



UCH COMPRESSION PROJECT



Design Engineering, Procurement (Supply), Construction, Installation/Erection, Pre-Commissioning, Commissioning & Start-up (including performance testing and Reliability Guarantee Test) of Compression System at UCH Compression Project
Tender Enquiry No. PROC-FC/CB/PROJ/UCH(COM)-4462/2019

PRE-BID CLARIFICATION-13

Item No.	ITB Reference	ITB Description	Query	Response
1	Documents of telecom systems	As per clarification response, LAN and Telephone System shall be considered for new MCC room. Also CCTV is required.	Kindly provide the related FEED deliverables of Telephone, LAN, and CCTV systems. If not available, kindly provide the existing system drawings.	Bidder to note that single telephone set and one Lan connection is required at MCC room which will be linked to the existing Plant local telephone exchange. Cables may be laid from UCH-II existing MCC to new MCC room, provisions are available at existing MCC for both telephone and LAN connection. Bidder scope is to supply and laying of telephone and LAN cables from existing MCC to new MCC along with supply and installation of telephone set, wall outlet face plates and other accessories required for complete installation of LAN and telephone set. The quantity and placement shall further be finalized during detail engineering stage. Further, bidder should collect the relevant information during Pre-bid Site visit.
2	Information of existing telecom systems	As per clarification response, LAN and Telephone System shall be considered for new MCC room. Also CCTV is required.	Bidder assumes that the existing IP PBX, LAN and CCTV core system is located in the existing Control Room. New MCC room will be connected with the existing systems. Kindly clarify if not correct. Kindly provide the existing systems information: manufacture and model.	Kindly refer to OGDCL/ENAR reply against Sr. No 1.
3		Compressor shed	Please clarify whether it is an enclosed shelter or not?	Bidder to consider 'steel structure shed' for the compressors while for turbine, bidder to refer sec.8.2.6 of Doc. No. 0221-GS-9510-3 (Spec for Centrifugal Compressors).
4		Diesel pump shed in UCH-II zone	Please clarify if there has a shed in the existing diesel pump area?	No shed is available in existing diesel pump area
5		(1) A steel structure shed shall also be provided on the new Instrument Air/ Nitrogen Generation System. (2) A Sun Shade Shall Be Provided at The Skid for Protection from High Ambient Temperature And / Or Rain	Refer to (1) and (2), Shed Requirement is specified. However, Requirement of Lifting arrangement is not specified. Company to advise on Lifting arrangement for these. Also, for below equipment, please advise whether shed or lifting facility is required: (1) Utility Water Pump (2) Cooling Water Pump	Please refer Sec.3.8 of SEC.III (scope of work) where overhead crane for lifting equipment requirement is clearly mentioned. For Utility & Cooling water pump lifting facility or shed, please note that EPCC contractor shall finalize such requirements during detailed engineering and submit for OGDCL/ENAR review and approval.



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Item No.	ITB Reference	ITB Description	Query	Response
6	(1) SECTION – III Scope of Work, 4.14 and 4.16	<p>As per Scope of Work (Section II of ITB), 4.14 : The EPC contractor shall be complete responsible for dismantling, relocation, re-installation, testing and commissioning of electrical equipment of Diesel storage tank (800-TK1010) area and Diesel pumps (800-P101A/B)</p> <p>4.16: The scope shall be as minimum as follows; a. 02nos. motors for diesel pumps installed at existing location shall be dismantled, relocated & reinstalled at new proposed location.</p> <p>b. All the electrical motors local on/off switches / LCS shall be dismantled, relocated & reinstalled from existing location to new proposed location.</p> <p>i. All the civil/structural work related to dismantling & installation of electrical equipment shall be in the scope of contractor. This work shall include not limited to the dismantling / cutting of the existing floor, making as a new, structural works, covering of cable trenches with grading / chequered plates, closing of hole in wall / floor etc. without charges of extra cost for the completion of entire electrical works</p>	<p>Refer to these Scope work items; Bidder understand that relocation scope involves only dismantling and re-installation of Electrical Equipment of Diesel Pumps / Diesel Tank and its associated (electrical) system, and NOT the relocation of Diesel Pump complete skids and Diesel Storage tanks.</p> <p>Please confirm our understanding and advise way forward for relocation scope for Electrical equipment w.r.t to any re-work required on Diesel Pump units and Storage tank (if these are remained to same location)</p>	<p>Please refer Sec.1.1 (Sheet 4 of 35) of SEC.II (Instructions To Bidder) where it is clearly mentioned that following activity shall be in EPC contractor's scope of work;</p> <p>"-Relocation of existing Diesel Tank, pumps and its associated systems."</p> <p>Accordingly relocation complet in all respect is the responsibility of EPCC. Further any item/material not in usable condition shall be arranged (brand new) by EPCC.</p>
7		4985-PC-2201-2B (OVERAL PLOT PLAN)	Please kindly verify the compressor maintenance space and relevant compressor shedsize,minimum compressor maintenance space is recommended to be added in compressor Shed(consider of existing fence on the north and east of shed and new pipe rack on the south of shed,compressor maintenance is inconvenience and limited),then size of compressor shed is recommended to be added,or modify the existing fence,please clarify.	Please note that shared plot plan is developed on the basis of basic engineering (FEED). Bidder (in case of award of contract) shall be responsible for proposing shed size and maintenance area (while forecasting any modification in existing fence) for OGDCL/ENAR review/approval during detailed engineering stage.
8		P&ID 56501-F-208 and 0221-PB-2100 SLUG CATCHER	Please Clarify What is the PSV relief case of M-200/210, M-200 PSV size needs to be check and provide the result.	It is to note that as per SOW detailed engineering is in bidder's scope. Furthermore, EPCC shall check and perform all possible scenarios for selection of all new PSVs as already stipulated in SOW.



