TYPE
N46	3 1/2" THICK BLOCK TYPE, DOUBLE LAYER
N47	4" THICK BLOCK TYPE, DOUBLE LAYER
N48	4 1/2" THICK BLOCK TYPE, DOUBLE LAYER
N49	5" THICK BLOCK TYPE, DOUBLE LAYER
	VERY HIGH TEMPERATURE EQUIPMENT INSULATION - SEE NOTE 1A3
N50	1 1/2" THICK BLOCK TYPE
N51	2" THICK BLOCK TYPE
N52	2 1/2" THICK BLOCK TYPE
N53	3" THICK BLOCK TYPE
N54	3 1/2" THICK BLOCK TYPE, DOUBLE LAYER
N55	4" THICK BLOCK TYPE, DOUBLE LAYER
N56	4 1/2" THICK BLOCK TYPE, DOUBLE LAYER
N57	5" THICK BLOCK TYPE, DOUBLE LAYER
N58	5 1/2" THICK BLOCK TYPE, DOUBLE LAYER
N59	6" THICK BLOCK TYPE, DOUBLE LAYER
	COLD PIPE SECTIONAL TYPE INSULATION - SEE NOTE 1B
N60	1" THICK CELLULAR GLASS
N61	1 1/2" THICK CELLULAR GLASS
N62	2" THICK CELLULAR GLASS
N63	2 1/2" THICK CELLULAR GLASS
N64	3" THICK CELLULAR GLASS, DOUBLE LAYER
N65	3 1/2" THICK CELLULAR GLASS, DOUBLE LAYER
N66	4" THICK CELLULAR GLASS, DOUBLE LAYER
N67	4 1/2" THICK CELLULAR GLASS, DOUBLE LAYER
N68	5" THICK CELLULAR GLASS, DOUBLE LAYER
N69	5 1/2" THICK CELLULAR GLASS, DOUBLE LAYER
N70	6" THICK CELLULAR GLASS, DOUBLE LAYER
N71	6 1/2" THICK CELLULAR GLASS, TRIPLE LAYER
N72	7" THICK CELLULAR GLASS, TRIPLE LAYER
N73	7 1/2" THICK CELLULAR GLASS, TRIPLE LAYER
	COLD EQUIPMENT BLOCK TYPE INSULATION - SEE NOTE 1B
N465	1" THICK CELLULAR GLASS
N466	1 1/2" THICK CELLULAR GLASS
N467	2" THICK CELLULAR GLASS
N468	2 1/2" THICK CELLULAR GLASS
N469	3" THICK CELLULAR GLASS

