

DRAWING NO.	5B1109-02-EL-00-001	REVISION	AS BUILT
CUSTOMER	DEVON	CUSTOMER REF	4100001262
AGENT	WORLEY PARSONS	JOB NO.	5B1109
PROJECT	FERRIER	QUOTATION NO.	C-0734 D
PREPARED BY	SHAUN ECKFORD	DATE REVISED	2014-08-13
TYPE	CHEMICAL INJECTION SKID	DATE ISSUED	
TAG NO.	002-PK-27-1000	PAGE	1

DEVON FERRIER CPF (CENTRAL PROCESS FACILITY)

LIQUID EXTRACTION PLANT


002-PK-27-1000


CHEMICAL INJECTION PACKAGE

**DEVON FERRIER
11-02-39-8W5M**



Reviewed by:  Date: 2014-08-13

Approved by:  Date: 2014-08-13

JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 2		

I. 010 SKID

- S-100
- (1) STRUCTURAL STEEL SKID
12'0" WIDE X 26'0" LONG
W12@26#/FT MAIN MEMBERS
1/4" THICK CHECKERPLATE FLOOR
CHECKERPLATE PERIMETER TO BE STITCH WELDED
CHECKERPLATE SEAMS TO BE SEAL WELDED
2" HIGH DRIP LIP ON PERIMETER OF SKID
12" X 12" X 4" DEEP SUMP C/W 2" DRAIN TO SKID EDGE
FOUR (4) LIFTING LUGS
SKID DRAWING STAMPED BY PROFESSIONAL ENGINEER
CHECKER PLATE SHALL BE PAINTED WITH CLOVERDALE BLUE #409
 - (1) SKID INSULATION


4" THICK URETHANE FOAM INSULATION ON UNDERSIDE OF SKID C/W FIRE RETARDANT COATING (R16)

SKID IS NOT INCLUDED IN THE SCOPE OF SUPPLY.

II. 011 SKID/STRUCTURAL #2

ADDITIONAL STRUCTURAL SUPPORT REQUIRED FOR ROOF BECAUSE OF REMOVED WALL ON SEPARATOR AND PUMP SKID




JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 3		

III. 030 PUMPS AND INSTRUMENTS

PARAFIN-ASHPHALTENE SOLVENT

002-P-27-1020	(1)	TEXSTEAM TXT 2500 QUADPLEX MODEL: 25F5-4 PLUNGER: 4 X 1/2" RATE: 26.5 TO 263.84L/DAY DISCHARGE PRESSURE: 1000 PSI MAX MOTOR: BALDOR MTR 1/2 HP 3/60/575V XP CFLG VFD RATED
002-PD-27-1020A\B\C\D	(4)	ACCUPULSE PULSATION DAMPENER MODEL: APIF-S/S-T-1 PROCESS CONNECTION: 1/2" FNPT MAWP: 300 PSIG VOLUME: 4 CUBIC INCH BODY MATERIAL: 316SS BELLOWS MATERIAL: PTFE
002-LG-27-1020	(4)	LEVEL GAUGE BRAND: KENCO MODEL: 5700-52-A-T-RH SERVICE: CHEMICAL MAWP: ATMOSPHERIC VISIBLE GLASS: 47-1/2" C-C: 52"
002-PSV-27-1020A\B\D	(3)	1/4" MNPT X 1/4" FNPT BRAND: SWAGELOK MODEL: SS-4R3A5-KZ ORIFICE: .140" Ø SET PRESSURE: 300 PSIG SERVICE CONDITION: CHEMICAL
002-PSV-27-1020C	(1)	1/4" MNPT X 1/4" FNPT BRAND: SWAGELOK MODEL: SS-4R3A5-KZ ORIFICE: .140" Ø SET PRESSURE: 600 PSIG SERVICE CONDITION: CHEMICAL
PI-002-PG-27-1020E\F\G\H	(4)	1/2" X 4-1/2" WIKA 233.34 ALL RANGES MODEL: 233.34 RANGE: 4000 PSIG CASE: 4-1/2" FACE PROCESS: 1/2" NPT BOTTOM CONNECTION C/W 910.13 WIKA OVERPRESSURE PROTECTOR 1/2 316SS 50-250 BAR SETPOINT C/W 3.1B MATERIAL CERTIFICATE TAG: 002-PG-27-1020E/F/G/H (4) TAG: 002-PG-27-1017A (1) TAG: 002-PG-27-1011C/D (2)



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 4		

002-FG-27-1020A\B\C\D (4) 3/4" NPT JACOBY TARBOX FLOW INDICATOR
 - MODEL S-960HPA(NF)-2000
 - 2000 PSIG MAWP

SCALE INHIBITOR PUMP

002-P-27-1017 (1) TEXSTEAM TXT 2500 SIMPLEX
 MODEL: 25G4-1
 PLUNGER: 1 X 3/16"
 RATE: 1.89 TO 18.55L/DAY
 DISCHARGE PRESSURE: 6000 PSI MAX
 MOTOR: BALDOR MTR 1/2 HP 3/60/575V XP C-FLG VFD RATED

002-PD-27-1017 (1) ACCUPULSE PULSATION DAMPENER
 MODEL: APIF-S/S-T-1
 PROCESS CONNECTION: 1/2" FNPT
 MAWP: 300 PSIG
 VOLUME: 4 CUBIC INCH
 BODY MATERIAL: 316SS
 BELLOWS MATERIAL: PTFE

002-LG-27-1017 (1) LEVEL GAUGE
 BRAND: KENCO
 MODEL: 5700-52-A-T-RH
 SERVICE: CHEMICAL
 MAWP: ATMOSPHERIC
 VISIBLE GLASS: 47-1/2"
 C-C: 52"


002-PSV-27-1017 (1) 1/4" MNPT X 1/4" FNPT
 BRAND: SWAGELOK
 MODEL: SS-4R3A5-KZ
 ORIFICE: .140" Ø
 SET PRESSURE: 300 PSIG
 SERVICE CONDITION: CHEMICAL

