PLAINTIFF'S EXHIBIT

DOW-2448

150-LB. CARBON STEEL SYSTEM
(PROCESS)
0 TO 150 PSIG @ -20F TO +400F

ITEM	SIZE	DESCRIPTION
PIPE		
P-238	1/4 THRU 1 1/2	ASTM A-106 GR B, EX STRONG SEAMLESS STEEL PIPE.
P-278	2 THRU 14	ASTM A-106 GR B, STD WEIGHT SEAMLESS STEEL PIPE.
P-328	16 THRU 48	ASTM A-53 OR API-5L GR B, 0.375 WALL SEAMLESS OR ELEC WELD STEEL PIPE.
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		
ELT-16B	1/2 THRU 1 1/2	EX STRONG SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPB, ANSI B16.9.
C-42	1/2 THRU 1 1/2	EX STRONG STEEL WELDOLET, ASTM A-105.
R-22XSW	1/2 THRU 1 1/2	EX STRONG STEEL SWAGED NIPPLE, ASTM A-106 GR B OR AISI C-1025 BARSTOCK, BEVEL ENDS.
PC-52B	1/2 THRU 1 1/2	EX STRONG SEAMLESS STEEL WELDING CAP, ASTM A-234 GR WPB, ANSI B16.9.
ELTR-15B	2 THRU 24	STD WEIGHT SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPB, ANSI B16.9.
NOTE		WELDING ELBOWS SHALL BE LONG RADIUS.
PC-51B	2 THRU 12	STD WEIGHT SEAMLESS STEEL WELDING CAP, ASTM A-234 GR WPB, ANSI B16.9.
PC-7	14 THRU 36	ASME FLANGED AND DISHED STEEL HEAD WITH 1 1/2 INCH STRAIGHT FLANGE, 0.375 INCH WALL, O.D. TO CONFORM WITH PIPE SIZE, ASTM A-285, GRADE B OR C.
C-41	2 THRU 36	STD WEIGHT STEEL WELDOLET, ASTM A-105.

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ITEM	SIZE	DESCRIPTION
FLANGES		
F-1-RF	2 THRU 24	150-LB RAISED FACE SLIP-ON FLANGE, ASTM A-105, ANSI B16.5.
F-24-RF	1/2 THRU 24	150-LB RAISED FACE WELDING NECK FLANGE, ASTM A-105, ANSI B16.5, BORE TO MATCH WELDING FITTINGS.
F-3-RF	1/2 THRU 24	150-LB RAISED FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
F-98	26 THRU 48	CLASS 175 LARGE DIA RAISED FACE WELDING NECK FLANGE, ASTM A-105. FLANGES OVER 3 INCH THICK TO BE NORMALIZED. DIMENSIONS TO BE IN ACCORDANCE WITH TAYLOR FORGE CATALOG 722 PAGE 32, CRANE CATALOG 61 PAGE 108, TUBE TURN PART NO. 703 OR LADISH PART NO. 505, BORE TO MATCH PIPE.
N-60		FLAT FACE FLANGES SHALL BE USED WHEN BOLTING TO FLAT FACE CI FLANGES ON VALVES AND EQUIPMENT.
N-66A		REDUCING FLANGES SHALL BE SLIP-ON TYPE.
BRANCH CONNECTIONS		
BC-57W		FOR WELDED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WELDOLET MAY BE USED IN PLACE OF REDUCING TEE WHEN BRANCH IS SMALLER THAN HEADER.
GASKETS		
G-9A	1/2 THRU 48	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	1/2 THRU 48	ASTM A-193 GR B7 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.

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ITEM	SIZE	DESCRIPTION
VALVES		
*V-737B	1/2 THRU 6	150-LB FLANGED STEEL BALL VALVE WITH 316 STAINLESS STEEL BALL, TEFLON SEATS AND SEALS, 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE, 1 1/4" AND OVER LEVER OPERATOR. 300F MAXIMUM ALLOWABLE TEMPERATURE. CONTRO C-1166-BC HILLS MC C S151-CS-T-S6 HILLS MC C F151-CS-T-S6 JAMESBURY D150F-22-36TT KTM E0862-32-TT-15-L LUNK 713LT MARPAC CS-B470-12-TT-W MARPAC CS-B470-12 MARPAC CS-400-12-TT SMITH 415TB WALWORTH S-4170F WKM B100-CS-02-S1 WKM B102-CS-02-S1
V-617	1/2 THRU 2	150-LB FLANGED OS/Y GATE VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH HARD-FACED SEATS. BONNEY HL1-113 HANCOCK 950-F-15 JENKINS 8815 LUNK 1100-W PACIFIC 3150-2 RP&C F158DE SMITH 815 VELAN F-00548-C2TY VOGT 353
V-56	3 THRU 30	150-LB FLANGED WEDGE GATE VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH STELLITED SEAT RINGS. CRANE 47XU JENKINS 100982 KITZ 150SCLS MALBRANCUE 123AXS PACIFIC 150-U POWELL 1503-P140 SELLA 1111-F-2 TRIANGLE 1822V VOGT 6068 WALWORTH 5202-F-UT
V-36	1/2 THRU 8	150-LB FLANGED OS/Y GLOBE VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM.