ITEM NO.	DESCRIPTION
	COLD EQUIPMENT BLOCK TYPE INSULATION - CONTINUED
N470	3 1/2" THICK CELLULAR GLASS, DOUBLE LAYER
N471	4" THICK CELLULAR GLASS, DOUBLE LAYER
N472	4 1/2" THICK CELLULAR GLASS, DOUBLE LAYER
N473	5" THICK CELLULAR GLASS, DOUBLE LAYER
N474	5 1/2" THICK CELLULAR GLASS, DOUBLE LAYER
N475	6" THICK CELLULAR GLASS, DOUBLE LAYER
N476	6 1/2" THICK CELLULAR GLASS, TRIPLE LAYER
N477	7" THICK CELLULAR GLASS, TRIPLE LAYER
N478	7 1/2" THICK CELLULAR GLASS, TRIPLE LAYER
N479	8" THICK CELLULAR GLASS, TRIPLE LAYER
	HOT TANK INSULATION - SEE NOTES 1C & 1D
N30	2" BLOCK TYPE TANK INSULATION
N31	3" BLOCK TYPE TANK INSULATION
	MISCELLANEOUS MATERIALS FOR HOT AND COLD INSULATION
N202	HIGH TEMPERATURE INSULATING CEMENT - 'SUPER-STICK' P.K. INSULATION
N203	HIGH TEMPERATURE INSULATION CEMENT - 'QUICK-COTE' P.K. INSULATION
N206	WEATHERJACKET CAULKING - DOW-CORNING '732' (SILICONE), FOSTER '95-44' (BUTYL), CHILDERS 'CP-76' (BUTYL), GE '1009' (-100°F TO +250°F)
N207	HIGH TEMPERATURE SEMI-VISCOUS WEATHERCOAT - (-75°F TO +500°F) CHILDERS 'CP-79 CHILASTIC'
N208	GENERAL PURPOSE MASTIC - (-20°F TO +180°F) '46-51' H.B. FULLER (FOSTER), 'CP-11-1' CHILDERS
N209	WEATHERCOAT - TROWEL GRADE '90-07', H.B. FULLER (FOSTER), 'CP-25' CHILDERS
N210	AMORPHOUS WOOL BLANKET, (TO 1800°F) 6# DENSITY, 1" THICK 'SF 607' THERMAL CERAMICS; AMORPHOUS WOOL BLANKET, (TO 1800°F) 8# DENSITY, 1" THICK 'INSULFRAX 1800' CARBORUNDUM (PREFERRED)
N211	REFACTORY CERAMIC FIBER 8# DENSITY
N212	FIBERGLASS BLANKET, (TO 1200°F) 10# DENSITY, 1/2" THICK 'INSUL-BATTE/TEMPMAT' J.P. STEVENS
N213	MODIFIED ACRYLIC OR POLYESTER FABRIC; UNCOATED, OPEN WEAVE, 8 x 6 MESH 'MAST-A-FAB' 9 x 8 SYNTHETIC MEMBRANE - FOSTER
N214	GLASS FABRIC; ASPHALT IMPREGNATED, OPEN WEAVE, 10 x 10 MESH
N215	GLASS FABRIC; UNCOATED, OPEN WEAVE, 10 x 10 MESH
N219	0.010" THICK STAINLESS STEEL SMOOTH SHEET WITH MOISTURE BARRIER
N220	0.010" THICK SMOOTH PRE-FORMED STAINLESS STEEL GORE SEGMENTS FOR SWEEPING ELLS WITH MOISTURE BARRIER, 'GORE ELL-JAC' CHILDERS OR EQUAL
N221	0.010" THICK 1 1/4" PITCH CORRUGATED STAINLESS STEEL SMOOTH SHEETS WITH MOISTURE BARRIER
N222	22 GAGE SMOOTH GALVANIZED STEEL SHEET
N223	16 GAGE SMOOTH GALVANIZED STEEL SHEET
N224	0.040" SMOOTH ROLL ALUMINUM JACKETING WITH MOISTURE BARRIER
N225	0.016" THICK, 3/16" CROSS-CRIMPED CORRUGATED ALUMINUM WEATHER JACKET WITH MOISTURE BARRIER
N226	0.020" THICK SMOOTH ALUMINUM WEATHER JACKET, HEMMED, WITH MOISTURE BARRIER
N227	0.024", 1 1/4" PITCH CORRUGATED ALUMINUM WEATHER JACKET WITH MOISTURE BARRIER - SMOOTH
N228	0.024", 3/16" CORRUGATED ALUMINUM WEATHER JACKET WITH MOISTURE BARRIER
N229	0.024" SMOOTH ROLL ALUMINUM JACKETING WITH MOISTURE BARRIER
N230	0.020" THICK, 1 1/4" PITCH CORRUGATED ALUMINUM WEATHER JACKET WITH MOISTURE BARRIER - SMOOTH
N231	0.024" THICK, SMOOTH, PRE-FORMED ALUMINUM GORE SEGMENTS FOR SWEEPING ELLS WITH MOISTURE BARRIER, 'GORE ELL-JAC' CHILDERS OR EQUAL
N232	END CAPS FOR PIPING - 0.016" SMOOTH ALUMINUM WITH MOISTURE BARRIER
N233	STAINLESS STEEL END CAPS FOR PIPING - 0.010" THICK WITH MOISTURE BARRIER
N240	0.016" THICK STAINLESS STEEL SMOOTH SHEET WITH MOISTURE BARRIER
N241	0.020" THICK STAINLESS STEEL SMOOTH SHEET WITH MOISTURE BARRIER
N242	0.016" THICK ALUMINUM SMOOTH SHEET, HEMMED, WITH MOISTURE BARRIER, 22 GAGE,
N243	300 SERIES STAINLESS STEEL SMOOTH SHEET, 22 GAGE
N244	GLASSFIBER TAPE, (TO 1000°F), 2" x 1/8", WOVEN, PLAIN WRAP, BOTH EDGES SELVAGED
N245	EXPANDED METAL, GALVANIZED, 1", 16 GAGE FLATTENED
N246	0.024" THICK 2-PIECE PRE-FORMED ALUMINUM (1100 ALLOY) ELBOW COVERS
N247	0.024" THICK x 2 1/2" PITCH, CORRUGATED ALUMINUM SHEETS WITH MOISTURE BARRIER
N248	0.032" THICK SMOOTH ROLL ALUMINUM JACKETING WITH MOISTURE BARRIER
N249	ALUMINUM FOIL, EXTRA HEAVY DUTY, ITEM 'N' 38
N250	0.016" THICK STEEL, SMOOTH ROLL JACKETING, AZ-60 GALVALUME COATED WITH MOISTURE BARRIER
N251	0.024" THICK 4-PIECE ALUMINUM ELBOW COVERS FOR SIZE 10 x 4 THRU 18 x 2, '4-PIECE ELL-JACS' CHILDERS