PI-002-PG-27-1017A (1) 1/2" X 4-1/2" WIKA 233.34 ALL RANGES
 MODEL: 233.34
 RANGE: 4000 PSIG
 CASE: 4-1/2" FACE
 PROCESS: 1/2" NPT BOTTOM CONNECTION
 C/W 910.13 WIKA OVERPRESSURE PROTECTOR
 1/2 316SS 50-250 BAR SETPOINT C/W 3.1B MATERIAL CERTIFICATE

TAG: 002-PG-27-1020E/F/G/H (4)
 TAG: 002-PG-27-1017A (1)
 TAG: 002-PG-27-1011C/D (2)

002-FG-27-1017 (1) 3/4" NPT JACOBY TARBOX FLOW INDICATOR
 - MODEL S-960HPA(NF)-2000
 - 2000 PSIG MAWP



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 5		

HYDRATE INHIBITOR PUMP

002-P-27-1011	(1)	TEXSTEAM TXT 2500 DUPLEX MODEL: 25F3-2 PLUNGER: 2 X 3/8" RATE: 14.76 TO 148.39L/DAY DISCHARGE PRESSURE: 1700 PSI MAX MOTOR: BALDOR MTR 1/2 HP 3/60/575V XP CFLG VFD RATED
002-PD-27-1011A\B	(2)	ACCUPULSE PULSATION DAMPENER MODEL: APX4-8-S/S-E-1 PROCESS CONNECTION: 1/2" FNPT MAWP: 4000 PSIG VOLUME: 8 CUBIC INCH BODY MATERIAL: 316SS BELLOWS MATERIAL: EPDM
002-LG-27-1011A\B	(2)	LEVEL GAUGE BRAND: KENCO MODEL: 5700-52-A-T-RH SERVICE: CHEMICAL MAWP: ATMOSPHERIC VISIBLE GLASS: 47-1/2" C-C: 52"
002-PSV-27-1011A\B	(2)	1/4" MNPT X 1/4" FNPT BRAND: SWAGELOK MODEL: SS-4R3A5-EP ORIFICE: .140" Ø SET PRESSURE: 1395 PSIG SERVICE CONDITION: CHEMICAL
PI-002-PG-27-1011C\D	(2)	1/2" X 4-1/2" WIKA 233.34 ALL RANGES MODEL: 233.34 RANGE: 4000 PSIG CASE: 4-1/2" FACE PROCESS: 1/2" NPT BOTTOM CONNECTION C/W 910.13 WIKA OVERPRESSURE PROTECTOR 1/2 316SS 50-250 BAR SETPOINT C/W 3.1B MATERIAL CERTIFICATE TAG: 002-PG-27-1020E/F/G/H (4) TAG: 002-PG-27-1017A (1) TAG: 002-PG-27-1011C/D (2)
002-FG-27-1011A\B	(2)	3/4" NPT JACOBY TARBOX FLOW INDICATOR - MODEL S-960HPA(NF)-2000 - 2000 PSIG MAWP


EYE WASH STATION

HAWS 7602.15 SELF CONTAINED EYEWASH STATION

CONSTRUCTION

STAINLESS STEEL CONSTRUCTED TANK MAKES FOR A SOLID PORTABLE UNIT WITH ADDED RESISTANCE AGAINST CORROSION AND BREAKAGE.



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 6		

VALVES

VALVE COMES EQUIPPED WITH STAINLESS STEEL BALL AND STEM FOR ADDED PROTECTION AGAINST CORROSION AND BREAKAGE. FULL CONTINUOUS FLOW OCCURS WITH THE SIMPLE PUSH OF A STAINLESS STEEL FLAG.

ADDED PROTECTION/MISC.

GREEN POLYETHYLENE PLASTIC DUST COVERS THAT RELEASE WITH WATER PRESSURE KEEP THE UNIT PROTECTED FROM DEBRIS UP UNTIL THE LAST SECOND BEFORE USE FURTHER OPTIMIZING OPERATION.

SAFETY

AIR PRESSURE GAUGE, PRESSURE RELIEF VALVE, AND TIRE-TYPE AIR FILL VALVE DECREASE THE POSSIBILITY OF MISHAPS AND MAKE FOR A SAFER PIECE OF EMERGENCY EQUIPMENT.

FLOW CONTROLS

GREEN ABS PLASTIC SOFT-FLO ANTI-SURGE HEADS DISTRIBUTE WATER AT A RATE OF .25 GPM (.9 L) WHEN PRESSURE IS BETWEEN 30 AND 90 PSI (2.1 AND 6.2 BAR). COMBINE THIS WITH CAPABILITIES OF A 15 GALLON 56.8 L) PORTABLE AND THE IRRIGATION PROCESS IS A THOROUGH ONE.


002-PIT-27-1100	(1)	ROSEMOUNT PRESSURE TRANSMITTER MODEL #: 2088G3S22A1M5B4C6Q4 (G) MEASUREMENT TYPE: GAUGE (3) PRESSURE UPPER RANGE LIMIT: 800# PSIG (S) TRANSMITTER OUTPUT: 4-20 MA WITH DIGITAL SIGNAL BASED ON HART PROTOCOL (22) ISOLATING DIAPHRAGM \ FILL FLUID: 316L SST \ SILICONE FILL (A) PROCESS CONNECTION: 1/2" FNPT (1) CONDUIT ENTRY: 1/2" NPT (MS) LCD DISPLAY (B4) SST MOUNTING BRACKET WITH SST BOLTS (C6) CERTIFICATIONS: CSA EXPLOSION PROOF, INTRINSICALLY SAFE (Q4) CALIBRATION CERTIFICATE
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IV. 080 PIPING FABRICATION & ASSEMBLY

DEVON PIPING SPECIFICATIONS

PER RFI#5 PIPING CLASSES AL73 SHALL BE USED IN LUE OF AL71, AND CL73 SHALL BE USED IN LUE OF CL71. AL71 AND CL71 WERE INCLUDED FOR REFERENCE.



