



ENGINEERING SPECIFICATIONS
TEXAS DIVISION

PLAINTIFF'S EXHIBIT

DOW-2381

(R)

46-611
11-15-75
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HYDROCARBON PROCESS PIPING
150 PSIG @ MINUS 150 TO +100F

ST0404822

ITEM	SIZE	DESCRIPTION
N-228		1 SCREWED FITTINGS SHALL NOT BE USED IN PIPING SYSTEMS WHERE VIBRATION IS PRESENT. "EXAMPLE: COMPRESSOR PIPING, ETC."
N-213		2 PIPING SHALL BE INSTALLED IN ACCORDANCE WITH ENGR SPEC 47-110.
N-18		3 ALL NIPPLES SHALL BE SCH 80 OR HEAVIER.
N-232		4 FOR INSTALLATION OF THREADED STAINLESS STEEL PIPING SYSTEMS, APPLY TEFLON TAPE TO MALE THREADS AND A COAT OF APPROVED JOINT COMPOUND THAT IS COMPATIBLE WITH THE PIPING SYSTEM TO THE FEMALE PIPE THREADS.

PIPE

P-44P	1/2 THRU 3/4	ASTM A-312 GR TP304, SCH 80S SEAMLESS STAINLESS STEEL PIPE.
P-35WP	1 THRU 4	ASTM A-312 GR TP304, SCH 40S WELDED STAINLESS STEEL PIPE. WELDS TO BE FLUSH OUTSIDE AND SMOOTH INSIDE. PIPE TO BE FULLY SOLUTION ANNEALED, PICKLED AND PASSIVATED.
P-34WP	6 THRU 24	ASTM A-312 GR TP304, SCH 10S WELDED STAINLESS STEEL PIPE. WELDS TO BE FLUSH OUTSIDE AND SMOOTH INSIDE. PIPE TO BE FULLY SOLUTION ANNEALED, PICKLED AND PASSIVATED.

FITTINGS

ELTXR-77P	1/2 THRU 3/4	2000-LB SCREWED FORGED STAINLESS STEEL FITTINGS, ASTM A-182 GR F304, ANSI B16.11.
N-234		3000-LB FITTINGS MAY BE SUBSTITUTED FOR 2000-LB FITTINGS.
U-12P	1/2 THRU 3/4	3000-LB SCREWED STAINLESS STEEL UNION, ASTM A-182 GR F304, VOGT 1931-F8 OR PETRO 304.
C-13PC	1/2 THRU 3/4	3000-LB STAINLESS STEEL SCREWED COUPLING, ASTM A-182 GR F304, ANSI B16.11.

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ITEM	SIZE	DESCRIPTION
C-15PS	1/2 THRU 3/4	3000-LB STAINLESS STEEL SOCKOLET, ASTM A-182 GR F304, FOR WELD IN.
C-50P	1 THRU 20	SCH 40S STAINLESS STEEL WELDOLET, ASTM A-182 GR F304.
PC-6P	1/2 THRU 3/4	SOLID STAINLESS STEEL HEX HEAD SCREWED PLUG, ASTM A-182 GR F304, ANSI B16.11.
R-83P	1/2 THRU 1 1/2	EX STRONG STAINLESS STEEL SWAGED NIPPLE, TYPE 304, 0.08 PER CENT MAX CARBON, THREADED, BEVELED, PLAIN OR ANY COMBINATION OF ENDS.
ELTR-63P	1 THRU 4	SCH 40S STAINLESS STEEL WELDING FITTINGS, ASTM A-403 GR WP304, ANSI B16.9.
ELTR-62P	6 THRU 24	SCH 10S STAINLESS STEEL WELDING FITTINGS, ASTM A-403 GR WP304, ANSI B16.9 PRESSURE TEMPERATURE RATING.
N-49		WELDING FITTINGS TO BE BY B AND W. CRANE, DYNAMIC PRODUCTS, FLOWLINE, LADISH, TAYLOR FORGE OR TUBE-TURN.
PC-65P	1 THRU 4	SCH 40S STAINLESS STEEL WELDING CAP, ASTM A-403 GR WP304, ANSI B16.9.
PC-64P	6 THRU 24	SCH 10S STAINLESS STEEL WELDING CAP, ASTM A-403 GR WP304, ANSI B16.9 PRESSURE TEMPERATURE RATING.
PC-43P	14 THRU 24	ASME FLANGED AND DISHED OR ELLIPSOIDAL STAINLESS STEEL HEAD WITH 1 1/2 INCH STRAIGHT FLANGE, 0.250 WALL, O.D. TO CONFORM WITH PIPE ASTM A-240 TYPE 304.
FLANGES		
F-86P-RF	1/2 THRU 3/4	150-LB RAISED FACE THREADED FLANGE, ASTM A-182 GR F304 STAINLESS STEEL, ANSI B16.5.
F-61P-RF	1 THRU 24	150-LB RAISED FACE WELDING NECK FLANGE, ASTM A-182 GR F304 STAINLESS STEEL, ANSI B16.5, ECRE TC MATCH PIPE.
F-60P-RF	1/2 THRU 24	150-LB RAISED FACE BLIND FLANGE, ASTM A-182 GR F304 STAINLESS STEEL, ANSI B16.5.

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BHH

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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.

BC-112 FOR WELDED PIPING, USE STRAIGHT SIZE OR
REDUCING TEE. WELDOLET OR REINFORCING PAD
MAY BE USED ON REDUCING BRANCH CONNECTIONS
IN PLACE OF REDUCING TEE. FOR 3/4 INCH AND
SMALLER, USE SOCKLET WELDED TO HEADER.

