



CENTRAL U.P. GAS LIMITED
(CITY GAS PROJECT IN KANPUR & BAREILLY)

**BID DOCUMENT FOR THE
PROCUREMENT OF CS FITTING,
VALVES & INSULATION JOINT
FOR KANPUR, UNNAO, BAREILLY
AND JHANSI**

BID DOCUMENT NO : CUGL/C&P/TEN2324/47

E-TENDER NO. : 55744

OPEN DOMESTIC COMPETITIVE BIDDING

TECHNICAL DOCUMENTATION

TECHNICAL, VOL II OF II



**PROCUREMENT OF CS FITTINGS, VALVES AND
INSULATION JOINTS**

**CENTRAL UP GAS LIMITED (CUGL)
CITY GAS DISTRIBUTION PROJECT
TENDER FOR PROCUREMENT OF CS FITTINGS & FLANGE, VALVES
AND
INSULATION JOINTS**

**SECTION-V- (A)
TECHNICAL SPECIFICATION
(FOR GROUP-A)**

**PROCUREMENT OF CS FITTINGS, VALVES AND
INSULATION JOINTS**



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1.0 SCOPE OF SUPPLY

1.1 General

This Section covers the scope of supply of Fittings and Flanges to be used in the City Gas Distribution Project at Kanpur, Bareilly & Jhansi.

The scope of supply covers the design, manufacture, inspection, testing, and preparation for shipment and documentation requirements for these items in accordance with the requirements of this Requisition.

1.2 Material Delivery Requirements

The finished materials are to be delivered by the Supplier at the nominated delivery point at Kanpur, fixed by the Purchaser/ Purchaser Representative.

The Supplier shall be responsible for all handling and transportation between his production plant and the nominated delivery point in accordance with this specification.

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2.0 Bid Compliance

2.1 Supplier's Compliance

Supplier shall submit his bid in full compliance with the requirements of this MR and attachments. Bidder shall include the following statement in his bid:

We certify that our bid is fully complying with your enquiry dated and referenced

.....
,

Compliance with this material Requisition in any instance shall not relieve the Vendor of his responsibility

to meet the specified performance.

2.2 Compliance with Specification

The supplier shall be completely responsible for the design, materials, fabrication, testing, and inspection, preparation for shipment & transfer of above material to nominated delivery point strictly in accordance with the MR & all attachments thereto.

2.3 Supplier's Scope

Supplier's scope of work includes design, manufacture & Testing and Supply of Fittings and flanges as per attached specification.

2.4 Inspection

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Pre-Dispatch Inspection shall be performed by CUGL appointed Third Party Inspection agency. The supplier is required to submit QAP to CUGL for prior approval before inspection call. Any charges which will be required to carry out the testing and other inline inspections shall be in scope of bidder.

3.0 SPECIAL INSTRUCTIONS TO BIDDERS

- 3.1** Bidder to note that no correspondence shall be entered into or entertained after the bid submission.
- 3.2** Bidder shall furnish quotation only in case he can supply material strictly as per this Material Requisition and specification/data sheets forming part of Material requisition.
- 3.3** If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope & technical/performance data required to be submitted with the offer, the offer shall be liable for rejection.
- 3.4** The submission of prices by the Bidder shall be construed to mean that he has confirmed compliance with all technical specifications of the corresponding item(s).
- 3.5** Bidder must submit all documents as listed in checklist along with his offer.
- 3.6** Supplier must note that stage wise inspection for complete fabrication, testing including the raw material inspection to be carried out.

4.0 INFORMATION/DOCUMENTS/ DRAWINGS TO BE SUBMITTED BY SUCCESSFUL BIDDER

Successful Bidder shall submit three copies, each of the following documents unless noted otherwise,

- 4.1** Inspection & test reports for all mandatory tests as per the applicable code as well as test reports for any supplementary tests, in nicely bound volumes.

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- 4.2 Material test certificates (physical property, chemical composition, make, heat treatment report, etc.) as applicable for items in nicely bound volumes.
- 4.3 Statutory test certificates, as applicable.
- 4.4 Filled in Quality Assurance Plan (QAP) for Purchaser's/ Consultant's approval. These QAPs shall be submitted within 15 days from LOI/ FOI.
- 4.5 WPS & PQR, as required.
- 4.6 The detailed fabrication drawings for Purchaser's/Consultant's approval within two (2) weeks of placement of order.
- 4.7 Detailed completion schedule activity wise (Bar Chart), within one week of placement of order.
- 4.8 Weekly & fortnightly progress reports for all activities including procurement.
- 4.9 Purchase orders of bought out items soon after placement of order.
- 4.10 All approved drawings as well as inspection and test reports for Owner's/ Consultants reference/ record in nicely category-wise bound volumes separately.
- 4.11 A list of documents to be furnished along with supply.

Note: All drawings, instructions, catalogues, etc., shall be in English language and all dimensions shall be metric units.



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5. Check Lists

CHECKLIST – TECHNICAL

REQUISITION FOR:	FLANGES AND FITTINGS
PROJECT:	CITY GAS DISTRIBUTION PROJECT

Bidder confirms the compliance of the following check listed items , as a minimum, to have been enclosed in the offer.

S.NO.	Requirements	Compiled by Bidder
1	Reference List of previous supply of Fittings & Flanges (for similar design as quoted) enclosed.	Yes/No
2	Filled - up Data Sheets, duly signed and stamped by bidder enclosed.	Yes/No
3	Compliance statement duly filled and stamped enclosed.	Yes/No
4	GA & assembly drawings, cross section drawings including part list & material list enclosed.	Yes/No
5	Other technical details & vendor's product catalogues enclosed.	Yes/No

To be filled, signed and stamped by bidder

**Bidder's Seal
Bidder**

Signature of



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6. COMPLIANCE STATEMENT:

COMPLIANCE STATEMENT

REQUISITION FOR:	FLANGES AND FITTINGS
PROJECT:	CITY GAS DISTRIBUTION PROJECT

S.No.	Requirement	Bidder's Confirmation
1	Bidder confirms that all materials proposed for supply by the bidder are same/superior to those specified in specification/ data sheets enclosed.	
2	Bidder confirms that the offer is in total compliance with the Technical requirements of the Material Requisition. Bidder confirms that deviation expressed or implied anywhere else in the offer shall not be considered valid.	
3	Bidder confirms that in the event of securing order for the requisitioned item(s), good for manufacturing drawings of ordered item(s) shall have complete details with dimensions, part list and material list including back-up calculations in the first submission, failing which the vendor shall be solely responsible for any likely delay in delivery of item(s).	

Bidder's Signature with Stamp

7. REFERENCES

As per table below:



**PROCUREMENT OF CS FITTINGS, BALL VALVES AND
INSULATION JOINTS**

**FORM-A
REFERENCE LIST FOR SUPPLY OF FLANGES AND FITTINGS FOR THE LAST SEVEN YEARS**

S.No.	Project	Client (Name & Address)	Flange Type	Size	Rating	Service	Year of Supply

To be filled, signed and stamped by Bidder.