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 7		

V. 082 MANUAL VALVES

BALL VALVES

60-BA8202A	(2)	BALL VALVE: 2" NPT 2000# BALON FLOATING BALL 2F-F93-SE FP CS BODY SWEET (FLOOR DRAIN)
27-BA8202K	(52)	BALL VALVE: 3/4" NPT 3000# BALON FLOATING BALL LS-07592 FP 316SS BODY & BALL NACE
27-BA8202K CSO	(14)	BALL VALVE: 3/4" NPT 3000# BALON FLOATING BALL LS-07592 FP 316SS BODY & BALL NACE

CHECK VALVES

27-DB0802K	(7)	CHECK VALVE: 3/4" NPT CLASS 1500 ARGUS BALL CHECK FULL 316SS BODY/STAINLESS TRIM CRN REQUIRED
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INSTRUMENT VALVES

27-NF8612V	(8)	NEEDLE VALVE: 3/4" MNPT X 1/2" FNPT 6000# ANDERSON GREENWOOD M25VIS-46 316SS (PG ISOLATION)
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GLOBES

48-LA0803A	(1)	GLOBE VALVE: 1-1/2" SW CLASS 800 VELAN W-2074B-02TY SWEET A105 BODY / TRIM 8
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GATES

48-GA0803A	(2)	GATE VALVE: 1-1/2" SW CLASS 800 VELAN W-2054B-02TY A105 BODY.\TRIM #8
48-GA0832A	(2)	GATE VALVE: 1-1/2" SW X NPT CLASS 800 VELAN C-2054B-02TY STD PORT A105 BODY \ TRIM #8 SWEET)

ACCESSORIES


002-SP-27-2501\2\3\4\5\6\7	(7)	3/4" NPT ALTA STRAINER Y-STRAINER YS600 STAINLESS STEEL
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VI. 084 SURFACE PREPARATION AND PAINTING

STRUCTURAL STEEL

(1)	STRUCTURAL STEEL (PER GS-6100)
	-SURFACE PREPARATION: BLAST TO SSPC-SP6
	-PRIMER: GLOVAGUARD 83150 4-6 MILS DFT
	-TOP COAT: ARMOUR SHIELD 839 HIGH GLOSS 2-4 MILS DFT ALIPHATIC URETHANE
	-COLOR: FS15090 (BLUE) / CLOVERDALE BLUE # 409
	**NOTE SIDES AND BOTTOM OF SKID ARE UNPAINTED



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 8		

MISCELLANEOUS

- PRESSURE SAFETY VALVES: (1) SAFETY ORANGE FS 12246
- HANDRAILS: SAFETY YELLOW FS 13591
- BAR GRATING & STAIR TREADS SHALL BE GALVANIZED
- NOSING OF THE STAIR TREADS TO BE PAINTED BY HIGH VISIBILITY SAFETY YELLOW


VII. 085 BUILDING

- 002-BU-27-1000 (1) BUILDING SIZE: 12 FT X 26 FT X 14'-9" FT HIGH
SELF FRAMING METAL BUILDING (SHED ROOF, 4:12 SLOPE)
- ROOF EXTERIOR: 22 GA. PREPAINTED
ROOF INTERIOR: 24 GA. FLUTED ALUM WHITE
INSULATION: R-30 FIBERGLASS
VAPOUR BARRIER: 6 MILL POLY
- WALL EXTERIOR: 22 GA. PREPAINTED
WALL INTERIOR: 24 GA. FLUTED ALUM WHITE
INSULATION: R-20 FIBERGLASS
VAPOUR BARRIER: 6 MILL POLY
- COLORS: BUILDING CLADDING QC8305 STONE GREY
TRIMS: QC8260 SLATE BLUE
DOORS: QC8260 SLATE BLUE
- COMPONENTS:
1 - 3' X 7' 16GA DOOR C/W 16GA FRAME, HGS, WS, CC, THRESHOLD, PAINTED & SWEEP
1 - LOCKING PANIC HARDWARE (VON DUPRIN 44TP)
1 - SINGLE GLAZED FIXED 24" X 24" I.W.G. GLAZED WINDOW IN DOOR
1 - HYDRAULIC CLOSURE
1 - 3' CANOPY FOR A SINGLE DOOR
2 - 32" X 36" DOUBLE GLAZED SLIDE WINDOW C/W 1/2 SCREEN
26 - LINEAL FEET OF EAVES TROUGH AND DOWNSPOUTS
26 - LINEAL FEET OF ICE RAKES ATTACHED AT THE EAVE
2" INTERIOR DRIP LIP
- PROFESSIONAL ENGINEERS STAMPED DRAWING FOR THE PROVINCE OF ALBERTA
-ALL FLASHINGS, SCREWS, BOLTS, TRIMS AND CAULKING INCLUDED.