ITEM NO.	DESCRIPTION
	MISCELLANEOUS MATERIALS FOR HOT AND COLD INSULATION - CONT'D
N252	GALVANIZED STEEL CHANNEL FOR TUBING TRACERS
N253	0.024" THICK SMOOTH PRE-FORMED ALUMINUM GORE SEGMENTS FOR VESSEL HEADS, 'GORE HEAD-JACS' CHILDERS OR EQUAL
N330	1" x 0.028" STAINLESS STEEL HEXAGONAL POULTRY NETTING
N331	16 GAGE BLACK IRON WIRE
N333	16 GAGE, TYPE 300 SERIES STAINLESS STEEL, DEAD-SOFT, WIRE
N334	3/4" x 0.020" TYPE 302 STAINLESS STEEL STRAPPING
N335	TYPE 302 STAINLESS STEEL BUCKLE FOR 3/4" x 0.020 STRAPPING
N336	1/2" x 0.015" TYPE 302 STAINLESS STEEL STRAPPING
N337	TYPE 302 STAINLESS STEEL BUCKLE FOR 1/2" x 0.015" STRAPPING
N338	TYPE 304 STAINLESS STEEL DUAL SPRING EXPANSION UNIT - SEE DETAIL 6 DRAWING GD-N99995 - SUPER-MITY BY CHILDERS
N340	STAPLE, TINNED AND COPPERIZED
N341	STAINLESS STEEL FLAT SPRING EXPANSION UNIT - 4" CHIL-SPRING CHILDERS
N342	CHERRY T RIVETS - 'BAPTS 6-06E' ALUMINUM 3/16"
N343	CHERRY N RIVETS - 'AAP42' ALUMINUM 1/8"
N344	#8 x 1/2", TYPE 300 STAINLESS STEEL SLOTTED HEX HEAD SHOULDERED, TYPE AB SELF DRILLING OR SELF TAPPING
N345	OWENS-CORNING 'THERMAL INSULATING WOOL (TIW) TYPE 1'
N346	LAYBAR WELDING STUDS - STAINLESS STEEL, 3/8" DIAMETER
N347	WEATHERJACKET IMPALEMENT STUDS - 5/16" DIAMETER, STAINLESS STEEL OR STAINLESS STEEL COMPOSITE, - NELSON 'SET-LOCK' TYPE WITH STAINLESS STEEL OR ALUMINUM CAPS
N348	CHERRY N RIVETS - 'CCP-42' 1/8" STAINLESS STEEL
N349	18 GAGE, TYPE 300 SERIES STAINLESS STEEL, DEAD SOFT, WIRE
N350	3/4" x 0.025" TYPE 304 STAINLESS STEEL CLOSED SEALS, HEAVY DUTY
N351	CHEERY N RIVETS- 'CCP52' 3/16" STAINLESS STEEL
N352	CHEERY N RIVETS- 'AAP52' 3/16" ALUMINUM
N353	1 1/4" x 0.020" TYPE 304 STAINLESS STEEL STRAPPING AND 1 1/4" HEAVY DUTY CLOSED SEALS - CHILDERS
N449	FIBROUS ADHESIVE - CHILDERS 'CP-97', FOSTER '81-27'
N450	JOINT SEALER AND BEDDING COMPOUND, TEMPERATURE RANGE - 100°F TO 300°F - H.B. FULLER (FOSTER) 'FOAMSEAL 30-45', CHILDERS 'CP-70'
N453	FIBRATED ASPHALT CUTBACK MASTIC VAPOR BARRIER '30-90' H.B. FULLER (FOSTER), 'CP-22' CHILDERS, 'NOKORODE SEAL-KOTE' TOSCO CORPORATION
N454	FORMGLASS, BORE COATING, TEMPERATURE RANGE -300°F TO 300°F - U.S. GYPSUM 'HYDROCAL B-11', FOSTER '30-16'
N455	1/16" NEOPRENE RUBBER SHEET, 20" WIDE
N456	50 MIL THICK VAPOR BARRIER MEMBRANE SHEET, 36" WIDE, 'INSULRAP 50' POLYGUARD PRODUCTS INC
N501	3/8" DIAMETER STAINLESS STEEL ROD