Bidder's Seal

Signature of Bidder



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9.0 WARRANTY

10.0 DOCUMENTATION



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

1.0 SCOPE

1.1 This specification covers the minimum requirements for the design, manufacture and supply of following carbon steel fittings of size up to DN 200 mm (8”) and higher to be installed in natural gas or liquid hydrocarbon pipelines and piping system.

1.1.1 Fittings such as tees, elbows, caps etc. shall conform to the requirements of MSS- SP-75, latest edition. Dimensions standard for Screwed/SW fittings shall be as per ANSI B16.11.

1.2 All requirements contained in the above standards shall be fully valid unless cancelled, replaced or amended by more requirements as stated in this specification.

This specification does not cover the above-mentioned items, which are to be installed in pipeline handling sour hydrocarbon (liquid/gas) service as defined in NACE standard MR-0175-98.

2.0 REFERENCE DOCUMENTS

Reference has also been made in this specification to the latest edition of the following codes, standards and specifications:

- | | | |
|----|---------------|---|
| a) | ASME B 31.8: | Gas Transmission and Distribution Piping System |
| b) | ASME B 31.4: | Liquid transportation system for hydrocarbon liquid petroleum gas, anhydrous ammonia and alcohols |
| c) | ANSI B 16.25: | Butt – Welding Ends |
| d) | ASME B 16.9: | Factory made wrought steel butt welding fittings |
| e) | ASME B 16.11: | Forged Steel Fittings, Socket Welding and Threaded |
| f) | ASTM A 370: | Mechanical Testing of Steel Products |
| g) | ASTM Part-1: | Steel Piping, Tubing, Fittings |
| h) | MSS-SP-25: | Standard marking system for valves, fittings, flanges and unions. |
| h) | MSS-SP-75: | Specification for High Test Wrought Welding Fittings |



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- i) MSS-SP-97: Forged carbon steel branch outlet fittings – socket welding, threaded and butt welding ends
- 2.0 In case of conflict between the requirement of MSS-SP-75, & above reference documents and this specification, the requirements of this specification shall govern

3.0 MANUFACTURE'S QUALIFICATION

Manufacturer who intends bidding for fittings must possess the records of a successful proof test in accordance with the provisions of relevant MSS-SP-75 / ASME B16.9/ as applicable. These records shall be submitted at the time of bidding.

4.0 MATERIAL

- 4.1 The basic material for fittings shall be as indicated in the Purchase Requisition. Additionally, the material shall also meet the requirements specified hereinafter.
- 4.2 Steel used shall be fully killed.
- 4.3 Each heat of steel used for the manufacture of fittings shall have carbon equivalent (CE) not greater than 0.45 calculated from check analysis in accordance with the following formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{NI + Cu}{15}$$

Carbon contents on check analysis shall not exceed 0.22%.

- 4.4 For flanges and fittings specified to be used for Gas services or LPG services, Charpy V- notch test shall be conducted for each heat of steel. Unless specified otherwise, the Charpy V-notch test shall be conducted at 0 degree centigrade in accordance with the impact test provisions of ASTM A370 for flanges and fittings.

The average absorbed impact energy values of three full-sized specimens shall be 27 joules.

The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 joules.

- 4.5 Hardness testing shall be carried out by Manufacturer in accordance with applicable ASTM A370. Hardness testing shall cover at least 10% of item, per size, per heat, per manufacturing method. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10.



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5.0 DESIGN AND MANUFACTURE

- 5.1 Fittings such as tees, elbows and reducers shall be seamless type and shall conform to ASME B16.9 for sizes DN 50mm (2") to DN 200 mm (8") (both sizes included).
- 5.2 Fittings such as weldolets, sockolets, etc. shall be manufactured in accordance with MSS-SP-97.
- 5.3 Stub-in or pipe-to-pipe connection shall not be used in the manufacture of tees. Tees shall be manufactured by forging or extrusion methods. The longitudinal weld seam shall be kept at 90° from the extrusion. Fittings shall not have any circumferential joints.
- 5.4 All butt weld ends shall be bevelled as per ASME B16.5/ ASME B16.9/MSS-SP-97 as applicable
- 5.5 Repair by welding on parent metal of the fittings is not allowed.
- 5.6 Flanges such as weld neck flanges and blind flanges shall conform to the requirements of ASME B16.5. Spectacle blind and spacer & blind shall conform to the requirements of ASME B 16.48
- 5.7 Type, face and face finish of flanges shall be as specified in purchase requisition.
- 5.8 Flanges and Fittings manufactured from bar stock are not acceptable.

6.0 INSPECTION AND TESTS

- 6.1 The Manufacturer shall perform all inspections and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his works. Such inspection and tests shall be, but not limited to the following:
 - 6.1.1 All flanges and fittings shall be visually inspected. The internal and external surfaces of the flanges and fittings shall be free from any strikes, gauges and other detrimental defects.
 - 6.1.2 Dimensional checks shall be carried out on finished products as per ASME B16.5 for flanges, ASME B16.48 for spacers and blinds and ASME B16.9/ MSS-SP-97 as applicable for fittings and as per this specification.
 - 6.1.3 Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.
 - 6.1.4 All finished wrought weld ends subject to welding in field, shall be 100% tested for lamination type defects by ultrasonic test. Any lamination larger than 6.35 mm shall not be acceptable.
- 6.2 Purchaser's Inspector reserves the right to perform stage wise inspection and witness tests, as indicated in clause 6.1 of this specification at manufacturer's works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charges, reasonable access and facilities



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required for inspection, to the Purchaser's Inspector.

Inspection and tests performed/witnessed by Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and test.

7.0 TEST CERTIFICATES

Manufacturer shall furnish the following certificates:

- 7.1 Test certificates relevant to the chemical analysis and mechanical properties of the material used for manufacture of flanges and fittings as per relevant standards and this specification.
- 7.2 Test reports on non-destructive testing.
- 7.3 Certificates for each fitting stating that it is capable of withstanding without leakage a test pressure, which results in a hoop stress equivalent to 100% of the specified yield strength for the pipe with which the fitting is to be attached without impairment of serviceability.

7.0 PAINTING, MARKING AND SHIPMENT

- 7.1 After all inspection and tests required have been carried out; all external surfaces shall be thoroughly cleaned to remove grease, dust and rust and shall be applied with standard mill coating for protection against corrosion during transit and storage. The coating shall be easily removable in the field.
- 7.2 Ends of all fittings and weld neck flanges shall be suitably protected to avoid any damage during transit. Metallic or high impact plastic bevel protectors shall be provided for fittings and flanges. Flanges face shall be suitably protected to avoid and damage during transit.
- 7.3 All flanges and fittings shall be marked as per applicable dimension/ manufacturing standard.

8 MARKING

Vender has to be strictly ensured that all CS fitting must have hard stamping of class of fitting i.e.300# & 150 # along with applicable Standard code.