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Item No.	ITB Reference	ITB Description	Query	Response
9		0221-A-1008-0 (Blowdown Study Report)	Please clarify that table 1 calculation case is consider of M-200 and M-210 in parallel operation, otherwise please re-check these data.	It is to note that documents provided in tender are of FEED stage and as per SOW validation of FEED documents & detailed engineering are in bidder's scope. Furthermore, bidder to note that common BDV is provided for both M-200 & M-210 blowdown scenario as already depicted in Blowdown Study Report as well as in P&IDs.
10		0221-PB-2106-C (Fuel gas system) 0221-GS-9510-3 (Spec for Centrifugal Compressors)	In 8.2.4item in 0221-GS-9510-3 (Spec for Centrifugal Compressors), the fuel gas system shall include function of pressure reduction, primary separator, metering which are mismatched with 0221-PB-2106-C (Fuel gas system) Fuel gas treatment flow diagram. In Flow diagram there are no such function. Please clarify above them and quantities and otherwise. Compressor vendor can't provide above all the facilities. Please clarify scope of work for 0221-PB-2106-C (Fuel gas system)	It is to note that 0221-PB-2106-C (Fuel gas system) is the fuel gas system for whole FEC facility. Furthermore, Section 8.2.4 of 0221-GS-9510-3 (Spec for Centrifugal Compressors) clearly shows the individual Fuel Gas Treatment System requirement for each Turbo-Compressor to be provided by Vendor.
11		0221-PD-1008-B Piping layout	Please clarify which PID indicate 251-PCV-004/005.	Typo error in piping layout. Bidder to consider P&IDs as 'base' document to determine scope of work. Further, Piping Layouts are 'tentative & for indicative purpose only' and developed for routing indication only.
12		0221-PB-2105-C P&ID for Plant Air, Nitrogen & Service Water	Please clarify the location of 251-PCV-003 & 251-FE-002 is suitable or not. Could we update them?	The provided P&IDs are for indicative purpose only and contains minimum requirement. Furthermore, EPCC shall update and finalize all P&IDs during detailed engineering stage.
13		50561-F-208 Slug Catcher M-200 0221-PA-2000-A (Specification for Piping design and Material)	Please add Piping Class "A4" in document:0221-PA-2000-A (Specification for Piping design and Material) for piping number:36"-G-A4-1075 in PID:50561-F-208	Please refer attached Doc.4985-PA-2002a-0 (Piping Material Design)
14		50561-F-208 Slug Catcher M-200 0221-PA-2000-A (Specification for Piping design and Material)	Please add Piping Class "A2" in document:0221-PA-2000-A (Specification for Piping design and Material) for piping number:8"-F-A2-2200 in PID:50561-F-208	No need of "A2" piping spec as TP-019 is marked on "A4" piping spec.
15		50561-F-208 Slug Catcher M-200 0221-PA-2000-A (Specification for Piping design and Material)	Please clarify piping number:36"-PF-DC-1075A in PID:50561-F-208 should be classified as Class DC1 or DC2?	"DC" piping spec is attached. Further, bidder (after award of contract, if successful) to calculate wall thickness for 36" size pipe and share with OGDCL/ENAR for review/approval during detail engineering stage