NOTES

1. ACCEPTABLE INSULATION BRANDS (SEE NOTE II):
   - A. HOT PIPING (N1-N29) AND EQUIPMENT (N42-N59) INSULATION
     - 1. MODERATE TEMPERATURE INSULATION FOR USE UP TO 450°F
       - a. FIBERGLASS WITH BINDER (TO 450°F)
         - (1) MANVILLE/SCHULLER 'MICRO-LOK WITH ASJ/SSL JACKET'
         - (2) OWENS CORNING 'ASJ/SSL-II'
         - (3) KNAUF FIBERGLASS 'KNAUF PIPE INSULATION W/ASJ JACKET'
     - 2. HIGH TEMPERATURE INSULATION FOR USE UP TO 1200°F
       - a. CALCIUM SILICATE
         - (1) CALSILITE - MADE BY THE FILTERED PRESSED METHOD AT THE BRUNSWICK, GA PLANT (PREFERRED)
         - (2) MANVILLE 'THERMAL 12'
         - (3) CALSILITE - MADE BY THE CAST METHOD AT THE RUSTON, LA PLANT.
       - b. MINERAL WOOL
         - (1) OWENS CORNING HIGH TEMP 1200° AND INDUSTRIAL BOARD (PREFERRED)
         - (2) FIBREX INC 'FPITHERM 1200'
       - c. PERLITE SILICATE
         - (1) KNAUF INNOVA 'TEMPERLITE 1200'
         - (2) CALSILITE/SPROULE 'VR 1200'
         - (3) HOWRED CORP 'GOODTEMP'
       - d. PERLITE SILICATE MOLDED FITTING COVERS
         - (1) CALSILITE/SPROULE 'VR 1200 FITTING COVERS'
         - (2) KNAUF INNOVA 'TEMPERLITE 1200 FITTING COVERS'
     - 3. VERY HIGH TEMPERATURE INSULATION FOR USE TO 1800°F
       - a. SOLUBLE AMORPHOUS MINERAL WOOL BLANKET TO 1800°F
         - (1) CARBORUNDUM '8#, INSULFRAX 1800 BLANKET' (PREFERRED)
         - (2) THERMAL CERAMICS '6#, SF607 BLANKET'
       - b. CERAMIC FIBER BLANKET FOR USE TO 2300°F
         - (1) THERMAL CERAMICS 'KAOWOOL'
         - (2) CARBORUNDUM 'FIBERFRAX DURABLANKET'
         - (3) A.P. GREEN 'INSWOOL'
       - c. HIGH TEMPERATURE BLOCK
         - (1) A.P. GREEN INSBLOCK 19, 8# DENSITY
         - (2) U.S. G KFAC 19, 18# DENSITY
   - B. COLD PIPING (N60-N73) AND EQUIPMENT (N465-N479) INSULATION
     - 1. CELLULAR GLASS INSULATION, SECTIONAL AND SEGMENTAL, WITHOUT JACKETS, CURVED SEGMENTS, BEVELED LAGS, FLAT BLOCKS AND HEAD SEGMENTS.
       - a. PITTSBURGH-CORNING 'FOAMGLASS' (-290°F TO +250°F)
       - b. CELL-U-FOAM
     - 2. POLYISOCYANURATE FOAM INSULATION FABRICATED IN PIPE SECTIONS, BOARD AND BLOCK. TEMPERATURE RANGE (-100°F TO +300°F).
       - a. DOW 'TRYMER 2000'
       - b. APACHIE PRODUCTS ISO-25
   - C. HOT TANK SHELL INSULATION (N30-N31) FOR USE UP TO 450° F
     - 1. FIBERGLASS WITH BINDER
       - a. OWENS-CORNING 'INSUL-QUICK'
       - b. MANVILLE/SCHULLER 'PRECIPITATOR SPIN-GLAS'
       - c. CERTAINTEED - 850 BOARD
     - 2. MINERAL WOOL
       - a. OWENS CORNING INDUSTRIAL BOARD 1240 (PREFERRED)
       - b. FIBREX 'FBX 1200 BOARD'
       - c. ROCK WOOL MFG CO 'DELTA 10 BOARD'
   - D. HOT TANK ROOF INSULATION
     - 1. FIBERGLASS WITH BINDER, 11-13 LB. DENSITY (TO 450° F)
       - a. OWENS-CORNING 'ROOF DECK'
     - 2. MINERAL WOOL BINDER, 8 LB. DENSITY (TO 1200°F)
       - a. OWENS CORNING 'CAP BOARD'
     - 3. POLYISOCYANURATE FOAM BOARD, 2 LB. DENSITY (TO 300°F)
       - a. DOW 'THYMER 2000'
       - b. CELOTEX 'THERMAX'
       - c. POLYMER BUILDING SYSTEMS 'PBS/800'
       - d. RMAX 'TSX 2000'
     - 4. PRE-ENGINEERED ROOF SYSTEM
       - a. THERMACON-SECURUS BY THERMACON INDUSTRIES INC.
   - E. PREFABRICATED INSULATION PANELS FOR USE UP TO 300°F ON CYLINDRICAL EQUIPMENT
     - 1. THERMACON BRAND POLYISOCYANURATE FOAM WITH ALUMINUM BACKING

NOTES (CONTINUED)

II. MANUFACTURER'S 'BRAND NAMES' OR 'TRADE NAMES' SHOWN ON THIS DRAWING ARE PRODUCTS ACCEPTABLE TO COMPANY. COMPARABLE PRODUCTS BY OTHER MANUFACTURERS MAY BE PROPOSED, BUT THE USE OF ANY SUBSTITUTES MUST HAVE COMPANY APPROVAL.