9 WARRANTY

Manufacturer will reimburse purchaser for any fitting furnished on this order that fails under field hydrostatic test if such failure is caused by a defect in the fitting, which is outside the acceptance limits of this specification. The reimbursement cost shall include fitting, labour and equipment rental for finding, excavation, cutting out and installation of replaced fitting in position. The field



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hydrostatic test pressure will not exceed that value which will cause a calculated hoop stress equivalent to 100% of specified minimum yield strength for the pipe with which the fitting is to be attached without impairing its serviceability.

10.0 DOCUMENTATION

Documentation to be submitted by Manufacturer to company is summarized below. Number of Copies (Hard copies/ Soft copies etc.) shall be as indicated in CONTRACT document/ Material Requisition.

- 0.1** At the time of bidding, Manufacturer shall submit the following documents:
- a) Reference list of previous supplies of similar fittings of similar specification.
 - b) Clause wise list of deviation from this specification, if any.
 - c) Brief description of the manufacturing and quality control facilities of the Manufacturer's works.
 - d) Manufacturer's qualification requirement as per section 3.0 of this specification.
 - e) Quality Assurance Plan (QAP) enclosed with this tender duly signed, stamped, and accepted.
- 0.2** Prior to shipment, Manufacturer shall submit test certificates as listed in clause 7.0 of this specification.
- 0.3** All documents shall be in English Language only
- 0.4** **Material DATA sheet:** As given below



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DATA SHEET FOR FITTINGS

DATA SHEET FOR FITTINGS								
	OPERATION	CHARACTERISTICS	REF DOC. & ACCEPTANCE NORM	FORMAT OF RECORD	TYPE OF CHECK	INSPECTION		
						VENDOR	TPI	CLIENT
RAW MATERIAL INSPECTION								
PIPES/PLATES	CHEMICAL	CORRELATION WITH MILL TEST CERTIFICATE & CHECK TC AS PER TENDER	APPLICABLE CODE	MILL TC & CHECK TC	VERIFICATION OF MARKING WITH MTC & CHECK TEST IF ANY	P	R	R
ELECTRODES	CHEMICAL	BATCH TEST CERTIFICATE	ASME SEC II PART C	TEST CERTIFICATE		P	R	R
IN PROCESS								
HEAT TREATMENT		QUENCHING, NORMALISING AND TEMPERING	ASTM A 234 Gr WPB	HT RECORDS	VISUAL & REVIEW OF TC	P	R	R
DESTRUCTIVE TESTING								



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MECHANICAL TEST		TESTING – PER HEAT	ASTM A 234 Gr WPB	LR	WITNESS/ SCRUTINY OF THE REPORT	P	W	R
HARDNESS TEST		TESTING – PER HEAT	350 HV 10	LR	WITNESS/ SCRUTINY OF THE REPORT	P	R	R
IMPACT TEST AT 0 DEG (BASE MATERIAL, WELD AND HAZ)		TESTING – ONE SET PER HEAT	AVG- 35J IND – 28J (FOR ONE SPECIMEN)	LR	WITNESS/ SCRUTINY OF THE REPORT	P	W	R
NDT (WHICHEVER IS APPLICABLE)		UT	ASME SEC V	LR	WITNESS/ SCRUTINY OF THE REPORT	P	R	R
		MPI AT BEVEL END THICK >= 6 MM, DP > AT BEVEL IF t <= 6MM, 100%	ASME SEC V	LR	WITNESS/ SCRUTINY OF THE REPORT	P	R	R
FINAL								
OVERALL DIMENSION		100%	AS PER CODE	IIR		P	R	R
VISUAL CHECK		FFD-100%	AS PER CODE	IIR		P	R	R



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MARKING		Logo, Matl. Specn., Size, Sch/ Rating, Lot No.	P. O. SPEC	SPECIFIED IN TC		P	R	R
Review of Manufacturer's		Correlation of TC		LR		P	R	R
Preparation of documentation and issue of Release Note				STANDAR D		P		
CTC/ MTC : CHECK/ MILL TEST CERT., P: PERFORM, IIR: INTERNAL INSPECTION REPORT, W: WITNESS, FFD: FREE FROM DEFECTS, TPI: THIRD PARTY INSPECTION AGENCY,								
H: HOLD, LR: LAB REPORTS								
NOTE 1 : ALL FITTINGS 18" & ABOVE SHALL BE IN WELDED CONSTRUCTION - EXISTING WPS, PQR SHALL BE REVIEWED BY TPI								



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- 8.0 MARKING**
- 9.0 PACKING, SHIPPING & HANDLING**



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

1.0 SCOPE

This specification covers the minimum requirements for the design, manufacture and supply of following carbon steel flanges of size up to 6” to be installed in pipeline systems handling hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG):

- Flanges such as weld neck flanges, blind flanges, spectacle blinds, spacers and blinds, etc.

This specification does not cover the above-mentioned items, which are to be installed in pipeline system handling sour hydrocarbons (liquid / gas) service as defined in NACE standard MR-01-

75-98.

2.0 REFERENCE CODES:

Reference has been made in this specification to the latest edition of the following codes, standards and specifications:

CODES AND STANDARDS:

ASME B3 1.3 -	Process Piping
ASME B3 1.4 -	Pipeline Transportation System for Liquid Hydrocarbons and Other Liquids
ASME B3 1.8 -	Gas Transmission and Distribution Piping Systems
ASME B 16.5 -	Pipe Flanges and Flanged Fittings
ASME B 16.9 -	Factory Made Wrought Steel Butt Welding Fittings (1/2” to 24”)
ASME B 16.25 -	Butt-welding Ends



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- ASME B16.47 - Large Diameter Steel Flanges (26" to 60")
- ASME B 16.48 - Steel Line Blanks
- ASME Sec VIII/IX - Boiler and Pressure Vessel Code
- ASTM A 370 - Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
- MSS-SP-25 - Standard Marking System for Valves, Fittings, Flanges and Unions
- MSS-SP-75 - Specification for High Test Wrought Welded Fittings.
- MSS-SP-97 - Forged Carbon Steel Branch Outlet Fittings- Socket Welding, Threaded and Butt Welding Ends.

In case of conflict between various requirements of this specification and reference standard

mentioned above, the more stringent requirement shall apply.

3.0 MANUFACTURER'S QUALIFICATION

Manufacturer, who intends bid for flanges, must possess the records of a successful proof test, in accordance with the provisions of ASME B 16.9/ MSSSP- 75, as applicable. These records shall be submitted at the time of bidding.

4.0 MATERIALS

- 4.1 The basic material for flanges shall be as indicated in the Material Requisition Additionally; the material shall also meet the requirements specified hereinafter.
- 4.2 The Carbon steel used for the manufacture of Flanges shall be fully killed.
- 4.3 Each heat of steel used for the manufacture of flanges shall have



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carbon equivalent (CE) not greater than 0.45 %calculated from check analysis in accordance with following formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{NI + Cu}{15}$$

Carbon contents on check analysis shall not exceed 0.22%.

- 4.4** Unless specified otherwise, Charpy V-notch test shall be conducted for each heat of steel, in accordance with the impact test provision of ASTM A370 at 0°C temperature. The average absorbed impact energy values of three full- sized specimens shall be 35 joules.