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Item No.	ITB Reference	ITB Description	Query	Response
16		50561-F-208 Slug Catcher M-200	Piping class transformation is missing on Piping number:8"-CD-DC-3207A.	Bidder to consider spec break (A4 / DC) at TIP-004 on referred P&ID.
17		0221-DS-1705-0 (Cooling Water System) & 0221-PB-2107 PID for Cooling Water System & 0221-ELB-6600-0 Single Line Diagram 0.4kV Switchgear-MCC	According to the SLD, The Cooler water supply pumps are driven by VFD, which is not shown in DS and PID. The Cooler water supply pump rated 280kW, 0.4kV are suggested to be driven by VFD, please confirm it.	Cooling water supply pump motors-A & B shall be VFD driven as mentioned on to referred single line diagram. All the VFD's shall be energy efficient and ultra-low harmonic type.
18		Electrical	Please supply the drawing of MCC Layout (UCH-II)	Layouts as necessary have already been shared through tender document, additional detail/information, if required, will be collected/verified by bidder during pre-bid site visit. However, drawings as required above, if available at OGDCL, shall be submitted/shared after award of contract.
19		Clarification-03 published on 06-04-2020 on OGDCL website	Please note the content of Clarification-03 published on OGDCL website are same with Clarification-02. Please clarify this.	The contents are different, however, numbering system will be corrected by OGDCL.



Job No. 14 – 4985	
Spec. No. 4985-PA-2002a	
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SPECIFICATION FOR PIPING MATERIAL DESIGN

Project: **UCH-II Development Project**

Client: **Oil & Gas Development Company Limited**

Prepared by: **MTZ**
Checked by: **MHQ**
Approved by: **FS**
Revised by: **-**

Rev.	Description of Revision	Date	Revised Page Nos.
0	ISSUED FOR BIDDING	October 5, 2011	



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1.0 SCOPE

This specification covers the selection of commodity piping materials to be used in design, fabrication and installation of the gas gathering system and the liquid handling facilities plant for Oil & Gas Development Company's (OGDC) UCH-II Development Project.

2.0 MATERIALS

Materials for use in sour gas piping systems shall meet all the requirements of NACE MR0175 / ISO 15156. It is imperative that all materials selected and purchased for use in sour gas systems are resistant to sulfide-stress cracking (SSC), Hydrogen-induced cracking (HIC), and stress-oriented hydrogen induced cracking (SOHIC). For carbon steel materials, hardness control in manufacture is extremely critical.

Materials manufactured from carbon steels that do not meet the NACE requirements are satisfactory for utility air and instrument air system services.

3.0 SPECIFICATION NUMBERING

3.1 Piping Material

The two digits piping material design specifications are coded as follows:

First Digit:	Base Material
	A. Carbon Steel
	B. Stainless Steel

Second Digit:	Design Pressure and Service
<u>Design Pressure</u>	<u>Service</u>
1 150 psig	Air, Nitrogen or Water
2 150 psig	Sour Gas or Liquid
4 1,050 psig	Sour Gas or Liquid
5 1,250 psig	Sour Gas or Liquid
6 1,340 psig	Sour Gas or Liquid

3.2 Valve Designations

A five digit code is provided for each valve coded as follows:

First digit:	Valve type
Second digit	Pressure Rating
Third digit:	Material
Forth and Fifth digits:	End Type

Valve Type	Pressure Rating	Material	End Type
B = Ball	1 = ANSI 150#	C = Carbon Steel	SW = Socket Weld
D = Instrument Manifold	2 = ANSI 300#	S = Stainless Steel	SC = Screwed
C = Check	3 = ANSI 600#	B = Carbon body	BW = Butt weld
G = Gate	4 = ANSI 900#	Alloy Internals	FR = RF Flanged
	7 = 3000 # CWP		FX = RJ Flanged
			ST = SW x SC

4.0 **SPECIFICATIONS**

Piping material design specifications for the UCH II Development Project are as under:

SPECIFICATION A1

Spec.	Service	Design Pressure	Design Temperature
A1	Instrument Air, Utility Air, fire Water, Low Pressure Nitrogen	150 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	250 Psig	335 Psig

Pipe:

Size	Material	Schedule
2" - Smaller	API 5L GR B / A – 53 Gr. B	80
3" – 12"	API 5L GR B / A – 53 Gr. B	STD

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" – 1½"	ANSI 150#	ASTM A105	Socket Weld Raised Face	160
2"	ANSI 150#	ASTM A105	Weld Neck Raised Face	80
3" – 12"	ANSI 150#	ASTM A105	Weld Neck Raised Face	STD

Weld Fittings:

Size	Standard	Material	Schedule
¾" – 1½"	B16.11	A-105	3000#
2"	B16.9	A234 WPB	80
3" – 12"	B16.9	A234 WPB	STD



Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B1CFR	Ball	2 – 3	ANSI 150#	RF Flanged	Wrench
B1CFR	Ball	4	ANSI 150#	RF Flanged	Wrench
B1CFR	Ball	6 and above	ANSI 150#	RF Flanged	Hand wheel
C7SSC	Check	1- 1½	3000# CWP or 3600 WOG	Threaded Weld	Swing
C7SSW	Check	1- 1½	3000# CWP	Socket Weld	Swing
C1CFR	Check	2 and above	ANSI 150#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34 All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Branch Chart: A1

Branch	Header																		
	¾	1	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28		
¾	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
1		T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
2			T	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	
3				T	T	T	O	O	O	O	O	O	O	O	O	O	O	O	
4					T	T	T	O	O	O	O	O	O	O	O	O	O	O	
6						T	T	T	O	O	O	O	O	O	O	O	O	O	
8							T	T	T	T	O	O	O	O	O	O	O	O	
10								T	T	T	T	O	O	O	O	O	O	O	
12									T	T	T	T	O	O	O	O	O	O	
14										T	T	T	T	O	O	O	O	O	
16											T	T	T	O	O	O	O	O	
18												T	T	T	T	T	O	O	
20													T	T	T	T	O	O	
22														T	T	T	O	O	
24															T	T	T	O	
26																T	T	O	
28																		T	O

T = Tee, Reducing Tee or Extruded Header

O = Olet



GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI Spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193, Grade B7M with fluoro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluoro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION A2

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156.

Spec.	Service	Design Pressure	Design Temperature
A2	L.P. Fuel Gas Flare, Condensate, Produced Water	150 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.5	250 Psig	335 Psig

Pipe:

Size	Material	Schedule
2" & Smaller	API 5L GR B / A 106 Gr. B	80
3" – 12"	API 5L GR B/ A 106 Gr. B	STD
16" – 24"	API 5L GR B/ A 106 Gr. B	STD
30"	API 5L GR B	STD

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" - 1½"	ANSI B16.5 300#	ASTM 105	Socket Weld Raised Face	160
2"	ANSI B16.5 300#	ASTM 105	Weld Neck Raised Face	80
3"	ANSI B16.5 300#	ASTM 105	Weld Neck Raised Face	STD
4" – 12"	ANSI B16.5 150#	ASTM 105	Weld Neck Raised Face	STD
16" – 24"	ANSI B16.5 150#	ASTM 105	Weld Neck Raised Face	STD
30"	MSS SP 44 150#	ASTM 105	Weld Neck Raised Face	STD

Weld Fittings:

Size	Standard	Material	Schedule
¾" – 1½"	B16.11	ASTM A-105	3000#
2"	B16.9	A234 WPB	80
3" – 12"	B16.9	A234 WPB	STD
16" – 24"	MSS SP 75	A234 WPB	STD
30"	MSS SP 75	A234 WPB	STD



Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B2SFR	Ball	2 – 3	ANSI 300#	RF Flanged	Wrench
B1BFR	Ball	4	ANSI 150#	RF Flanged	Wrench
B1BFR	Ball	6 and above	ANSI 150#	RF Flanged	Hand wheel
C7SSW	Check	1-1½	3000# CWP	Socket Weld	Swing
C2BFR	Check	2 – 3	ANSI 300#	RF Flanged	Swing
C1BFR	Check	4 and above	ANSI 150#	RF Flanged	Swing

Alt valves must be designed and manufactured In accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Branch Chart: A2