GASKETS

G-44C SPIRAL-WOUND, 304 STAINLESS STEEL-ASBESTOS
GASKET WITH STAINLESS STEEL INNER AND OUTER
COMPRESSION-GAUGE RINGS, ID SAME AS SCH 5S
PIPE, FLEXITALLIC CGI, GARLOCK CRI, LAMONS
WRI, JM-913-IR OR STERLING GR-IR.

JOINT COMPOUND

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

JC-19 LIQUID-O-RING LUBCN 404 OR SLICK SEAL NO 4
THREAD SEAL.

FLANGE BOLTS

B-5 ASTM A-193 OR A-320 GR B-8 AUSTENITIC STEEL
STUD BOLTS WITH ASTM A-194 GR 8 HEAVY HEX
NUTS.

B-9 ASTM B-164 MCNEL 400 COLD DRAWN STUD BOLTS
WITH ROUGH TURNED FORGING QUALITY HEAVY HEX
NUTS.

NOTE WHERE BOLTS WILL BE EXPOSED TO CHLORIDE STRESS
CORROSION CRACKING USE B-9 BOLTING.

N-231 APPLY LUBRICANT TO FULL LENGTH OF THREADS.

BOLT LUBRICANT

BL-1A ARMITE LEC-PLATE 250.

VALVES

V-579C 1/2 THRU 3/4 600-LB SCREWED CS/Y SOLID WEDGE GATE VALVE.

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ITEM	SIZE	DESCRIPTION
		316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F, BOLTED BONNET.
V-579SWC	1/2 THRU 1 1/2	600-LB SOCKET WELDING OS/Y SOLID WEDGE GATE VALVE, 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F, BOLTED BONNET.
V-579SCS	1/2 THRU 1 1/2	600-LB ONE END SOCKET WELDING AND ONE END SCREWED OS/Y SOLID WEDGE GATE VALVE, 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F, BOLTED BONNET.
V-305AC	1 THRU 12	150-LB FLANGED, ANSI 316.5 FLANGE THICKNESS, OS/Y DOUBLE WEDGE GATE VALVE, 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F, BOLTED BONNET, TEFLON PACKING.
V-152	2 THRU 12	150-LB FLANGED OS/Y WEDGE GATE VALVE, ASTM A-352, GR LC-3 BODY, TYPE 316 STAINLESS STEEL TRIM FOR SERVICE TO MINUS 150F.
V-628AC	14 THRU 24	150-LB FLANGED OS/Y GATE VALVE, ALL 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F.
V-505C	1/2 THRU 3/4	150-LB SCREWED OS/Y GLOBE VALVE, 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F, PLUG TYPE DISC, BOLTED BONNET.
V-355AC	1/2 THRU 6	150-LB FLANGED OS/Y GLOBE VALVE, 316 STAINLESS STEEL, TEFLON PACKING, BOLTED BONNET FOR CRYOGENIC SERVICE TO MINUS 200F.
V-282AC	1/2 THRU 6	150-LB FLANGED, ANSI 316.5 FLANGE THICKNESS, HORIZONTAL SWING CHECK VALVE, TYPE 316 STAINLESS STEEL FOR CRYOGENIC SERVICE TO MINUS 200F.
V-159	2 THRU 12	150-LB FLANGED HORIZONTAL SWING CHECK VALVE, ASTM A-352 GR LC-3 BODY AND CAP, 316 STAINLESS TRIM, FOR MINUS 150F SERVICE.

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ITEM	SIZE	DESCRIPTION
V-678AC	1/2 THRU 6	150-LB FLANGED, ANSI 316.5 FLANGE THICKNESS, ANGLE VALVE, 316 STAINLESS STEEL, FOR CRYOGENIC SERVICE TO MINUS 200F, BOLTED BONNET, TEFLON PACKING.
V-144	1 1/2 THRU 2	150-LB FLANGED, 3-WAY, 2-PORT, 90 DEG TURN, TRANSFLO TYPE PLUG VALVE WITH TAPERED PLUG, ASTM A-352 GR LC-3 BODY, WRENCH OPERATED, LUBRICATED, FOR MINUS 150F SERVICE.
V-145	3 THRU 4	150-LB FLANGED, 3-WAY, 2-PORT, 90 DEG TURN, TRANSFLO TYPE PLUG VALVE WITH TAPERED PLUG, ASTM A-352 GR LC-3 BODY, WRENCH OPERATED, LUBRICATED, FOR MINUS 150F SERVICE.
V-145A	1 1/2 THRU 4	150-LB FLANGED, 3-WAY, 2-PORT, 90 DEG TURN, TRANSFLO TYPE PLUG VALVE WITH TAPERED PLUG, 316 STAINLESS STEEL BODY, ELECTROLIZED NICKEL PLUG WRENCH OPERATED, LUBRICATED, FOR MINUS 200F SERVICE.
V-146	6 THRU 12	150-LB FLANGED, 3-WAY, 2-PORT, 90 DEG TURN, TRANSFLO TYPE PLUG VALVE WITH TAPERED PLUG, ASTM A-352 GR LC-3 BODY, WORM GEAR OPERATED, LUBRICATED, FOR MINUS 150F SERVICE.
V-402	2 THRU 10	150-LB WELD END 3-BOLT LINE BLIND VALVE, 316 STAINLESS STEEL FLUID CONTACTING PARTS, 300 SST SERIES BOLTING, SAFETY LOCKING PEN, SPIRAL WOUND 304 STAINLESS STEEL-TEFLON OR TEFLON O-RING PACKED PLATE FOR MINUS 200F SERVICE, BCRE TO MATCH PIPE.

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