The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 80% of the above-mentioned average value.

For flanges specified to be used for other hydrocarbon service, the Charpy V-notch test requirements as stated above are not applicable, unless required by the specified material standard as a mandatory requirement.

When Low Temperature Carbon Steel (LTCS) materials are specified in Purchase Requisition for flanges, the Charpy V-notch test requirements of applicable material standard shall be complied with.

- 4.5** For flanges specified to be used for Gas service or High Vapour Pressure (HVP) liquid service, hardness test shall be carried out in accordance with ASTM A 370. Hardness testing shall cover at least 10% per item, per size, per heat, per manufacturing method. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10.

For welded portion maximum difference in hardness of base material, weld material and heat affected zone shall be less than 80 points in Vickers HV10.

- 4.6** In case of RTJ flanges, the groove hardness shall be minimum 140 BHN

5.0 DESIGN AND MANUFACTURE



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- 5.1 Flanges such as weld neck flanges and blind flanges shall conform to the requirements of ASME B16.5 upto sizes DN 600 mm (24") excluding DN 550 mm (22"), and for sizes DN 550 mm (22"), DN 650mm (26") and above ASME B 16.47 (Series B) shall be used.
- 5.2 Type, face and face finish of flanges shall be as specified in Purchase Requisition.
- 5.3 Flanges manufactured from bar stock is not acceptable.
- 5.4 All welds shall be made by welders and welding procedures qualified in accordance with provisions of ASME Sec. IX. The procedure qualification shall include Charpy V-notch test for weld/heat affected zone and hardness test in accordance with clause 4.4 and 4.5 of this specification.
- 5.5 Repair by welding on flanges and parent metal of fittings is not permitted. Repair of weld seam by welding shall be carried out by welders and welding procedures duly qualified as per ASME Section IX and records for each repair shall be maintained. Repair welding procedure qualification shall include all tests, which are applicable for regular production welding procedure qualification.
- 6.0 INSPECTION AND TESTS**
- 6.1 The Manufacturer shall perform all inspection and tests as per the requirement of this specification and the relevant codes, prior to shipment at his works. Such inspection and tests shall be, but not limited to, the following:
- 6.1.1 All flanges shall be visually inspected. The internal and external surfaces of the fittings shall be free from any earth strikes, gauges and other detrimental defects.
- 6.1.2 Dimensional checks shall be carried out on finished products as per ASME B16.5/MSS-SP- 44/ASME B16.47 as applicable for flanges, ASME B 16.48 for spacers and blinds and ASME B16.9/MSS-SP-75/MSS-SP-97 as applicable for fittings and as per this specification.
- 6.1.3 Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.



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6.2 Purchaser's Inspector reserves the right to perform stage wise inspection and witness tests, as

- indicated in clause 6.1 of this specification at Manufacturer's Works prior to shipment.

Manufacturer shall give reasonable notice of time and shall provide, without charge, reasonable access and facilities required for inspection, to the Purchaser's Inspector.

Inspection and tests performed/witnessed by Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

7.0 TEST CERTIFICATES

Manufacturer shall submit following certificates to Purchaser's Inspector:

- a) Test certificates relevant to the chemical analysis and mechanical properties of the materials used for construction as per this specification and relevant standards
- b) Test Reports on radiography, ultrasonic inspection and magnetic particle examination.
- c) Test reports of heat treatment carried out as per the specification.
- d) Welding procedures and welders qualification reports.
- e) EN 10204 3.2 Certificate stating the quality of relevant Flanges



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8.0 MARKING

Vender has to be strictly ensure that Flanges shall be marked with hard stamping of class of flanges i.e.300#& 150 # along with applicable Standard code.

9.0 DOCUMENTATION

9.1 Prior to shipment, the Manufacturer shall submit three copies of the test certificates as listed in clause 7.0 of this specification.

9.2 All documents shall be in English Language only.

10.0 PACKING, SHIPPING & HANDLING

10.1 After all inspection and tests required have been carried out; all external surfaces shall be thoroughly cleaned to remove grease, dust and rust and shall be applied with standard mill coating for protection against corrosion during transit and storage. The coating shall be easily removable in the field.

Ends of all weld neck flanges shall be suitably protected to avoid any damage during transit. Metallic or high impact plastic bevel protectors shall be provided for fittings and flange. Flange face shall be suitably protected to avoid any damage during transit.

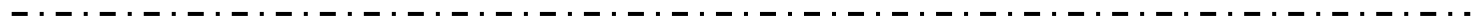


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CLIENT	CUGL	TAG NO.	
QUANTITY	As per MR	SIZE	As per M R
APPLICABLE TO: <input type="checkbox"/> PROPOSAL <input type="checkbox"/> PURCHASE <input type="checkbox"/> AS BUILT			
DESIGN DATA		FLANGE & SPACR BLIND	
DESIGN CLASS :		150#/300#	
DESIGN CODE :		B -16.5	
FLUID :		NATURAL GAS / R-LNG	
<input type="checkbox"/> SWEETSERVICE <input type="checkbox"/> SOUR <input type="checkbox"/> LETHAL			
DESIGN PRESSURE AND TEMPERATURE:			
INTERNAL : 19BAR g @ 0 to 60 <input type="checkbox"/> C			
EXTERNAL : ATM @ 45 <input type="checkbox"/> C			
MATERIAL OF CONSTRUCTION :		ASTM A 105	
FLANGE TYPE:		WELD NECK FLANGE/ SLIP ON FLANGE	
FLANGE FACING		RAISED FACE 125 AARH	
<input type="checkbox"/> PWHT <input type="checkbox"/> CHARPY IMPACT TEST			
PWHT REQUIRED FOR <input type="checkbox"/> CLIENT <input type="checkbox"/> PROCESS <input type="checkbox"/> CODE			
End Connection THK. (mm) :		Refer MR	
TOTAL MIN. THK :		N.A.	
RADIOGRAPHY AS PER CODE			
ULTRASONIC TESTING As Per CODE			



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS



		PROJECT: CITY GAS DISTRIBUTION PROJECT CLIENT: CENTRAL U.P. GAS LIMITED				QAP NO: 11-0257-02-08-10-004 ITEM DESCRIPTION: FLANGES (WNRF & SPACER BLIND)			
		CONSULTANT: VENDOR				PAGE NO: 1 of 1			
OPERATION	CHARACTERISTIC	TYPE/ METHOD CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	Subvendor	INSPECTION TPI	WGI
REVIEW OF PO TDC/ DRG	Review of PO/ DOC./ DRG & TD	Scrutiny/ Varification	Each doc	Appl. Spec./ Std			P	R	R
RAW MATERIAL	Manufacturing Process of Steel	Verification with M.T.C.	Each Heat	ASTM A 105	Material Spec/ Std/ Customer Spec	Material Test Cert. / RMI Register	P	R	R
FORGINGS	CHEMICAL COMPOSITION	SPECTRO ANALYSIS	EACH HEAT	CHW Standard Manufacturing Procedure FFD	Std. Procedure	Forging Process Record/ Internal Register	P	W	R
	Reductino Ratio	Measurements	Minimum 1 per size						
	Temperature during Forging	Optical Pyrometer							
Heat Treatment (Quenching and Tempering)	Forging Dimensions	Measurements	100%		Forging Drwg ANSI B16.5				
	Heat Treatment Cycle	Verification of Heat Treatment Cycle	HT one Lot	ASTM A 105	ASTM A 105	T.P.M Sheet, Heat Treatment Graph	P	R	R
	Tensile Test (TS,YS,EL%)	Tensile Testing			YS-485 MPA min				