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ITEM	SIZE	DESCRIPTION
		CRANE 143X FSVC 2501.1A JENKINS 1040-E2 KITZ 150SCJ LUNK 1532-C MALBRANQUE 523AX NEWCO (VITAS) 21F-CB1 PACIFIC 160-1 POWELL 1531-P-140 SELLA 3111-F STOCKHAM 15-GPF-1 TRIANGLE 1812 VELAN F-0074C-02TY VOGT 473 WALWORTH 5275-F-AA
V-759	1/2 THRU 1 1/2	150-LB FLANGED HORIZONTAL LIFT CHECK VALVE. CARBON STEEL BODY. 13 CHROME ALLOY STEEL TRIM. BOLTED CAP. BONNEY FORGE HL1 403 VELAN F-00348-02TY VOGT 573
V-45	2 THRU 12	150-LB FLANGED HORIZONTAL SWING CHECK VALVE. CARBON STEEL BODY. 13 CHROME ALLOY STEEL TRIM. BOLTED CAP. ANDERSON GREENWOOD CV2-15-SCM-14-17 CRANE 147X FSVC 6561.1A JENKINS 1025-82 KITZ 150SCO LUNK 1572-C MALBRANQUE 823AX NEWCO (VITAS) 31F-CB1 PACIFIC 180-U POWELL 1561A-F140 SELLA 7111-F STOCKHAM 15-SF-U TRIANGLE 1842 VELAN F-00114C-02TY WALWORTH 5341-F-AA
V-795	2 THRU 12	150-LB RF WAFER CHECK VALVE. CARBON STEEL BODY AND DISC. METAL SEAL. INCONEL SPRING. ANDERSON-GREENWOOD CV1A-15-SCM-16 GULF MB15-2027WR MISSION K15SPF
V-671S	3 THRU 4	150-LB FLANGED PLUG VALVE. DUCTILE IRON BODY WITH 316 STAINLESS STEEL PLUG. TEFLON

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ITEM	SIZE	DESCRIPTION
		SLEEVE, WRENCH OPERATED.
		400F MAXIMUM ALLOWABLE TEMPERATURE. DURCO G411-DI-316 TUFLINE 067-DI-316 UNION 15A2HLFL
*V-671SA	6 THRU 8	150-LB FLANGED PLUG VALVE, DUCTILE IRON BODY WITH 316 STAINLESS STEEL PLUG, TEFLON SLEEVE, WEATHERPROOF GEAR OPERATED. 400F MAXIMUM ALLOWABLE TEMPERATURE. DURCO G411H-DI-316 TURLINE 067EG-DI-316 UNION 15AHLFL
V-5170	1/2 THRU 3	150-LB FLANGED 3-WAY, 2-PORT, 90 DEGREE TURN, TEFLON SLEEVED, TRANSFLOW PLIG VALVE, DUCTILE IRON BODY AND 316SS PLUG, 45 DEGREE OFF-SET LEVER OPERATOR. 400F MAXIMUM ALLOWABLE TEMPERATURE. TUFLINE 037AX-DI-316 45 OFFSET
V-5171	4 THRU 10	150-LB FLANGED 3-WAY, 2-PORT, 90 DEGREE TURN, TEFLON SLEEVED, TRANSFLOW PLIG VALVE, DUCTILE IRON BODY AND 316SS PLUG, WEATHERPROOF GEAR OPERATOR. 400F MAXIMUM ALLOWABLE TEMPERATURE. TUFLINE 037EG-AX-DI-316
*V-831	3 THRU 4	150-LB WAFER TYPE BUTTERFLY VALVE, DUCTILE IRON BODY, 316 STAINLESS STEEL DISC AND STEM, MOLDED TEFLON SEAT, THROTTLING LEVER OPERATOR. 300F MAXIMUM ALLOWABLE TEMPERATURE. DURCO BL-310
*V-831G	6 THRU 12	150-LB WAFER TYPE BUTTERFLY VALVE, DUCTILE IRON BODY, 316 STAINLESS STEEL DISC AND STEM, MOLDED TEFLON SEAT, WEATHERPROOF GEAR OPERATOR. 300F MAXIMUM ALLOWABLE TEMPERATURE. DURCO BL-311
NOTE		ALL PIPING ONE INCH AND SMALLER MAY BE BENT PIPE INSTEAD OF STRAIGHT WITH BUTT WELD ELBOWS. PIPE BENDS SHALL HAVE A RADIUS OF NOT LESS THAN FIVE (5) NOMINAL PIPE DIAMETERS AND SHALL BE FREE FROM KINKS, RIPPLES OR FLATS.
N-213		PIPING SHALL BE INSTALLED IN ACCORDANCE

