

PLAINTIFF'S EXHIBIT

DOW-2447

PIPING SPEC P
DATE 11-20-78
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LOW TEMPERATURE STEEL SYSTEM
300 PSIG MAXIMUM @ -50F
720 PSIG @ 100F

ST0408339

ITEM	SIZE	DESCRIPTION
PIPE		
P-38	1 THRU 14	ASTM A-333 GR 9, STD WEIGHT SEAMLESS STEEL PIPE, EXCEPT CHARPY TEST AT MINUS 75F.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTR-41A	1 THRU 14	STD WEIGHT SEAMLESS STEEL WELDING FITTINGS, ASTM A-420 GR WPL6, CHARPY TEST AT MINUS 50F, ANSI B16.9.
NOTE		WELDING ELBOWS SHALL BE LONG RADIUS.
PC-59	1 THRU 14	STD WEIGHT SEAMLESS STEEL WELDING CAP, ASTM A-420 GR WPL6, CHARPY TEST AT MINUS 50F, ANSI B16.9.
FLANGES		
F-27-RF	1 THRU 14	300-LB RAISED FACE SLIP-ON FLANGE, ASTM A-350 GR LF2, CHARPY TEST AT MINUS 50F, ANSI B16.5.
F-29A-RF	1 THRU 14	300-LB RAISED FACE WELDING NECK FLANGE, ASTM A-350 GR LF2, CHARPY TEST AT MINUS 50F, ANSI B16.5, BORE TO MATCH PIPE.
F-28A-RF	1 THRU 14	300-LB RAISED FACE BLIND FLANGE, ASTM A-350 GR LF2, CHARPY TEST AT MINUS 50F, ANSI B16.5.
N-66A		REDUCING FLANGES SHALL BE SLIP-ON TYPE.
BRANCH CONNECTIONS		
BC-57W		FOR WELDED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WELDLET MAY BE USED IN PLACE OF REDUCING TEE WHEN BRANCH IS SMALLER THAN HEADER.

BHL

PIPING SPEC P

PA4380

11-20-78

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ITEM	SIZE	DESCRIPTION
GASKETS		
G-9A	1 THRU 14	STD FLAT RING GASKET, 1/8 INCH THICK ASBESTOS WITH SILICON RELEASING AGENT, JM-60, GARLOCK 7021 OR NICOLET 225 OR 245.
FLANGE BOLTS		
B-A193B7Q	1 THRU 14	ASTM A-193 GR E7 LIQUID QUENCHED AND TEMPERED ALLOY STEEL STUD BOLTS WITH ASTM A-194 GR 2H HEAVY HEX NUTS.
BOLT LUBRICANT		
BL-5		JET-LUBE SS-30 COPPER ANTI-SEIZE COMPOUND.
VALVES		
V-194B	1 THRU 14	300-LB FLANGED OS/Y WEDGE GATE VALVE, ASTM A-352, GR LCB BODY, TYPE 316 STAINLESS TRIM, BOLTED BONNET, FOR SERVICE TO MINUS 50F. CRANE 33LUF-LCB CRANE 33LU-LCB JENKINS 1010FSF JENKINS 1010F5-LCB LUNK 3012 A582 MALBRANQUE 133EL NEWCO (VITAS) 13F-LB4 PACIFIC 350-12-LCB POWELL 3003-LCB-P175 SELLA 1121-F-LCB STOCKHAM 30-CF-12-LCB TRIANGLE A-3822P-LCB WALWORTH 5206F-LCB
V-186B	1 THRU 8	300-LB FLANGED OS/Y GLOBE VALVE, ASTM A-352 GR LCB BODY, 316 STAINLESS TRIM, BOLTED BONNET, FOR SERVICE TO MINUS 50F. CRANE 151-L-LCB FSVC 2503-1C-LCB JENKINS 1042-F5 LUNK 3042 A582 MALBRANQUE 533EL NEWCO (VITAS) 23F-LB4 PACIFIC 360-12-LCB POWELL 3031-LCB-P175 SELLA 3121-F-LCB STOCKHAM 30-GPF-12-LCB TRIANGLE A-3812P-LCB WALWORTH 5281F-LCB