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

MECHANICAL TESTING	Hardness *		One Lot	ASTM A 105	TS-565 MPA min %EL - 18 Grain Size ASTM 5 to 8	Mechanical Test Report & T.C.	P	W	R
	Micro Test			ASTM E-112					
Impact Test		28 J min (one specimen) 35 J Avg							

* Hardness - 248 HV10

RMI - Raw Material Indent



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

TABLE OF CONTENT (Piping Material Specifications)

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2. DEFINITIONS

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ABBREVIATIONS

PIPING CLASS DESCRIPTION

PIPING CLASS 1A1

PIPING CLASS 3A1

PIPING CLASS 6A1



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PIPING MATERIAL SPECIFICATION

1.0 GENERAL NOTES

This specification describes the minimum requirements for the design, furnishing of materials, fabrication, and inspection and testing of pipes, fittings and valves.

All material shall conform to ASTM, API or BS standards. Design and fabrication shall conform to ANSI

/ ASME for pressure piping, ANSI B 31.3 – Chemical Plant and petroleum Refinery Piping, and ANSI B 31.8 – Gas transmission and Distribution piping system.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

2.0 DEFINITIONS

- Shall:** This verbal form indicates requirements strictly to be followed in order to conform to the standards and from which no deviation is permitted.
- Should:** This verbal form indicates that among several possibilities one is particularly suitable without mentioning or excluding others or that a certain course of action is preferred but not necessarily required.
- May:** This verbal form indicates a course of action permissible within the limits of this standard.
- Can:** This verbal form is used for statements of possibility & capability, whether material, physical or casual.

3.0 CODES AND STANDARDS

The latest revision of the following shall be considered as part of this specification.

ASME B16.5 Steel Pipe Flanges and Flanged Fittings



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

ASME B 16.9 Factory made Wrought Steel Butt-welding Fittings

ASME B 16.11 Forged Steel Fittings, Socket Welding and Threaded

ASME B 16.20 Metallic Gaskets for Pipe Flanges.

ASME B 16.21 Non-Metallic Flat Gasket for Pipe Flanges

ASME B16.47 Large Diameter Steel Flanges (26" thru 60")

ASME B31.3 Process Piping

ASME B 31.4 Pipeline Transportation system for Liquid hydrocarbons & other Liquids ASME B 31.8 Gas Transmissions and Distribution Piping System

ASME B 36.10 Welded and Seamless Wrought Steel Pipe

ASME B 46.1 Surface Texture

API 5L Line Pipe

API 6D Pipeline Valves

API 590 Steel Line Blank

API 600 Steel Gate Valves Flanges and Butt-welding Ends

API 602 Compact Steel Gate Valves



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

-
- MSS SP 44 Steel Pipeline Flanges
- MSS SP 75 Specification for High Test Wrought Butt Welding Fittings
- MSS SP 97 Integrally Reinforced Forged Branch Outlet Fitting – Socket Welding, Threaded and Butt-welding Ends
- ASTM A 105 Forging, Carbon Steel for Piping Components
- ASTM A 193 Alloy Steel and Stainless Steel bolting Materials for High temp Service. ASTM A 194 Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service
- ASTM A 320 Standard Specification for Alloy Steel and Stainless Steel Bolting Materials
- ASTM A 216 Steel Casting, Carbon, Suitable for Fusion Welding, for High Temperature Service.
- ASTM A 234 Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperature
- ASTM A 285 Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength.
- ASTM A 694 Forging, Carbon and Alloy Steel, for Pipe Flanges, Fitting, Valves and Parts for High Pressure Transmission Service.
- ASTM A 333 Low temperature service seamless pipe.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

ASTM A 350	Forged Carbon and Low Alloy Steel requiring Notch Toughness Testing for Piping Components
ASTM A 420	Piping Fittings of Wrought Carbon Steel and Alloy Steel for Low Temperature Service.
ASTM A 860	Standard Specification for Wrought High Strength Low Alloy Steel Butt Welding Fittings

4.0 ABBREVIATIONS

4.1 Flange Facing

RTJ	-	Ring Type Joint
FF	-	Flat Face
RF	-	Raised Face

4.2

Fittings



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PE	-	Plain End
BE	-	Bevel End
BW	-	Butt Weld
PBE	-	Plain Both End
PO	-	Plain One End
E	-	Threaded Both End
TB	-	Threaded One End
E	-	Long Radius
TO	-	Short Radius
E		
LR		
SR		

4.3 Connections

BW	-	Butt-Weld
FLG	-	Flanged
D	-	Screwed
SCR	-	Slip-On
D SO	-	Socket Weld
SW	-	Threaded
THR	-	Weld Neck
D		
WN		

4.4 Wall Thickness



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

-
- SCH - Schedule in accordance with ANSI B 36.10 or B 36.19 STD -
Standard Weight Wall Thickness
- XS - Extra Strong Wall Thickness
- XXS - Double Extra Strong Wall Thickness

4.5 Valve Description

- BC - Bolted Cap
- BB - Bolted Bonnet
- ES - Extension Stem
- FB - Full Bore
- MO - Motor Operated
- GO - Gear Operated
- NRS - Non-Rising Stem (with inside screw) OS&Y -
Outside Screw and Yoke
- RB - Reducer Bore
- RS - Rising Stem



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

SC	-	Screwed Cap
UB	-	Union Bonnet
UC	-	Union Cap
WB	-	Welded Bonnet

4.6 Pipes Description

BE	-	Beveled End
CS	-	Carbon Steel
ERW	-	Electric Resistance Welded
EFW	-	Electric Fusion Welded
FS	-	Forged Steel
HFI	-	High Frequency Induction
KCS	-	Killed Carbon Steel
KFS	-	Killed Forged Steel
OH	-	Open Hearth



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

SAW - Submerged Arc Welded

SMLS - Seamless

5.0 PIPING CLASSES DESCRIPTION

Piping Classes assigned for the project are based on the following 2-digit system.

First Digit

Numerical, denoting the basic system rating or flange class

i.e.	1	= ASME Class 150
	3	= ASME Class 300
	6	= ASME Class 600
	9	= ASME Class 900

Second Digit



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

Letter, denoting the material

A	-	Carbon Steel
C	-	Stainless Steel
F	-	Fiberglass Reinforced plastic/epoxy (FRP)
G	-	Galvanized
P	-	Plastic (PEHD)
S	-	Stainless Steel
V	-	PVC

Third Digit

Sequential number to differentiate two or more piping classes of the same rating and same material but presenting some difference related to the handled fluid.