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ITEM	SIZE	DESCRIPTION
		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.
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 3/8	MONEL SWAGELOK TUBING FITTINGS.
ELTR-5	1/4 THRU 1 1/2	3000-LB THREADED FORGED STEEL FITTINGS, ASTM A-105, ANSI B16.11.
R-22	1/4 THRU 1 1/2	EX STRONG STEEL SWAGED NIPPLE, ASTM A-106 OR A-53 GR B, OR ASTM A-696 GR B OR C BARSTOCK, THREADED, BEVELED, PLAIN, OR ANY COMBINATION OF ENDS.
C-3	1/4 THRU 1 1/2	3000-LB THREADED FORGED STEEL COUPLING, ANSI B16.11, OR 3000-LB THREDOLET, ASTM A-105, FOR WELDING IN.
U-2	1/4 THRU 1 1/2	3000-LB THREADED FORGED STEEL UNION, ASTM A-105, AAR DIMENSIONS, STEEL TO STEEL SEAT, PETRO AAR OR VOGT 1931.
PC-12	1/4 THRU 1 1/2	THREADED SOLID STEEL HEX BULL PLUG, ASTM A-696 GR B OR C BARSTOCK, NORRIS.
N-1		ALL 1/2 NPT NIPPLES USED FOR INSTRUMENT AND TEST CONNECTIONS SHALL BE HEAVY HEX BAR STOCK WITH A MINIMUM WALL THICKNESS OF 0.151 INCH, (0.400 I.D.).
N-8		NO THREADED FITTINGS PERMITTED UNLESS ISOLATED FROM PROCESS OR SOURCE BY WELDED OR FLANGED VALVE.

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ITEM	SIZE	DESCRIPTION
BRANCH CONNECTIONS		
BC-2S		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.
JOINT COMPOUND		
JC-15		TEFLON TAPE 1/2 INCH BY 3 MIL THICKNESS.
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
V-367	1/4 THRU 1	800-LB SCREWED CS/Y SOLID WEDGE GATE VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH HARD-FACED SEAT RINGS, BOLTED BONNET. BONNEY FORGE HL113/F HANCOCK 950S JENKINS 8800 LUNK 1111-W RP&C F56DE SMITH 800 TRIANGLE 8522V VELAN S-2054B-02TY VOGT 12111
V-625	1/4 THRU 1	3000-LB SCREWED CARBON STEEL BAR STOCK NEEDLE VALVE, 13 CHROME ALLOY STEEL STEM AND SEAT. CRANE 222X DRAGON 1C-M-02 EDWARD 152 LUNK 1730 POWELL 1974 RP-C 1060 VOGT 1861
V-712	1/4	300-LB SCREWED HORIZONTAL LIFT CHECK VALVE, 316 STAINLESS STEEL, BOLTED CAP. ALOYCO 2550-CF8M COOPER 330 SELC NEWCO (WADA) 43T-F34 PACIFIC S-3381-12 POWELL 2004A

ST0408350

ITEM	SIZE	DESCRIPTION
		VOGT 701 F8M
V-665B	1/2 THRU 1 1/2	500-LB SCREWED CARBON STEEL BALL VALVE WITH STAINLESS STEEL BALL, TEFLON SEATS AND SEALS, 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE, 1 1/4" AND OVER LEVER OPERATOR. CLAYTON MARK 880TTO HILLS MC C F602-CS-T-S6/SP-DDB HILLS MC C M502-CS-T-S6 JAMESBURY 21-22-36-MT JENKINS 8421 SMITH 411TBR
V-409	1/2 THRU 1 1/2	1500-LB SCREWED IN-LINE CHECK VALVE, CARBON STEEL BODY AND PISTON, 316 STAINLESS STEEL SPRING, TEFLON SEAT. CHECK-ALL UN-3-C-T
*		ASTERISK BEFORE VALVE NUMBER INDICATES RESTRICTED VENDOR LIST.

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