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ITEM	SIZE	DESCRIPTION
V-1988	1 1/2 THRU 14	300-LB FLANGED HORIZONTAL SWING CHECK VALVE, ASTM A-352 GR LCB BODY AND CAP, TYPE 316 STAINLESS STEEL TRIM, FOR MINUS 50F SERVICE. ANDERSON GREENWOOD CV2-30-SFM-3-17 CRANE 159-L-LCB JENKINS 1026-F5 LUNK 3072 A532 MALBRANQUE 833BL NEWCO (VITAS) 33F-LB4 PACIFIC 380-12-LCB POWELL 3061A-LCB-P175 SELLA 7121-F-LCB STOCKHAM 30-SF-12-LCB TRIANGLE A-3842-P-LCB WALWORTH 5344F-LCB
V-814	1/2 THRU 3	300-LB FLANGED 3-WAY, 2-PORT 90 DEGREE TURN, TEFLON SLEEVED, TRANSFLOW PLUG VALVE, TYPE 316 STAINLESS STEEL BODY AND PLUG, 45 DEGREE OFF-SET LEVER OPERATOR. DURCO MG431-1-D4 45 OFFSET TUFLINE 0337-AX-316 45 OFFSET
V-814G	4 THRU 8	300-LB FLANGED 3-WAY, 2-PORT 90 DEGREE TURN, TEFLON SLEEVED, TRANSFLOW PLUG VALVE, TYPE 316 STAINLESS STEEL BODY AND PLUG, WEATHERPROOF GEAR OPERATOR. DURCO MG431H-1-D4 TUFLINE 0337EG-AX-316
N-213		PIPING SHALL BE INSTALLED IN ACCORDANCE WITH ENGR SPEC 47-110.
N-100		INSTRUMENTATION
N-101		THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR INSTRUMENTATION. FOR ITEMS NOT LISTED, THE PRECEDING PIPING SPECIFICATION IS TO BE USED WHERE APPLICABLE.
PIPE		
P-105	1/4 THRU 1/2	ASTM B-165 ANNEALED MONEL SEAMLESS TUBING, 1/4 OD, 3/8 OD OR 1/2 OD BY 0.035 WALL, AS SPECIFIED.
P-42	1/4 THRU 1	ASTM B-165 ANNEALED, SCH 40S SEAMLESS MONEL PIPE.

ITEM	SIZE	DESCRIPTION
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FITTINGS

E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER
 C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP

ELTR-105	1/4 THRU 1/2	MONEL SWAGelok TUBING FITTINGS.
ELTR-69	1/4 THRU 1	2000-LB THREADED FORGED ANNEALED NICKEL COPPER (MONEL) FITTINGS, ASTM B-564, DIMENSIONS PER ANSI B16.11.
C-16C	1/4 THRU 1	3000-LB THREADED MONEL COUPLING, ASTM B-564 ANNEALED NICKEL COPPER, ANSI B16.11 DIMENSIONS.
PC-13	1/4 THRU 1	THREADED SOLID MONEL SQUARE HEAD PLUG, ASTM B-564 ANNEALED NICKEL COPPER, DIMENSIONS PER ANSI B16.11.
U-14	1/4 THRU 1	3000-LB THREADED MONEL UNION, ASTM B-564 ANNEALED NICKEL COPPER.

FLANGES

F-603	1/4 THRU 1/2	500-LB SOCKET WELD TWO HOLE FLANGE. VOGT SW330 OR EQUAL
N-8		NO THREADED FITTINGS PERMITTED UNLESS ISOLATED FROM PROCESS OR SOURCE BY WELDED OR FLANGED VALVE.

BRANCH CONNECTIONS

BC-25		FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.
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JOINT COMPOUND

JC-15		TEFLON TAPE 1/2 INCH BY 3 MIL THICKNESS.
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VALVES

V-699	1/4	3000-LB NEEDLE VALVE, 316 STAINLESS BODY, TEFLON PACKING, 1/4 INCH MALE PIPE THREAD BY 1/4 INCH SWAGelok ENDS. WHITEY 1VM4-S4-316
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ITEM	SIZE	DESCRIPTION
V-579C	1/4 THRU 3/4	600-LB SCREWED CS/Y SOLID WEDGE GATE VALVE, 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F, BOLTED BONNET. ALCOY 4210A-CF8M COOPER 3611 CRYO CRANE 66170 LADISH 8663 PACIFIC S-3651-F-12 POWELL 1972A SMITH 800HK VOGT 12401

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