III. COLORED STRAPPING FOR JACKETING OVER NON-ASBESTOS INSULATION, (E.G. CHILDERS 'BLUE').

IV. CONSIDER USING COLORED STRAPPING FOR INDICATING NON-ASBESTOS INSULATION (E.G. CHILDERS 'ROYAL BLUE').

V. FOR HOT PIPING AND EQUIPMENT INSULATION GREATER THAN 3" THICK, USE DOUBLE LAYER INSULATION.

REFERENCE DRAWINGS

STANDARD INSULATION FOR HOT PIPING	GD-N99783
STANDARD INSULATION FOR COLD PIPING	GD-N99784
STANDARD INSULATION FOR HOT VESSELS	GD-N99785
STANDARD INSULATION FOR COLD VESSELS	GD-N99786
STANDARD STEAM TRACING DETAILS	GF-L99880

REVISIONS

Rev.	Description	Date	By	
9	UPDATED AND REARRANGED ENTIRE DRAWING	9-21-92	DOL	RSD
10	UPDATED INFORMATION ON NOTES A2a(1), A2b(1), A3c(2), B1a, B2b, C2a, D2a AND ITEM NO. N338	3-29-01	MFH	LIL
8	REVISED NOTES 1A, 1B, 1C, 1D & III AND ITEM NUMBERS N21-9, N100, N202, N203, N206-9, N220, N221, N224, N227, N229, N230-2, N250-3, N330-1, N333-8, N341-4, N346, N453 & N456.		AAW	
	ADDED ITEM NUMBERS N210-2, N233, N243-9 & N348-53. DELETED ITEM NUMBERS N332 & N505.	5-5-95	TDU	

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SCALE NONE DATE 6-1-66 APPROVED RPH
DR. SHI CH. PHL DR. APP RWE ENGR.
OPR'G DEPT. ENG. DEPT. RDS

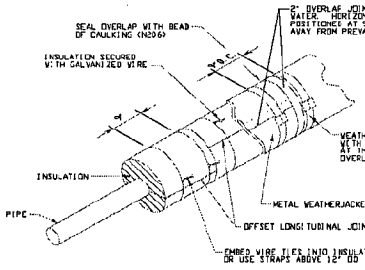
STANDARD INSULATION ITEM NUMBERS

N C.C. S.O. GD-N99993 10

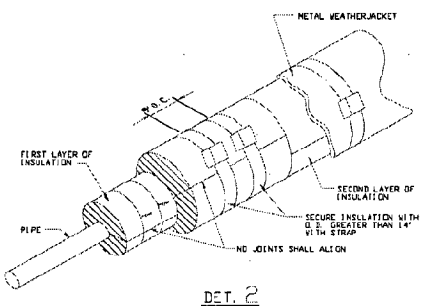
STANDARD DRAWING

N99993D0.DWG 4/23/01 MHAD T:\STDDWGS\WRMSTD

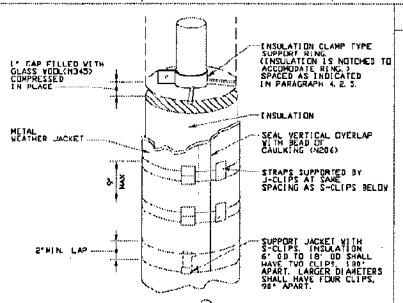
CUSA-CSB-0001315
EPA



DET. 1
SINGLE LAYER PIPE INSULATION
USE WITH PARAGRAPH 4.2.2 AND 4.2.3



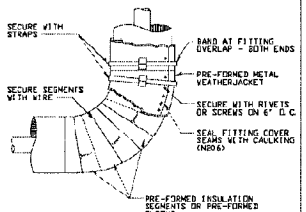
DET. 2
DOUBLE LAYER PIPE INSULATION
(USE WITH PARAGRAPH 4.2.2, 4.2.3 AND 4.2.4)



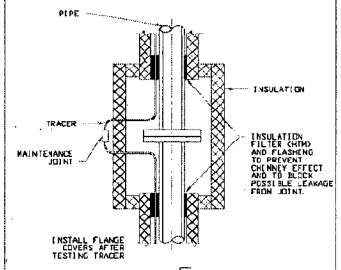
DET. 3
VERTICAL PIPE INSULATION
USE WITH PARAGRAPH 4.2.5 AND 4.3.6

NOTES

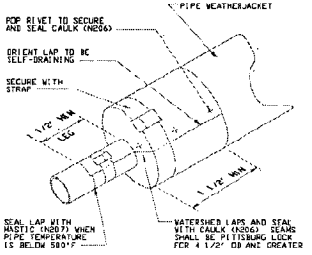
1. DELETED
2. ITEM DESCRIPTIONS (i.e. "N" NUMBERS) ARE DETAILED ON GD-N99993. STANDARD INSULATION ITEM NUMBERS.
3. WHEN LINE IDENTIFICATION SHEET SPECIFIES "INSULATED VALVES", FLANGES AND FITTINGS ARE TO BE INSULATED AS WELL.
4. INSULATION IS GENERALLY SHOWN AS SINGLE LAYER, BUT THE DETAILS APPLY TO THE NUMBER AND THICKNESS OF LAYERS AS DESCRIBED IN SUMMARY.