Fourth Digit

Letter, denoting the aboveground and underground



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

U = Underground

PIPING MATERIAL SPECIFICATION

PIPING SPECIFICATION	CENTRAL UP GASLIMITED	RATING 150#
1A1		CODE ANSI B 31.8
TEMPERATURE (0 TO 60 °C)		BASIC MATERIAL
MAOP PRESSURE (19 bar g)		CORROSION ALL – 1.5 MM



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

ITEM	SHORT CODE	SIZE FROM - THRU	DESCRIPTION	RATING	DIMENSION STANDARD	MATERIAL	REMARKS
PIPELINE	PL	2"-4"	BE	6.4 MM	API 5L	API 5L Gr X 42	
			BE	6.4 MM	API 5L	API 5L Gr X 42	
PIPES	P	0.50"-0.75" 1" – 1.50" 2" 3"-14"	PE, SEAMLESS	S 160	ANSI B 36.10	ASTM A 106 Gr B ASTM A 106 Gr B	
			PE, SEAMLESS	S80	ANSI B 36.10		
			BE, SEAMLESS	10 ASTM A 106 Gr B			
			BE, SEAMLESS	STD	ANSI B 36.10		
ELBOWS 90 LR	E	0.50"-0.75" 1" – 1.50" 2"-14"	SW	6000#	ANSI B 16.11	ASTM A 105	
			SW	3000#	ANSI B 16.11	ASTM A 105	
			BW,1.5D	M	ANSI B 16.9	ASTM A 234 Gr WPB	
ELBOWS 45 LR	E45	0.50"-0.75" 1" – 1.50" 2"-14"	SW	6000#	ANSI B 16.11	ASTM A 105	
			SW	3000#	ANSI B 16.11	ASTM A 105	
			BW,1.5D	M	ANSI B 16.9	ASTM A 234 Gr WPB	
REDUCERS CONCENTRIC	RC	2" – 14"	BW-ANSI B16.25	M,M	ANSI B16.9	ASTM A 234 Gr WPB	
REDUCERS ECCENTRIC	RE	2" – 14"	BW-ANSI B16.25	M,M	ANSI B16.9	ASTM A 234 Gr WPB	
TEES EQUAL	T	0.50"-0.75" 1" – 1.50" 2"-14"	SW	6000#	ANSI B 16.11	ASTM A 105	
			SW	3000#	ANSI B 16.11	ASTM A 105	
			BW,1.5D	M	ANSI B 16.9	ASTM A 234 Gr WPB	
TEES RED	T	0.50"-0.75" 1" – 1.50" 2"-14"	SW	6000#	ANSI B 16.11	ASTM A 105	
			SW	3000#	ANSI B 16.11	ASTM A 105	
			BW,1.5D	M	ANSI B 16.9	ASTM A 234 Gr WPB	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

SOCKOLET	S	0.50"-0.75"	SW	6000#	MSS-SP 97	ASTM A 105	
		1" - 1.50"	SW	3000#			
WELDOLET	W	2" - 14"	BE - ANSI B 16.25	M, XXS	MSS-SP 97	ASTM A 105	
CAPS	C	0.50"-0.75"	SCRF	6000#	ANSI B 16.11	ASTM A 105	
		1" - 1.50"	SCRF	3000#	ANSI B 16.11	ASTM A 105	
		2"-14"	BW	M	ANSI B 16.9	ASTM A 234 Gr WPB	
FULL COUPLINGS	FC	0.50"-0.75"	SW	6000#	ANSI B 16.11	ASTM A 105	
HALF COUPLINGS	HC	0.50" -0.75"	SW	6000#	ANSI B 16.11	ASTM A 105	
		1"-1.50"	SW	3000#			
NIPPLES	NA	0.50" -0.75"	PBE, SEAMLESS		ANSI B 36.10	ASTM A 106 GrB M	
	NB	1"-1.50"	PBE, SEAMLESS		ANSI B 36.10	ASTM A 106 Gr B	

NOTE :- M = THICKNESS TO MATCH PIPE WALL THICKNESS



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS



PIPING SPECIFICATION	CENTRAL UP GAS LIMITED	RATING	150#
IAI		CODE	ANSI B 31.8
TEMPERATURE(0 TO 60 °C)		BASIC MATERIAL	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

ITEM	SHORT CODE	SIZE FROM- THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	CORROSION ALLOWANCE 1.5 mm
							REMARKS
WN FLANGES	FW	0.50"-14"	150# RF 125 AARH	M	ANSI B16-5	ASTM A105	
BLIND FLANGE	FB	0.50"-14"	150# RF 125 AARH		ANSI B16-5	ASTM A105	
FLANGES FIG 8	FF	0.5" - 14"	150# RF 125 AARH		ANSI B16-48	ASTM A105	
SPCR & BLND	FSB	10" - 14"	150# RF 125 AARH		ANSI B16-48	ASTM A105	
STUD BOLTS	B	0.5" - 14"			ANSI B18-2	Bolt: A193 B7 Nut: A194 Gr.2H	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

GASKETS SPIRAL	G	0.5" - 14"		150#, SPIRAL	B-16.20 - ANSI B16.5	SP. WND metallic with Graphite Filler	
WOUND GATE VALVE	VG	0.50 - 1.50	SW B16.11	800#	API 602	(5 mm thick) ASTM A 216 Gr WCB	
NOTE: M=THICKNESS T MATCH PIPE WALL THICKNESS							
PIPING MATERIAL SPECIFICATION						Document No.	Rev.
							0

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING			
1A1							150#			
TEMPERATURE (0 TO 60 °C)							CODE		ANSI B 31.8	
PRESSURE (18.75 bar g)							BASIC MATERIAL		CORROSION ALLOWANCE	
ITEM	SHORT CODE	SIZE FROM- THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS			
BALL VALVES	VBA	0.50 - 1.50	SW:ANSI B16-5	800#	ANSI B 16-10	BODY: ASTM A105 BALL: SS 316	FULL BORE FIRE SAFE WRENCH OPERATED.			
		2"-3"	BW:ANSI B16-5	150#	ANSI B 16-10	BODY: ASTM A216 Gr. WCB BALL:	FULL BORE FIRE SAFE WRENCH OPERATED.			