HVAC

BASED ON CLASSIFIED AREA
BASED ON 6 ACPH CONTINUOUS PLUS ADDITIONAL 6 ACPH FOR EMERGENCY
UNIT HEATER SIZED TO ALLOW FOR 6 CONTINUOUS ACPH



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 9		

002-EF/EFM-27-1093	(1)	6-ACPH (CONTINUOUS) RUFFNECK EFX-12A-2H XP EXHAUST FAN 575/3/60 1/2HP 850CFM T3B MOTOR C/W BACK GUARD & GRAVITY BACK DRAFT DAMPER CLASS I DIV 1 & 2 GROUP C&D
002-EF/EFM-27-1092	(1)	6-ACPH (CONTINUOUS) RUFFNECK EFX-12A-2H XP EXHAUST FAN 575/3/60 1/2HP 850CFM T3B MOTOR C/W BACK GUARD & GRAVITY BACK DRAFT DAMPER CLASS I DIV 1 & 2 GROUP C&D
002-L-27-1094	(1)	24" X 24" PBX-4L6 PARALLEL BLADE DAMPER C/W FLANGE FRAME C/W BELIMO 120V NFBUP-S ACTUATOR MOUNTED IN AIRSTREAM C/W BELIMO ZS260 EXPLOSION PROOF ENCLOSURE, REMOVE LIMIT SWITCH CABLE AND SHIP LOOSE
002-UHG/UHM-27-1091	(1)	RUFFNECK GYLCOL HEATER AH-20A-A5 70KW 575/3/60 1/2HP XP T3B MOTOR- 20" FAN, 5 TUBE PASSES C/W 1.5" NPT CONNECTIONS, BMK & XT312 SPDT REMOTE THERMOSTAT CLASS I DIV 1 & 2 GROUP C&D <ul style="list-style-type: none"> • FLUID WEIGHT: TEG 60%/WATER 40% • INLET TEMP: 160°C • OUTLET TEMP: 135°C • ALTITUDE: 1036M ASL • OPERATING PRESSURE: 1,470KPA


-PROFESSIONAL ENGINEERS STAMPED DRAWING FOR THE PROVINCE OF ALBERTA
-HVAC STAMPED CALCULATIONS INCLUDED

VIII. 086 ELECTRICAL WORKS

GENERAL

WIRING TO BE COMPLETED USING CLASS E ALUMINUM TRAY





JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE	10	

ELECTRICAL INCLUSIONS

		<ul style="list-style-type: none"> •SUPPLY AND INSTALLATION OF (3) KILLARK 150W VM4L LED INTERIOR FIXTURES C/W 3 WAY SWITCHING. •SUPPLY AND INSTALLATION OF (1) KILLARK VM1L LED EXTERIOR FIXTURES. •SUPPLY AND INSTALLATION OF (1) LUMACELL 120VAC EMERGENCY LIGHTS (RG12HZ120), ONE MOUNTED AT EACH DOOR C/W REQUIRED CABLE, WIRING AND LABELING.
(002-MHS-27-1091)		<ul style="list-style-type: none"> •WIRING TO (1) "CUSTOMER SUPPLIED" RUFFNECK HEATERS CONTROL C/W HAND/OFF/AUTO SWITCH (EDS21273), AND THERMOSTAT CONTROL DEVICE EACH WIRED BACK TO LP JB'S
(002-MHS-27-1092/1093)		<ul style="list-style-type: none"> •WIRING TO (2) "CUSTOMER SUPPLIED" EXHAUST FAN CONTROL C/W HAND/OFF/AUTO SWITCH (EDS21273) WIRED BACK TO LP JB'S.
(002-MHS-27-1011)		<ul style="list-style-type: none"> •SUPPLY AND INSTALLATION FOR (1) HYDRATE INHIBITOR PUMP (002-P-27-1011) AS PER THE PROVIDED PIO. TO BE WIRED TO SKID EDGE
(002-MHS-27-1017)		<ul style="list-style-type: none"> •SUPPLY AND INSTALLATION FOR (1) SCALE INHIBITOR PUMP (002-P-27-1017) AS PER THE PROVIDED PIO. TO BE WIRED TO SKID EDGE
(002-MHS-27-1020)		<ul style="list-style-type: none"> •SUPPLY AND INSTALLATION FOR (1) PARAFFIN ASPHALTENE SOLVENT PUMP (002- P-27-1020) AS PER THE PROVIDED PIO. TO BE WIRED TO SKID EDGE •SUPPLY AND INSTALLATION OF (1) THOMAS & BETTS SELF-LUMINOUS EXIT SIGN (LTEU-1) •WIRE TO (1) ANALOG (PIT-1100) & (1) DISCRETE (ZYS-1094) DEVICES FROM LP JB'S C/W REQUIRED CABLE, WIRING AND LABELING. •GROUNDING OF ALL CABLE TRAY C/W FT4 RATED GROUND WIRE. •GROUND BUS BARS TO BE INSTALLED IN DIAGONAL CORNERS OF SKID PACKAGE. •LOCAL AREA PERMIT IS INCLUDED.
002-XA-01-1300E/F	(2)	SUPPLY AND INSTALLATION OF (2) RED EMERGENCY STROBES. (FEDERAL SIGNAL 151XST-120R) C/W REQUIRED CABLE, WIRING AND LABELING.
002-XA-01-1300G/H	(2)	SUPPLY AND INSTALLATION OF (2) AMBER EMERGENCY STROBES.
	(1)	<p>DRAWINGS</p> <p>SUPPLY OF ITP UPON RECEIPT OF PO.</p> <p>SUPPLY OF (4) P.ENG. STAMPED JUNCTION BOX/CONNECTION/WIRING DIAGRAM DRAWINGS C/W BOM.</p> <p>SUPPLY OF (1) P.ENG STAMPED ELECTRICAL LAYOUT DRAWINGS.</p> <p>SUPPLY OF (1) P.ENG STAMPED INSTRUMENT LAYOUT DRAWINGS.</p> <p>SUPPLY OF (1) P.ENG. STAMPED CABLE TRAY/GROUNDING LAYOUT DRAWING</p> <p>SUPPLY OF CABLE SCHEDULE.</p> <p>SUPPLY OF ELECTRICAL EQUIPMENT LIST. OSUPPLY OF LIGHTING STUDY FROM KILLARK</p> <p>SUPPLY OF ELECTRICAL LOAD LISTS</p> <p>SUPPLY OF ELECTRICAL COMPONENT SPEC SHEETS</p> <p>FUGITIVE EMISSIONS STUDY</p> <p>SUPPLY ITP</p>



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 11		

	DEVON CANADA CORPORATION		Page 1 of 2
	General Specification		Jul 11 2012 Rev 1A
	GS-5210	Piping Class Specification	CL71