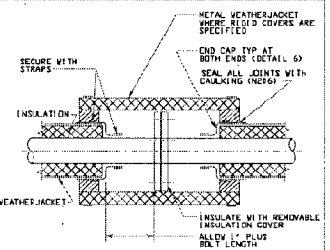
DET. 4
INSULATION OF PIPE BENDS
USE WITH PARAGRAPH 4.2.8 AND 4.3.1a



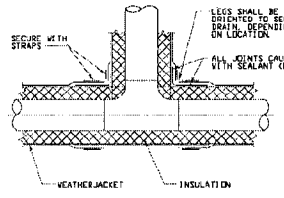
DET. 5
TRACED VERTICAL PIPE INSTALLATION



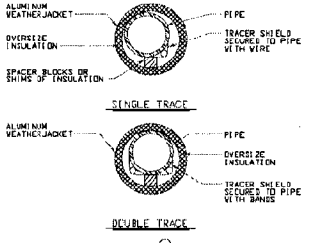
DET. 6
END CAP CONSTRUCTION AT INSULATION TERMINATION
USE DRAWING WITH PARAGRAPH 4.3.4



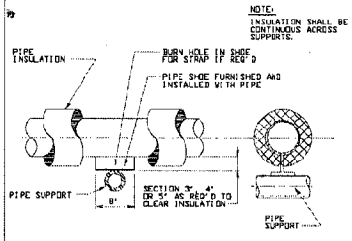
DET. 7
INSULATION OF FLANGES FITTINGS, TWO-PIECE RIGID OR SOFT REMOVABLE PER CHEVRON DIRECTION



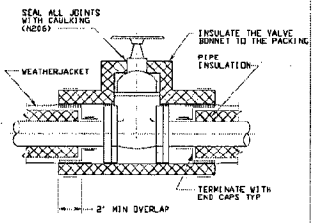
DET. 8
INSULATION OF WELDED FITTINGS



DET. 9
INSULATION OF STEAM TRACED LINES SUPPORTED BY HANGERS
USE DRAWING WITH PARAGRAPH 4.4



DET. 10
PIPE SUPPORTS
(NOT APPLICABLE TO ALLOY PIPE)



DET. 11
INSULATION OF VALVES, TWO-PIECE RIGID OR SOFT REMOVABLE PER CHEVRON DIRECTION

REFERENCE DRAWINGS		
STANDARD INSULATION ITEM NUMBERS	GD-N99993	
STANDARD INSULATION FOR HOT VESSELS	GD-N99785	
STEAM TRACING DETAILS SHEET 1 & 2	GF-L99888	

REVISIONS

6	REVISED DET. 1, 2, 3, 4, 6, 7, 9 AND 11. REPLACED DETAIL 5. ADDED NEW BORDER. DELETED NOTE 1	3-12-95	LNT
3	REVISED AND REDRAWN ON CAD FOR MANUALS RESTRUCTURING TASK FORCE	3-14-89	JVD/JVD

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SCALE NONE DATE 6-20-94 APPROVED
DR AT CH CWW BR APP CCZ ENGR FB
DPR G DEPT. ENG. DEPT. DRL RPH

STANDARD INSULATION FOR HOT PIPING

N C.C. S.O.

GD-N99783 6

		LIMITED BY:	Flanges
SERVICE:	Process	MATERIAL:	Carbon Steel
RATING CLASS:	300 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	Min. to 750F	STRESS RELIEF:	NONE
NOMINAL CORROSION ALLOWANCE:	0.125 in. (0.100 in. MIN)	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #8 (13CR & HF)		

*LIMITATIONS: Pressure limits for steels in hydrogen service. See Note 302.

PRESSURE - TEMPERATURE RATINGS			NOTE: HYDROTEST @ AMBIENT = 1125 psig					
TEMP F	Min. to 100	200	300	400	500	600	700	750
psig	740	675	655	635	600 (280)*	550 (65)*	535 (50)*	505 (50)*
TEMP C	Min. to 38	93	149	204	260	316	371	399
kPag	5100	4655	4515	4380	4135	3795	3690	3480

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Table 2-1.1.)