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

						(A 216 Gr. WCB) + 0.003" ENP	
		4"-10"	BW:ANSI B16-5	150 #	ANSI B 16-10	BODY: ASTM A216 Gr. WCB BALL: (A 216 Gr. WCB) + 0.003" ENP	FULL BORE FIRE SAFE GEAR OPERATED.
		12"-14"	BW:ANSI B16-5	150#	ANSI B 16-10	BODY: ASTM A216 Gr. WCB BALL: (A 216 Gr. WCB) + 0.003" ENP	DOUBLE BLOCK AND BLEED FULL BORE FIRE SAFE GEAR OPERATED.
GLOBE VALVES	VGL	0.50 - 1.50	SW ANSI B16-5	800#	ANSI B 16-10	BODY: ASTM A 105 TRIM: ASTM A182 F6	HANDWHEEL FIRE SAFE
		2" - 14"	FLGD RF ANSI B16-5	150#	ANSI B 16-10	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	HANDWHEEL FIRE SAFE
LIFT CHECK VALVES	VCH	0.50 - 1.50	SW ANSI B16-5	800#	ANSI B 16-10	BODY: ASTM A 105 TRIM: ASTM A182 F6	HORIZONTAL INSTALLATION
SWING CHECK VALVE		2"-14"	FLGD RF ANSI B16-5	150#	ANSI B 16-10	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	HORIZONTAL INSTALLATION VERTICAL INSTALLATION FLOW UPWARDS
NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS							



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

	PIPING MATERIAL SPECIFICATION	Document No.	Rev.
			0



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PIPING SPECIFICATION		RATING	150#
IA1	CENTRAL UP GAS LIMITED	CODE	ANSI B 31.8
TEMPERATURE (0 TO 60 °C)		BASIC MATERIAL	
PRESSURE (18.75 bar g)		CORROSION ALW	1.5 mm

BRANCH TABLE

		B R A N C H S I Z E																			
		1/2"	3/4"	1"	1.1/2"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"
H E A D E R S I Z E	1/2"	T																			
	3/4"	T	T																		
	1"	T	T	T																	
	1.1/2"	T	T	T	T																
	2"	S	S	S	T	T															
	3"	S	S	S	S	T	T														
	4"	S	S	S	S	T	T	T													
	6"	S	S	S	S	W	T	T	T												
	8"	S	S	S	S	W	W	T	T	T											
	10"	S	S	S	S	W	W	T	T	T	T										
12"	S	S	S	S	W	W	W	T	T	T	T										
14"	S	S	S	S	W	W	W	T	T	T	T	T									
16"	S	S	S	S	W	W	W	W	T	T	T	T	T								
18"	S	S	S	S	W	W	W	W	T	T	T	T	T	T							
20"	S	S	S	S	W	W	W	W	W	T	T	T	T	T	T						
24"																					
28"																					
30"																					



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING	300#
3A1							CODE	ANSI B 31.8
TEMPERATURE (0 TO 60 °C)							BASIC MATERIAL	
PRESSURE (49 bar g)							CORROSION ALLOWANCE	
ITEM	SHORT CODE	SIZE FROM-THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS	
PIPELINE	PL	2"-4"	BE	6.4 mm	API 5L	API 5L Gr. X42		
		6"-10"	BE	6.4 mm	API 5L	API 5L Gr. X42		
PIPES	P	0.50" - 0.75"	PE, SEAMLESS	S160	ANSI B36-10	ASTM A 106 Gr.B		
		1" - 1.50"	PE, SEAMLESS	S160	ANSI B36-10	ASTM A 106 Gr.B		
		2"	BE, SEAMLESS	S80	ANSI B36-10	ASTM A 106 Gr.B		
		3" - 10"	BE, SEAMLESS	STD	ANSI B36-10	ASTM A 106 Gr.B		
		12" - 14"	BE, SEAMLESS	S40	ANSI B36-10	ASTM A 106 Gr.B		
ELBOWS 90 LR	E	0.50" - 0.75"	SW	6000#	ANSI B16.11	ASTM A105		
		1" - 1.50"	SW	3000#	ANSI B16.11	ASTM A105		
		2" - 14"	BW, 1.5D	M	ANSI B16.9	ASTM A 234 Gr WPB		
ELBOWS 45 LR	E45	0.50" - 0.75"	SW	6000#	ANSI B16.11	ASTM A105		
		1" - 1.50"	SW	3000#	ANSI B16.11	ASTM A105		
		2" - 14"	BW, 1.5D	M	ANSI B16.9	ASTM A 234 Gr WPB		
REDUCERS CONCENTRIC	RC	2" - 14"	BW - ANSI B16-25	M,M	ANSI B16-9	ASTM A 234 Gr WPB		
REDUCERS ECCENTRIC	RE	2" - 14"	BW - ANSI B16-25	M,M	ANSI B16-9	ASTM A 234 Gr WPB		
TEES EQUAL	T	0.50" - 0.75"	SW	6000#	ANSI B16.11	ASTM A105		
		1" - 1.50"	SW	3000#	ANSI B16.11	ASTM A105		
		2" - 14"	BW	M	ANSI B16.9	ASTM A 234 Gr WPB		



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

TEES RED	TR	0.50" - 0.75"	SW	6000#	ANSI B16.11	ASTM A105	
		1" - 1.50"	SW	3000#	ANSI B16.11	ASTM A105	
		2" - 14"	BW	M.M	ANSI B16.9	ASTM A 234 Gr WPB	
SOCKOLET	S	0.50" - 0.75"	SW	6000#	MSS-SP 97	ASTM A105	
		1" - 1.50"	SW	3000#			
WELDOLETS	W	2" - 14"	BW - ANSI B16-25	M.XXS	MSS-SP 97	ASTM A105	
CAPS	C	2" - 14"	BW	M	ANSI B16-9	ASTM A 234 Gr WPB	
NIPPLES	NA	0.50" - 0.75"	PBE, SEAMLESS	M	ANSI B36-10	ASTM A 106 Gr.B	
	NB	1" - 1.50"	PBE, SEAMLESS	M	ANSI B36-10	ASTM A 106 Gr.B	
FULL COUPLINGS	FC	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#			
HALF COUPLINGS	HC	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"	SW	3000#			
NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS							
PIPING MATERIAL SPECIFICATION					Document No.	Rev.	
						0	

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING	300#
3A1							CODE	ANSI B 31.8
TEMPERATURE (0 TO 60 °C)							BASIC MATERIAL	
PRESSURE (49 bar g)							CORROSION ALLOWANCE	
ITEM	SHORT CODE	SIZE FROM-THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

W N FLANGES	FW	2"-14"	RF, 125 AA RH	300#, M	A NSI B16-5	AST M A1 05	
FLG S W	FS	0.50 - 1.50	RF, 125 AA RH	300#, M	A NSI B16-5	AST M A1 05	
BLIND FLANGE	FB	0.50"-14 "	RF, 125 AA RH	300#	A NSI B16-5	AST M A1 05	
FLANGES FIG 8	FF	0.5" - 14"	FF, 125 AA R H	300#, M	ANSI B16-48	AST M A1 05	
SP C R & BLND	FSB	10" - 14"	FF, 125 AA R H	300#	ANSI B16-48	AST M A1 05	
ST UD BOLTS	B	0.50" - 14"			A NSI B18-2	Bolt: A193 B7 Nut: A19 4 Gr.2 H	
GASKETS SPIRAL WO UND	G	0.5" - 14"		SPIRA L, 300#	B-16.20 - A NSI B16.5	SP, WND metallic with Graphite Filler (5mm thick)	
GATE VALVE	VG	0.50 - 1.50	SW B16,11	800#, 3000#	API602	AST M A1 05	
		2" - 14"	FLGD, B-16.5, RF/125 AARH	300#	API600	AS TM A 216 Gr WCB	
	VP	0.50" - 1.50"	S W, BS -5353	3000 #	A NSI B16-11	AST M A1 05	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PLUG VALVE	2" - 14"	FLG/B W, API 6D	300#	ANSI B16-9	ASTM A 216 Gr WCB
NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESSES					
PIPING MATERIAL SPECIFICATION				Document No.	Rev.
				0	0