Branch	Header																	
	¾	1	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	
¾	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
1		T	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2			T	T	O	O	O	O	O	O	O	O	O	O	O	O	O	O
3				T	T	T	O	O	O	O	O	O	O	O	O	O	O	O
4					T	T	T	O	O	O	O	O	O	O	O	O	O	O
6						T	T	T	O	O	O	O	O	O	O	O	O	O
8							T	T	T	T	O	O	O	O	O	O	O	O
10								T	T	T	T	O	O	O	O	O	O	O
12									T	T	T	T	O	O	O	O	O	O
14										T	T	T	T	O	O	O	O	O
16											T	T	T	O	O	O	O	O
18												T	T	T	T	T	O	O
20													T	T	T	T	O	O
22														T	T	T	O	O
24															T	T	T	O
26																T	T	O
28																	T	O

T = Tee. Reducing Tee or
Extruded Header O = Olet

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the



flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193, Grade B7M with fluoro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluoro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION A4

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156.

Spec.	Service	Design Pressure	Design Temperature
A4	H.P. Plant Gas Piping	1050 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,600 Psig	2,160 Psig

Pipe:

Grade	Material	Size	Schedule
GRB	API 5L / A 106 Gr. B	8" Smaller	XS
X65	API 5L	36"	0.750" Wall

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" - 1½"	ANSI B 16.5 600#	ASTM A105	Socket Weld Raised Face	160
2" - 8"	ANSI B 16.5 600#	ASTM A105	Weld Neck Raised Face	XS
36"	MSS SP 44 600#	ASTM A105	Weld Neck Raised Face	0.750" Wall

Weld Fittings:

Size	Standard	Material	Schedule
¾" - 1½"	B16.11	A-105	3000#
2" - 8"	B16.9	A234 WPB	XS
36"	MSS SP 75	A234 WPY65	0.750" Wall

Valves:

Code Designation	Valve Type	Size Range in Inches	Design Pressure	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 - 3	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	4	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSW	Check	1½ and Below	3000#	Socket Weld	Swing
C3SFR	Check	2 - 3	ANSI 600#	RF Flanged	Swing
C3BFR	Check	4 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. Check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees, shall be used for all branch connections where the branch size is 2-Inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for Instrumentation and sampling, weldolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No threadolets or elbolets shall be used.

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves, shall be used in place of a Flexitallic gasket all gaskets shall be manufactured in accordance with ANSI B 16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193, Grade B7M with fluoro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluoro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION A5

All pipes must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
A5	Gas Flow Line Pipe	1,250 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.72	1,900 Psig	2,160 Psig

Pipe:

Size	Material	Schedule
8"- 12"	API 5LX52	STD

SPECIFICATION A6

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
A6	Well Head Gas, Launchers and Receivers Gas, H.P. Plant Gas Piping.	1,250 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,900 Psig	2,160 Psig

Pipe:

Size	Material	Grade	Schedule
6" Smaller	API 5L / A 106 Gr. B	GRB	XS
8"-12"	API 5L / A 106 Gr. B	X.52"	XS
30"	API 5L	X.65	0.750" wall

Flanges:

Size	Pressure Rating	Material	Type	Schedule
¾" - 1½"	ANSI B16.5 600#	ASTM A105	Socket Weld Raised Face	160
2"-12"	ANSI B16.5 600#	ASTM A105	Weld Neck Raised Face	XS
30"	MSS SP 44 600#	ASTM A105	Weld Neck Raised Face	0.750" wall

Weld Fittings:

Size	Standard	Material	Schedule
¾" - 1½"	B16.11	ASTM A-105	3000#
2" - 12"	B16.9	ASTM A234 WPY52	XS
30"	MSS SP 75	ASTM A234 WPY65	0.750" wall

Valves:

Code Designation	Valve Type	Size Range in Inches	Design Pressure	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 3	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	4	ANSI 600#	RF Flanged	Wrench
B3BFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSW	Check	1½ and Below	3000#	Socket Weld	Swing
C3SFR	Check	2 – 3	ANSI 600#	RF Flanged	Swing
C3BFR	Check	4 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. Check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for instrumentation and sampling, weldolets may be used for sizes smaller than 2” so long as the branch to header diameter ratio is 50% or less. No thredolets or elbolets shall be used.