Design Code: ASME B31.3-10	Pressure Class: ASME 600	Temperature (°C): -45 to 375	C.A. (mm): 0.75	Service: Normal (Sweet)	Primary Joints: RF/BW/SW
General Notes Applicable to Piping Class: 1, 2, 8		Primary Material: Dual Graded 316/316L		Tubing Class: DL74	Alternate NPT Class: CL73
Primary Fluids/Service: Corrosive Produced H ₂ O, Vents and Drains, Inert Gases, Corrosive Chemicals, Breathing Air, Clean Service Fluids (Lubricants, Hydraulic Fluids, Coolants), De-Mineralized or De-ionized H ₂ O					
Joint Non-Destructive Examination: All Joints: 20% Visual Butt Welds: 10% RT Socket Welds: 5% RT (Fit-up) + 10% MT Fillet Welds: 10% MT			Permissible use of Alternate NPT Class: Prefabricated Non-Enclosed Packages/Modules: Not Permitted All Other Services: See Flowchart 1		


PWHT: All Services None	Branch Tables per GS-5210: Primary: BCT1 Instruments, Temporary Hydrotest Vents/Drains: BCT3
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Primary Pressure / Leak Test Requirement: Recorded Hydrotest: Min. 14,895 kPag ; Max. 15,510 kPag	Permissible Alternative Test: as per GS-5905 on Exception Basis Only
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Pressure – Temperature Rating:									
Temperature (°C)	-45 to 38	50	100	150	200	250	300	350	375
Max. Design Pressure (kPag)	9,930	9,620	8,440	7,700	7,130	6,680	6,320	6,070	5,980

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES	
Pipe	¼ to 1 ½		S-80S (80)	PE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	2		S-80S (80)	BE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	3 to 4		S-80S (80)	BE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	6 to 8		S-80S (80)	BE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	10 to 12		S-80S (80)	BE	ASTM A358-316/316L CI.1 EFW, ASME B36.19M (Ej = 1.0)		
	14 to 24		S-80	BE	ASTM A358-316/316L CI.1 EFW, ASME B36.10M (Ej = 1.0)		
Nipples	Regular	¼	S-160	TBE	ASTM A312-TP316/316L SMLS, ASME B36.10M	13	
	Regular	¼ to 1 ½	S-160	POE x TOE	ASTM A312-TP316/316L SMLS, ASME B36.10M	17	
	Regular	¼ to 1 ½	S-80S	PBE	ASTM A312-TP316/316L SMLS, ASME B36.19M	6	
	Swage	¼ to 1 ½	¼ to 1	S-80	PLE x TSE	ASTM A403-WP316/316L-S, MSS SP-95	6
	Swage	¼ to 1 ½	¼ to 1	S-80	PBE	ASTM A403-WP316/316L-S, MSS SP-95	
	Swage	2	¼ to 1 ½	S-80	BLE x PSE	ASTM A403-WP316/316L-S, MSS SP-95	
	Swage	3	¼ to 1 ½	S-80	BLE x PSE	ASTM A403-WP316/316L-S, MSS SP-95	
Flanges	¼ to 1 ½		Class 600	RF SW	ASTM A182-F316/316L, ASME B16.5		
	2 to 24		Class 600	RF WN	ASTM A182-F316/316L, S-80, ASME B16.5		
Orifice Flanges	2 to 14		Class 600	RF WN	ASTM A182-F316/316L, S-80, NPS ½ NPT Taps, ASME B16.36		
	≥ 16		-	-	Use normal flanges and install pressure taps on pipe	10	
Blind Flanges	¼ to 24		Class 600	RF	ASTM A182-F316/316L, ASME B16.5 Tapped blinds per ASME B16.5-09 Table 6		
Blanks	¼ to 8		Class 600	RF	Figure 8 Blank, ASTM A240-TP316, ASME B16.48		
	10 to 24		Class 600	RF	Paddle Blank and Spacer, ASTM A240-TP316, ASME B16.48		





JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 12		

	DEVON CANADA CORPORATION		Page 2 of 2	
	General Specification		Jul 11 2012 Rev 1A	
	GS-5210	Piping Class Specification	CL71	

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES
Fittings						
Threadolet	2 to 24	¾ to 1 ½	Class 6000	IRE x TE(F)	ASTM A182-F316/316L, MSS SP-97	6,42
Nipolet, NPT	2 to 8	¾ to 1 ½	Class 3000	IRE x TE(F)	ASTM A182-F316/316L, S-160 bore, MSS SP-97 as applicable	6
Nipolet, NPT	10 to 24	¾ to 1 ½	Class 6000	IRE x TE(F)	ASTM A182-F316/316L, S-160 bore, MSS SP-97 as applicable	6
Sockolet	2 to 8	¾ to 1 ½	Class 3000	IRE x SW	ASTM A182-F316/316L, MSS SP-97	
Sockolet	10 to 24	¾ to 1 ½	Class 6000	IRE x SW	ASTM A182-F316/316L, MSS SP-97	
Latrolet	2 to 8	¾ to 1 ½	Class 3000	IRE x SW	ASTM A182-F316/316L, MSS SP-97 as applicable	
Latrolet	10 to 24	¾ to 1 ½	Class 6000	IRE x SW	ASTM A182-F316/316L, MSS SP-97 as applicable	
Elbolet	2 to 8	¾ to 1 ½	Class 3000	IRE x SW	ASTM A182-F316/316L, MSS SP-97 as applicable	
Elbolet	10 to 24	¾ to 1 ½	Class 6000	IRE x SW	ASTM A182-F316/316L, MSS SP-97 as applicable	
Nipolet, PE	2 to 8	¾ to 1 ½	Class 3000	IRE x PE	ASTM A182-F316/316L, S-80 bore, MSS SP-97 as applicable	
Nipolet, PE	10 to 24	¾ to 1 ½	Class 6000	IRE x PE	ASTM A182-F316/316L, S-80 bore, MSS SP-97 as applicable	
90° Ell	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
45° Ell	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Tee	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Tee (Red)	1 to 1 ½	¾ to 1	Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Plug	¾ to 1 ½		-	TE	ASTM A182-F316/316L, Solid Round Head, ASME B16.11	6,12
Coupling	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Coupling (Red)	1 to 1 ½	¾ to 1	Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Union (GJ)	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, integral seat, MSS SP-83 (rated per ASME B16.11)	
Cap	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	6
Cap	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Bushing	-		-	-	Not Permitted	
Weldolet	6 to 24	2 to 10	S-80/S-80	IRE x BE	ASTM A182-F316/316L, MSS SP-97	
Nipoflange	6 to 24	2 to 10	Class 600	IRE x RF	RF S-80 bore x IRE (S-80 run), ASTM A182-F316/316L	
90° Ell	2 to 8		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
90° Ell	10 to 24		S-80	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
45° Ell	2 to 8		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
45° Ell	10 to 24		S-80	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Tee	2 to 8		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Tee	10 to 24		S-80	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Tee (Red)	3 to 8	2 to 6	S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Tee (Red)	10 to 24	4 to 20	S-80	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Reducer	3 to 8	2 to 6	S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Reducer	10 to 24	4 to 20	S-80	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Cap	2 to 8		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Cap	10 to 24		S-80	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Gaskets	¾ to 24		Class 600	RF	Flexitallic Flexicarb CGI spiral wound gasket, 316 SS windings and inner ring, ASME B16.20	
Bolting	All				ASTM A193-B7 stud bolts w/ ASTM A194-2H nuts	