MINIMUM TEMPERATURE (see Note 300)				
SIZE:	¼" - 16"	18"	20"	24"
°F:	-20	-7	-2	+9
°C:	-29	-21	-19	-12

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE	20					
		3/4 – 1-1/2	160	PE	CS, SMLS, ASTM A106-B	L11LA1B
		2 – 3	XS	BE	CS, SMLS, ASTM A106-B	L11NA2A
		4 – 10	STD WT	BE	CS, SMLS, ASTM A106-B	L11MA2A
		12 – 24	40	BE	CS, SMLS, ASTM A106-B	L11EA2A
NIPPLES	03, 20					
Branch		3/4 – 1-1/2	160	PE	CS, SMLS, ASTM A106-B	L34LAEJ
Branch		3/4 – 1-1/2	XXS	TOE-POE	CS, SMLS, ASTM A106-B	L34PAHJ
Swage (CONC)		3/4 – 1-1/2	160	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55LA1VA
Swage (CONC)		3/4 – 1-1/2	XXS	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35PBMQ
FITTINGS						
Sockolet		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, MSS SP-97	L36VBDT
Thredolet	03	3/4 – 1-1/2	Class 6000	THRD	CS, ASTM A105, MSS SP-97	L36VBAT
SW Elbolet		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105	L36VBDU
Latrolet	92	3/4 – 1-1/2	160	Weld	CS, ASTM A105	L56LA1K
Weldolet	05	3/4 – 1-1/2	160	Weld	CS, ASTM A105, MSS SP-97	L56LA1H
90 ELL		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDB
45 ELL		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDA
Tee		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBD
Tee	03	3/4 – 1-1/2	Class 6000	THRD	CS, ASTM A105, ASME B16.11	L31VBA
Tee (RED)		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBDD
Plug	03	3/4 – 1-1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
Plug		3/4 – 1-1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
Coupling		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L34VBDH
Cap		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L37VBDX
Reducer (CONC)		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
Reducer (ECC)		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
Weldolet	05	2 – 3	XS	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 LR ELL		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
45 LR ELL		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
Tee		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
Tee (RED)		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
Cap		2 – 3	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
Reducer (ECC)		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
Weldolet	05	4 – 8	STD WT	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
90 LR ELL		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
45 LR ELL		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
Tee		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
Tee (RED)		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1D

CUSA-CSB-0001317
EPA

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
Cap		4 – 10	STD WT	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R
Reducer (CONC)		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55EA1DA
Reducer (ECC)		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55EA1DB
90 LR ELL		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50EA1BC
45 LR ELL		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50EA1AC
Tee		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51EA1
Tee (RED)		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51EA1D
Cap		12 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57EA1R
VALVES						
Gate	67	1/2 – 1/2	Class 800	MSW/FSW	CS body, API #8 trim, BB, RP, EXTD BDY	L20KAXHDM
Gate	15	3/4 – 1-1/2	Class 300	RF	CS body, API #8 trim, BB, RP	L20FA3DD
Gate	06	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, BB, RP	L20KA7DD
Gate		3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BB, RP	L20KA1DD
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BB, FP	L20KA1DD
Gate	161	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, BELLOW SEAL, BB, RP	L20KA7DDL
Gate	161	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, BB, RP	L20KA1DDL
Gate	161,325	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, BB, FP	L20KA1DDL
Gate	06	3/4 – 1-1/2	Class 800	MSW/FNPT	CS body, API #8 trim, BB, RP, EXTD BDY	L20KAYHDM
Gate		2 - 6	Class 300	RF	CS body, API #8 trim, BB, FP	L20FA3DD
Gate		8 - 24	Class 300	RF	CS body, API #8 trim, BB, FP, GO	L20FA3DDF
Globe	161, 307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, WB	L21KA1JEL
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BB	L21KA1DE
Globe	307	2 - 2	Class 300	RF	CS body, API #8 trim, BB	L21FA3DE
Globe	307	3 - 8	Class 300	RF	CS body, API #8 trim, BB, GO	L21FA3DEB
Check	61,328	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BC, piston, HORIZ	L22KA1TEF
Check	62,328	2 – 24	Class 300	RF	CS body, API #8 trim, BC, Swing	L22FA3PE
Check	62,328	2 – 24	Class 300	RF	CS body, API #8 trim, Dual Plate	L22FA3LEH
Ball	26, 101, 164	2 - 12	Class 300	RF	CS, body T3 MOD, Orbit H8 seat	L25FB3FD
Ball	26, 63, 101	2 - 12	Class 300	RF	CS, body T3 MOD, Orbit H seat	L25FB3FF
Butterfly	101	2 – 24	Class 300	RF	CS body, 316 SS trim, Flg, Triple Offset GO	L26FA3TJM
FLANGES	02					
Socket Weld		3/4 – 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.5, 160 Bore	L40FA3BL
Blind		3/4 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5	L43FA3
Blind Spectacle		3/4 – 14	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3E
Spacer Ring		16 – 24	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3FZ
Blind Plate		16 – 24	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3GZ
Weld Neck		2 – 3	Class 300	RF	CS, ASTM A105, ASME B16.5, XS Bore	L40FA3DN
Weld Neck		4 – 10	Class 300	RF	CS, ASTM A105, ASME B16.5, STD WT Bore	L40FA3DM
Weld Neck		12 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5, 40 Bore	L40FA3DE
Pair WN Orifice		2 – 3	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, XS Bore	L42FA3DNL
Pair WN Orifice		4 – 10	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, STD WT Bore	L42FA3DML
Pair WN Orifice	17	12 – 18	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, 40 Bore	L42FA3DEL
GASKETS						
		3/4 - 24	Class 300	RF	Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	301	3/4 – 24	Class 300		KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
BOLTING						
Stud Bolts	310	3/4 – 24			ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194, Gr 2H	L620BM
Stud Bolts	311	3/4 – 24			ASTM A193, Gr B16 stud w/ 2 heavy hex nuts ASTM A194, Gr 7	L620CM