GASKETS

All gaskets shall be 1/8" Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek insulating gasket with a 316L SS retainer and bolt sleeves-shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193. Grade B7M with fluoro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194. Grade 2HM with fluoro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION B4

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
B4	H.P Gas Piping	1,050 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,600 Psig	2,160 Psig

Pipe:

Size	Material	Schedule
1½” Smaller	A – 312 TP / 316L SS	80 S
2”- 18”	316L SS	80 S

Flanges:

Size	Pressure Rating	Material	Type	Schedule
1½” Smaller	ANSI B16.5 600#	A – 182 Gr. F / 316L Dual Stamped 316	Socket Weld Raised Face	80 S
2”-6”	ANSI B16.5 600#	A – 182 Gr. F / 316L Dual Stamped 316	Weld Neck Raised Face	80 S
18”	MSS SP 44 600#	A – 182 Gr. F / 316L Dual Stamped 316	Weld Neck Raised Face	80 S

Weld Fittings:

Size	Standard	Material	Schedule
1½” Smaller	B16.11	A-182 F-316L SS	6000#
2” – 6”	B16.9	A-403 WP-316L SS	80 S
8” – 18”	MSS SP 75	A-403 WP-316L SS	80 S

Valves:

Code Designation	Valve Type	Size Range in Inches	Design Pressure	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 4	ANSI 600#	RF Flanged	Wrench
B3SFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSW	Check	½ - 1½	3000# CWP	Socket Weld	Swing
C3SFR	Check	2 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2” and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for Instrumentation and sampling, weldolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No thredolets or elbolets shall be used.

GASKETS

All gaskets shall be Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek Flowlok insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -193. Grade B7M with fluoro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194. Grade 2HM with fluoro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION B5

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
B5	H.P Gas Piping	1,250 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	1,900 Psig	2,200 Psig

Pipe:

Size	Material	Schedule
1" Smaller	A – 312 TP / 316 SS	80 S
2"-6"	A – 312 TP / 316 SS	80 S
8"-16"	A – 312 TP / 316 SS	80 S
18"	A – 312 TP / 316 SS	80 S

Flanges:

Size	Pressure Rating	Material	Type	Schedule
1½" Smaller	ANSI B16.5 600#	A-182 Gr. F / 316L Dual Stamped 316	Socket Weld Raised Face	80 S
2"- 16"	ANSI B16. 600#	316L Dual Stamped 316	Weld Neck Raised Face	80 S
18"	MSS SP 44 600#	316L Dual Stamped 316	Weld Neck Raised Face	80 S

Weld Fittings:

Size	Standard	Material	Schedule
1½"- Smaller	B16.11	A-182 F-316L SS	3000#
2" – 6"	B16.9	A-403 WP-316L SS	80 S
8" – 12"	B16.9	A-403 WP-316L SS	80 S
16"	MSS SP 75	A-403 WP-316L SS	80 S

Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1½	3000# CWP	SW x Thread	Wrench
B3SFR	Ball	2 – 4	ANSI 600#	RF Flanged	Wrench
B3SFR	Ball	6 and above	ANSI 600#	RF Flanged	Hand wheel
C7SSC	Check	1 - 1½	3000# CWP or 3600 WOG	Threaded	Swing
C7SSW	Check	½ - 1½	3000# CWP	Socket Weld	Swing
C3SFR	Check	2 and above	ANSI 600#	RF Flanged	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156, 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for instrumentation and sampling, weldolets and sockolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No threadolets or elbolets shall be used.

GASKETS

All gaskets shall be Flexitallic Style CGI spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek

Flow lock insulating gasket with a 316L SS retainer and bolt sleeves shall be used In place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -103, Grade B7M with fluoro-polymer coating. All hex nuts provided with these bolts shall be ASTM A -194, Grade 2HM with fluoro-polymer coating.

TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

SPECIFICATION B6

All pipe, valves and fittings must meet the material requirements of NACE MR0175 / ISO 15156

Spec.	Service	Design Pressure	Design Temperature
B6	Well Head Gas Piping	1,340 Psig	30 to 150 °F

Design Factor and Hydrostatic Testing

Design Factor	Minimum Test Pressure	Maximum Test Pressure
0.50	2,050 Psig	2,160 Psig

Pipe:

Size	Material	Schedule
1½"- Smaller	A-312 Gr. TP / 316L SS Dual Stamped 316	80 S
2"-6"	A-312 Gr. TP /316L SS Dual Stamped 316	80 S

Flanges:

Size	Pressure Rating	Material	Type	Schedule
1½" - Smaller	ANSI B16.5 900#	A-182 Gr. F / 316L SS	Socket Weld Raised Face	80 S
2"-6"	ANSI B16.5 900#	A-182 Gr. F / 316L SS	Weld Neck Raised Face	80 S
8" - 16"	ANSI B16.5 900#	A-182 Gr. F / 316L SS	Weld Neck Raised Face	80 S