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 13		

	DEVON CANADA CORPORATION General Specification		Page 1 of 1
	GS-5210	Piping Class Specification	Jul 11 2012 Rev 1A
			CL73

Design Code: ASME B31.3-10	Pressure Class: ASME 600	Temperature (°C): -45 to 200	C.A. (mm): 0.75	Service: Normal (Sweet)	Primary Joints: NPT/RF
General Notes Applicable to Piping Class: 1, 8		Primary Material: Dual Graded 316/316L		Tubing Class: DL74	PWHT: Per Code

Primary Fluids/Service:

THIS CLASS IS RESTRICTED AND IT MAY ONLY BE USED AS PERMITTED BY FLOWCHART 1

Corrosive Produced H₂O, Vents and Drains, Inert Gases, Corrosive Chemicals, Breathing Air, Clean Service Fluids (Lubricants, Hydraulic Fluids, Coolants), De-Mineralized or De-ionized H₂O

Joint Non-Destructive Examination:

All Joints: 20% Visual
Fillet Welds: 10% MT

Branch Tables per GS-5210:

All Branch Connections: [BCT2](#)

Primary Pressure / Leak Test Requirement:

Recorded Hydrotest: Min. **14,895 kPag**; Max. **15,510 kPag**

Permissible Alternative Test:


as per GS-5905 on Exception Basis Only


Pressure – Temperature Rating:

Temperature (°C)	-45 to 38	50	100	150	200				
Max. Design Pressure (kPag)	9,930	9,620	8,440	7,700	7,130				

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES
Pipe	¾ to 1 ½		S-80S	TE	ASTM A312-TP316/316L SMLS, ASME B36.19M	
Nipples						13
Regular	¾ to 1 ½		S-160	TBE	ASTM A312-TP316/316L SMLS, ASME B36.10M	
Swage	¾ to 1 ½	¼ to 1	S-80	TBE	ASTM A403-WP316/316L-S, MSS SP-95	
Flanges	¾ to 1 ½		Class 600	RF NPT	ASTM A182-F316/316L, ASME B16.5	
Blind	¾ to 1 ½		Class 600	RF	ASTM A182-F316/316L, ASME B16.5	
Flanges					<i>Tapped blinds per ASME B16.5-09 Table 6</i>	
Blanks	¾ to 1 ½		Class 600	RF	Figure 8 Blank, ASTM A516-70N, ASME B16.48	
Fittings						12
90° Ell	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
45° Ell	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Tee	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Tee (Red)	1 to 1 ½	¾ to 1	Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Plug	¾ to 3		-	TE	ASTM A182-F316/316L, Solid Round Head, ASME B16.11	
Coupling	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Coupling (Red)	1 to 1 ½	¾ to 1	Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Union (GJ)	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, integral seat, MSS SP-83 (rated per ASME B16.11)	
Cap	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Bushing	-		-	-	Not Permitted	
Gaskets	¾ to 1 ½		Class 600	RF	Flexitallic Flexicarb CGI spiral wound gasket, 316 SS windings and inner ring, ASME B16.20	
Bolting	All				ASTM A193-B7 stud bolts w/ ASTM A194-2H nuts	



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 14		

	DEVON CANADA CORPORATION		Page 1 of 3
	General Specification		Jul 11 2012 Rev 1A
GS-5210	Piping Class Specification		AL71

Design Code: ASME B31.3-10	Pressure Class: ASME 150	Temperature (°C): -45 to 200	C.A. (mm): 0.75	Service: Normal (Sweet)	Primary Joints: RF/BW/SW
General Notes Applicable to Piping Class: 1, 2		Primary Material: Dual Graded 316/316L		Tubing Class: DL74	Alternate NPT Class: AL73
Primary Fluids/Service: Corrosive Produced H ₂ O, Vents and Drains, Inert Gases, Corrosive Chemicals, Breathing Air, Clean Service Fluids (Lubricants, Hydraulic Fluids, Coolants), De-Mineralized or De-ionized H ₂ O					
Joint Non-Destructive Examination: All Joints: 20% Visual Butt Welds: 10% RT Socket Welds: 5% RT (Fit-up) + 10% MT Fillet Welds: 10% MT			Permissible use of Alternate NPT Class: Prefabricated Non-Enclosed Packages/Modules: Not Permitted All Other Services: See Flowchart 1		