90° BRANCH CONNECTION, Legend and Chart

BRANCH \ HEADER SIZE	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4	1/2
24	T															
20	E	T														
18	E	E	T													
16	E	E	E	T												
14	E	E	E	E	T											
12	E	E	E	E	E	T										
10	E	E	E	E	E	E	T									
8	W	E	E	E	E	E	E	T								
6	W	W	W	E	E	E	E	E	T							
4	W	W	W	W	W	W	E	E	E	T						
3	W	W	W	W	W	W	W	E	E	E	T					
2	W	W	W	W	W	W	W	W	W	E	E	T				
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	T			
1	S	S	S	S	S	S	S	S	S	S	S	S	E	T		
3/4	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T	
1/2	S	S	S	S	S	S	S	S	S	S	S	S	E	E	E	T

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES, AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIPMENT.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED FOR VENT, DRAIN AND INSTRUMENT CONNECTIONS ONLY.
09 PRESSURE AND TEMPERATURE RATING MAY BE LIMITED BY CERTAIN COMPONENTS PERMITTED BY THIS SPECIFICATION. REFER TO MANUFACTURER'S RECOMMENDED PRESSURE-TEMPERATURE RESTRICTIONS.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
20 SCH XXS PIPE AND PIPE NIPPLES SHALL BE USED FOR THREADED CONNECTIONS FOR SIZES NPS 1/2 – 1-1/2.
26 TO BE USED ONLY WHEN INDICATED ON THE P&ID.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
300 FOR PIPING SYSTEM MAWP LOWER THAN PIPE CLASS MAX. PRESSURE, SEE FIG. 323.2.2B IN ASME B31.3 FOR REDUCTION IN MINIMUM DESIGN METAL TEMPERATURE.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
302 MAXIMUM HYDROGEN PARTIAL PRESSURE FOR STEELS IN HYDROGEN SERVICE. PRESSURE LIMITS ARE BASED ON FIGURE 1 IN API 941 WITH A REQUIRED SAFETY FACTOR OF -50°F (-10°F) AND -50 PSI (-345 KPA).
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
310 ASME A193/SA193 GR. B7 STUD BOLTING IS LIMITED TO PROCESS SERVICE TEMPERATURES NOT GREATER THAN 700°F TO AVOID THERMAL FATIGUE CRACKING.
311 ASME A193/SA193 GR. B16 STUD BOLTING SHOULD BE USED IN ALL PROCESS SERVICES WITH TEMPERATURES GREATER THAN 700°F. FLANGES SHOULD NOT BE INSULATED AT PROCESS SERVICE TEMPERATURES ABOVE 850°F TO AVOID THERMAL FATIGUE CRACKING. AT TEMPERATURES GREATER THAN 850°F, WEATHER SHIELDS OVER FLANGES ARE ACCEPTABLE.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
17 USE WELD NECK FLANGES AND THROAT TAPS NPS 20 INCH AND LARGER
63 ORBIT VALVE WITH TYPE "H" SEATS LIMITED TO 500F.
67 USE RESTRICTED ORIFICE FLANGE TAP CONNECTIONS. THREADED NIPPLES TO BE SEAL WELDED. NIPPLE LENGTHS SHALL BE IN ACCORDANCE WITH STANDARD DRAWING D-601407.
92 USE RESTRICTED TO THERMOWELL ASSEMBLIES.
101 TO BE USED WHERE TIGHT SHUT-OFF IS REQUIRED.
161 USE BELLOW SEAL GATE VALVES FOR ALL IN-KIND REPLACEMENT ONLY. INSTALL NEW BELLOW SEALVALVES WHEN REQUIRED BY PROJECT FOR PERMIT PURPOSES.
164 USE ORBIT VALVES WITH T7 (CORROSIVE) TRIM & TYPE h8 SEAT IN 500 F TO 650 F TEMP RANGE.

SERVICE:

- HC Liquid Gas & Vapor (Corrosive)
- HC Liquid Gas & Vapor (Corrosive) w/ Trace H2S
- LPG (Corrosive) & LPG w/ Trace H2S
- LPG w/HC Mixtures (Corrosive)
- LPG w/HC Mixtures (Corrosive) w/ Trace H2S
- H2 & H2/HC to 450F (232C)
- H2 & H2/HC w/ Trace H2S to 450F (232C)

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