Weld Fittings:

Size	Standard	Material	Schedule
1½" - Smaller	B16.11	A-182 F-316L SS	3000#
2" - 6"	B16.9	A-403 TP-316L SS	80

Valves:

Code Designation	Valve Type	Size Range in Inches	Pressure Rating	End Connection	Operation
B7SSW	Ball	½ - 1-½	3000# CWP	Socket Weld	Wrench
B7SST	Ball	½ - 1-½	3000# CWP	SW x Thread	Wrench
B4SFR	Ball	6 and above	ANSI 900#	RF Flanged	Hand wheel
C7SSW	Check	½ - 1-½	3000# CWP	Socket Weld	Swing

All valves must be designed and manufactured in accordance with ASME B 16.34. All valves must meet the material requirements of NACE MR0175 / ISO 15156. 2" and larger check valves are to be bolted bonnet.

BRANCH CONNECTIONS

Smoothly contoured tees shall be used for all branch connections where the branch size is 2-inch or larger. Smoothly contoured tees are always preferred for branch connections where practical. For small branch connections for instrumentation and sampling, weldolets may be used for sizes smaller than 2" so long as the branch to header diameter ratio is 50% or less. No thredolets or elbolets shall be used.

GASKETS

All gaskets shall be Flexitallic Style CG1 spiral-wound gaskets. Materials of construction for the Flexitallic gaskets shall be type 316L stainless steel with flexicarb filler. Where the flange connections involve connection of a stainless steel flange to a carbon steel flange, a Pikotek Flowlok insulating gasket with a 316L SS retainer and bolt sleeves shall be used in place of a Flexitallic gasket. All gaskets shall be manufactured in accordance with ANSI B16.20 and shall meet the requirements of NACE MR0175 / ISO 15156.

BOLTING

All bolting for flanges shall be ASTM A -103, Grade B7M with fluoro-polymer coating. All hex nub provided with these bolts shall be ASTM A -194, Grade 2HM with fluoro-polymer coating.


TUBING

All tubing and tubing fittings shall be stainless steel ASTM 316 manufactured to meet the design pressure and temperature of this piping material specification.

NOTES

- A. PRESSURE / TEMPERATURE LIMITS ARE BASED ON FLANGE RATINGS IN ACCORDANCE WITH ANSI / ASME B 16.5 LATEST EDITION.
- B. PRESSURE / TEMPERATURE RATING NOT APPLICABLE TO SOFT SEATED VALVES. E.G. BALL VALVES .
- C. TEST PRESSURE: 2100PSIG, REFER TO LINE LIST FOR HYDROSTATIC TEST PRESSURE.
- D. STAINLESS STEEL MATERIAL SHALL BE SOLUTION ANNEALED.
- E. STUDBOLT LENGTHS SHOWN ARE BASED ON ANSI/ASME B 16.5 LATEST EDITION AND ARE FOR STANDARD FLANGE BOLTING, SPECIAL BOLT LENGTHS E.G. FOR SPECTACLE BLIND, TO BE CALCULATED TO SUIT.
- F. COLD WORKING IS NOT PERMITTED.
- G. ALL COMPONENTS TO BE WELDED SHALL MEET THE FOLLOWING REQUIREMENTS.
 - (a) CARBON CONTENT = 0.030 % MAX
- H. IF IMPACT TESTING IS REQUIRED REFER TO PROJECT SPECIFICATION FOR PIPING DESIGN AND MATERIAL AND
- I. ALL PIPING MATERIAL SHALL BE COMPLIANCE WITH NACE MR-01-75/ ISO15156 (LATEST EDITION)
- J. FOR DETAIL REQUIREMENT OF VALVES REFER DOC#4985-PA-2003.

ADDITIONAL NOTES

	PIPING MATERIAL SPECIFICATION	PROJECT Gas Plant Facility Project								
	SPEC. DC	CORROSION ALLOWANCE 0.0 mm	DESIGN CODE ASME B31.3		A	10/1/2011	FIRST ISSUE	WRK	MK	FS
	RATING ASME 600 LB RF	MAIN MATERIAL DUPLEX STEEL	JOB NO. 14 - 4985		Rev.	Date:	Description	Prep. by:	Chk. by:	Appr. by:
Doc. No. 4985-PA-2002-09(Sheet 2 of 2)										