PWHT:	All Services None	Branch Tables per GS-5210: Primary: BCT1 Instruments, Temporary Hydrotest Vents/Drains: BCT3
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Primary Pressure / Leak Test Requirement: Recorded Hydrotest: Min. 2,850 kPag ; Max. 3,000 kPag	Permissible Alternative Test: as per GS-5905 on Exception Basis Only
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Pressure – Temperature Rating:							
Temperature (°C)	-45 to 38	50	100	150	200		
Max. Design Pressure (kPag)	1,900	1,840	1,620	1,480	1,370		

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES	
Pipe	¾ to 1 ½		S-80S (80)	PE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	2		S-80S (80)	BE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	3 to 8		S-40S (Std)	BE	ASTM A312-TP316/316L SMLS, ASME B36.19M		
	10 to 12		S-40S (Std)	BE	ASTM A358-316/316L Cl.1 DSAW, ASME B36.19M (Ej = 1.0)		
	14 to 24		S-Std	BE	ASTM A358-316/316L Cl.1 DSAW, ASME B36.10M (Ej = 1.0)		
Nipples	Regular	¾	S-160	TBE	ASTM A312-TP316/316L SMLS, ASME B36.10M	13	
	Regular	¾ to 1 ½	S-160	POE x TOE	ASTM A312-TP316/316L SMLS, ASME B36.10M	17	
	Regular	¾ to 1 ½	S-80S	PBE	ASTM A312-TP316/316L SMLS, ASME B36.19M	6	
	Swage	¾ to 1 ½	¾ to 1	S-80	PLE x TSE	ASTM A403-WP316/316L-S, MSS SP-95	6
	Swage	¾ to 1 ½	¾ to 1	S-80	PBE	ASTM A403-WP316/316L-S, MSS SP-95	
	Swage	2	¾ to 1 ½	S-80	BLE x PSE	ASTM A403-WP316/316L-S, MSS SP-95	
	Swage	3	¾ to 1 ½	S-40/S-80	BLE x PSE	ASTM A403-WP316/316L-S, MSS SP-95	
Flanges	¾ to 1 ½		Class 150	RF SW	ASTM A182-F316/316L, ASME B16.5		
	2		Class 150	RF WN	ASTM A182-F316/316L, S-80, ASME B16.5		
	3 to 24		Class 150	RF WN	ASTM A182-F316/316L, S-Std, ASME B16.5		
Orifice Flanges	2		Class 300	RF WN	ASTM A182-F316/316L, S-80, NPS ¾ NPT Taps, ASME B16.36		
	3 to 12		Class 300	RF WN	ASTM A182-F316/316L, S-Std, NPS ¾ NPT Taps, ASME B16.36		
	≥ 14		-	-	Use normal flanges and install pressure taps on pipe	10	
Blind Flanges	¾ to 24		Class 150	RF	ASTM A182-F316/316L, ASME B16.5 Tapped blinds per ASME B16.5-09 Table 6		





JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 15		

	DEVON CANADA CORPORATION		Page 2 of 3
	General Specification		Jul 11 2012 Rev 1A
	GS-5210	Piping Class Specification	AL71

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES
Blanks	¾ to 12 14 to 24		Class 150 Class 150	RF RF	Figure 8 Blank, ASTM A240-TP316, ASME B16.48 Paddle Blank and Spacer, ASTM A240-TP316, ASME B16.48	
Fittings						
Threadolet	2 to 24	¾ to 1 ½	Class 3000	IRE x TE(F)	ASTM A182-F316/316L, MSS SP-97	6,42
Nipolet, NPT	2 to 24	¾ to 1 ½	Class 3000	IRE x TE(F)	ASTM A182-F316/316L, S-160 bore, MSS SP-97 as applicable	6
Socket	2 to 24	¾ to 1 ½	Class 3000	IRE x SW	ASTM A182-F316/316L, MSS SP-97	
Latrolet	2 to 24	¾ to 1 ½	Class 3000	IRE x SW	ASTM A182-F316/316L, MSS SP-97 as applicable	
Elbolet	2 to 24	¾ to 1 ½	Class 3000	IRE x SW	ASTM A182-F316/316L, MSS SP-97 as applicable	
Nipolet, PE	2 to 24	¾ to 1 ½	Class 3000	IRE x PE	ASTM A182-F316/316L, S-80 bore, MSS SP-97 as applicable	
90° Ell	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
45° Ell	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Tee	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Tee (Red)	1 to 1 ½	¾ to 1	Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Plug	¾ to 1 ½		-	TE	ASTM A182-F316/316L, Solid Round Head, ASME B16.11	6,12
Coupling	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Coupling (Red)	1 to 1 ½	¾ to 1	Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Union (G)	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, integral seat, MSS SP-83 (rated per ASME B16.11)	
Cap	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	6
Cap	¾ to 1 ½		Class 3000	SW	ASTM A182-F316/316L, ASME B16.11	
Bushing	-		-	-	Not Permitted	
Weldolet	6 to 24	2	S-Std/S-80	IRE x BE	ASTM A182-F316/316L, MSS SP-97	
Weldolet	8 to 24	3 to 10	S-Std/S-Std	IRE x BE	ASTM A182-F316/316L, MSS SP-97	
Nipoflange	6 to 24	2	Class 150	IRE x RF	IRE (S-Std run) x RF S-80 bore, ASTM A182-F316/316L	
Nipoflange	8 to 24	3 to 10	Class 150	IRE x RF	IRE (S-Std run) x RF S-Std bore, ASTM A182-F316/316L	
90° Ell	2		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
90° Ell	3 to 8		S-Std	BE	ASTM A403-WP316/316L-S, ASME B16.9	
90° Ell	10 to 24		S-Std	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
45° Ell	2		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
45° Ell	3 to 8		S-Std	BE	ASTM A403-WP316/316L-S, ASME B16.9	
45° Ell	10 to 24		S-Std	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Tee	2		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Tee	3 to 8		S-Std	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Tee	10 to 24		S-Std	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Tee (Red)	3 to 4	2	S-Std/S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Tee (Red)	4 to 8	3 to 6	S-Std	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Tee (Red)	10 to 24	4 to 20	S-Std	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Reducer	3 to 4	2	S-Std/S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Reducer	4 to 8	3 to 6	S-Std	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Reducer	10 to 24	4 to 20	S-Std	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Cap	2		S-80	BE	ASTM A403-WP316/316L-S, ASME B16.9	
Cap	3 to 8		S-Std	BE	ASTM A403-WP316/316L-S, ASME B16.9	





JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION		PAGE 16	

	DEVON CANADA CORPORATION		Page 3 of 3
	General Specification		Jul 11 2012 Rev 1A
	GS-5210	Piping Class Specification	AL71

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES
Cap	10 to 24		S-Std	BE	ASTM A403-WP316/316L-WX, ASME B16.9	
Gaskets	¾ to 24		Class 150	RF	Flexitallic Flexicarb CGI spiral wound gasket, 316 SS windings and inner ring, ASME B16.20	
	▲ 2 to 12		Class 300	RF	Flexitallic Flexicarb CGI spiral wound gasket, 316 SS windings and inner ring, ASME B16.20	
Bolting	All				ASTM A193-B7 stud bolts w/ ASTM A194-2H nuts	



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 17		

	DEVON CANADA CORPORATION		Page 1 of 2
	General Specification		Jul 11 2012 Rev 1A
GS-5210	Piping Class Specification		AL73

Design Code: ASME B31.3-10	Pressure Class: ASME 150	Temperature (°C): -45 to 200	C.A. (mm): 0.75	Service: Normal (Sweet)	Primary Joints: NPT/RF
General Notes Applicable to Piping Class: 1		Primary Material: Dual Graded 316/316L		Tubing Class: DL74	PWHT: Per Code

Primary Fluids/Service:
THIS CLASS IS RESTRICTED AND IT MAY ONLY BE USED AS PERMITTED BY FLOWCHART 1
 Corrosive Produced H₂O, Vents and Drains, Inert Gases, Corrosive Chemicals, Breathing Air, Clean Service Fluids (Lubricants, Hydraulic Fluids, Coolants), De-Mineralized or De-ionized H₂O


Joint Non-Destructive Examination: All Joints: 20% Visual Fillet Welds: 10% MT	Branch Tables per GS-5210: All Branch Connections: BCT2
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Primary Pressure / Leak Test Requirement: Recorded Hydrotest: Min. 2,850 kPag; Max. 3,000 kPag	Permissible Alternative Test: as per GS-5905 on Exception Basis Only
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Pressure - Temperature Rating:							
Temperature (°C)	-45 to 38	50	100	150	200		
Max. Design Pressure (kPag)	1,900	1,840	1,620	1,480	1,370		

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES
Pipe	¾ to 3		S-80S	TE	ASTM A312-TP316/316L SMLS, ASME B36.19M	
Nipples						13
Regular	¾ to 1 ½		S-160	TBE	ASTM A312-TP316/316L SMLS, ASME B36.10M	
Regular	2 to 3		S-80S	TBE	ASTM A312-TP316/316L SMLS, ASME B36.19M	
Swage	¾ to 1 ½	½ to 1	S-80	TBE	ASTM A403-WP316/316L-S, MSS SP-95	
Swage	2 to 3	¾ to 1 ½	S-80	TBE	ASTM A403-WP316/316L-S, MSS SP-95	
Flanges	¾ to 3		Class 150	RF NPT	ASTM A182-F316/316L, ASME B16.5	
Blind	¾ to 3		Class 150	RF	ASTM A182-F316/316L, ASME B16.5	
Flanges					<i>Tapped blinds per ASME B16.5-09 Table 6</i>	
Blanks	¾ to 3		Class 150	RF	Figure 8 Blank, ASTM A516-70N, ASME B16.48	
Fittings						
90° Ell	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
90° Ell	2 to 3		Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
45° Ell	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
45° Ell	2 to 3		Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
Tee	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Tee	2 to 3		Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
Tee (Red)	1 to 3	¾ to 1 ½	Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Tee (Red)	3	2	Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
Plug	¾ to 3		-	TE	ASTM A182-F316/316L, Solid Round Head, ASME B16.11	12
Coupling	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Coupling	2 to 3		Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
Coupling (Red)	1 to 3	¾ to 1 ½	Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Coupling (Red)	3	2	Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
Union (GJ)	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, integral seat, MSS SP-83 (rated per ASME B16.11)	
Union (GJ)	2 to 3		Class 2000	TE	ASTM A182-F316/316L, integral seat, MSS SP-83 (rated per ASME B16.11)	



JOB: 5B1109	EQUIPMENT & INSTRUMENTATION LIST		DATE	2014-08-13	
TAG No.	QTY	DESCRIPTION	PAGE 18		

	DEVON CANADA CORPORATION		Page 2 of 2
	General Specification		Jul 11 2012 Rev 1A
	GS-5210	Piping Class Specification	AL73

ITEM	NPS LGE	NPS SML	RATING	ENDS	GENERAL DESCRIPTION	NOTES
Cap	¾ to 1 ½		Class 3000	TE	ASTM A182-F316/316L, ASME B16.11	
Cap	2 to 3		Class 2000	TE	ASTM A182-F316/316L, ASME B16.11	
Bushing	-		-	-	Not Permitted	
Gaskets	¾ to 3		Class 150	RF	Flexitallic Flexicarb CGI spiral wound gasket, 316 SS windings and inner ring, ASME B16.20	
Bolting	All				ASTM A193-B7 stud bolts w/ ASTM A194-2H nuts	