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING	300#
3A1							CODE	ANSI B 31.8
TEMPERATURE (0 TO 60 °C)							BASIC MATERIAL	
PRESSURE (49 bar g)							CORROSION ALLOWANCE	
ITEM	SHORT CODE	SIZE FROM-THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS	
BALL VALVES	VBA	0.50 - 1.50	FLGDRF:ANSI B16-5 125 AARH	300#	ANSI B16-10 BS 5351	BODY: ASTM A105 BALL:SS 316 BODY SEAT: RPTFE	FULL BORE FIRE SAFE WRENCH OPERATED.	
		2"	FLGDRF:ANSI B16-5 or BW :ANSI B16-5	300#	ANSI B16-10 BS 5351	BODY: ASTM A216 Gr. WCB	FULL BORE, FIRE SAFE, WRENCH OPERATED	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

						BALL: (A 216 Gr. WCB) + 0.003" ENP BODY SEAT: RPTFE	
		3" - 4"	FLGD RF:ANSI B16-5 or BW :ANSI B16-5	300#	ANSI B16-10 BS 5351	BODY: ASTM A216 Gr. WCB (A 216 Gr. WCB) + 0.003" ENP BODY SEAT: RPTFE	DOUBLE BLOCK AND BLEED FULL BORE FIRE SAFE WRENCH OPERATED.
		6"-14"	FLGD RF:ANSI B16-5 or BW :ANSI B16-5	300#	ANSI B16-10 BS 5351	BODY: ASTM A216 Gr. WCB BALL (A 216 Gr. WCB) BODY SEAT: RPTFE	DOUBLE BLOCK AND BLEED FULL BORE FIRE SAFE GEAR OPERATED.
GLOBE VALVES	VGL	0.50 - 1.50	FLGD RF:ANSI B16-5	300#	ANSI B16-10 BS 5352	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	HANDWHEEL FIRE SAFE
		2" - 4"	FLGD RF:ANSI B16-5	300#	ANSI B16-10 BS 1873	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	HANDWHEEL FIRE SAFE
		6" - 14"	FLGD RF:ANSI B16-5	300#	ANSI B16-10 BS 1873	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	GEAR OPERATED FIRE SAFE
LIFT CHECK VALVES		0.50 - 1.50	FLGD RF:ANSI B16-5	300#	ANSI B16-10 BS 5352	BODY: ASTM A 105 TRIM: ASTM A182 F6	HORIZONTAL INSTALLATION VERTICAL INSTALLATION FLOW UPWARDS
	VCH	2"-14"	FLGD RF:ANSI B16-5	300#	ANSI B16-10 BS 1868	BODY: ASTM A 216 Gr. WCB	HORIZONTAL INSTALLATION VERTICAL INSTALLATION FLOW UPWARDS



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

SWING CHECK VALVE					TRIM: ASTM A182 F6	
NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS						
PIPING MATERIAL SPECIFICATION					Document No.	Rev.
						0



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS



PIPING SPECIFICATION		RATING	300#
3A1		CODE	ANSI B 31.8
TEMPERATURE (0 TO 60°C)		BASIC MATERIAL CORROSION	
PRESSURE (49 bar g)		ALW	1.5 mm

BRANCH TABLE

B R A N C H S I Z E

	1/2"	3/4"	1"	1.1/2"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"
1/2"	T																			
3/4"	T	T																		
1"	T	T	T																	
1.1/2"	T	T	T	T																
2"	S	T	T	T	T															
3"	S	S	S	S	T	T														
4"	S	S	S	S	T	T	T													
H 6"	S	S	S	S	W	T	T	T												
E 8"	S	S	S	S	W	W	T	T	T											
A 10"	S	S	S	S	W	W	T	T	T	T										
D 12"	S	S	S	S	W	W	W	T	T	T	T									
E 14"	S	S	S	S	W	W	W	T	T	T	T	T								
R 16"	S	S	S	S	W	W	W	T	T	T	T	T	T							
18"	S	S	S	S	W	W	W	T	T	T	T	T	T	T						
S 20"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T					
T 24"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T	T				
Z 28"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T	T	T			
E 30"	S	S	S	S	W	W	W	T	T	T	T	T	T	T	T	T	T	T		



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING	600#
6A1							CODE	ANSI B 31.8
TEMPERATURE (0 TO 60°C)							BASIC MATERIAL	
DESIGN PRESSURE (98 bar g)							CORROSION ALLOWANCE 1.5 mm	
ITEM	SHORT CODE	SIZE FROM-THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS	
PIPELINE	PL	2"-4"	BE	6.4 mm	API 5L	API 5L Gr. X42		
		6"-10"	BE	6.4 mm	API 5L	API 5L Gr. X42		
PIPES	P	0.50" - 0.75"	PE, SEAMLESS	S160	ANSI B36-10	ASTM A 106Gr.B		
		1" - 1.50"	PE, SEAMLESS	S160	ANSI B36-10			
		2"	BE, SEAMLESS	S80	ANSI B36-10			
		3"	BE, SEAMLESS	STD	ANSI B36-10	ASTM A 106Gr.B		
		4" - 10"	BE, SEAMLESS	XS	ANSI B36-10			
		12" - 14"	BE, SEAMLESS	Sch 60	ANSI B36-10			
ELBOWS 90 LR	E	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTMA105		
		1" - 1.50"	SW	3000#	ANSI B16-11			
		2" - 14"	BW, 1.5D		ANSI B16-9	ASTMA 234 Gr WPB		
ELBOWS 45 LR	E45	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTMA105		
		1" - 1.50"	SW	3000#	ANSI B16-11			
		2" - 14"	BW, 1.5D		ANSI B16-9	ASTMA 234 Gr WPB		
TEES EQUAL	T	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTMA105		
		1" - 1.50"	SW	3000#	ANSI B16-11			
		2" - 14"	BW - ANSI B16-25		ANSI B16-9	ASTMA 234 Gr WPB		
TEES RED	TR	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTMA105		
		1" - 1.50"	SW	3000#	ANSI B16-11			
		2" - 14"	BW - ANSI B16-25		ANSI B16-9	ASTMA 234 Gr WPB		
SOCKOLET	S	0.50" - 0.75"	SW	6000#	MSS-SP 97	ASTMA105		
		1" - 1.50"	SW	3000#	MSS-SP 97	ASTMA105		



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

WELDOLETS	W	2" - 14"	BW - ANSI B16-25	XXS	MSS-SP97	ASTMA105	
CAPS	C	0.50" - 0.75"	SCRF	6000#	ASME B16-11	ASTMA105	
		1" - 1.50"	SCRF	3000#	ASME B16-11		
		2" - 14"	BW		ASME B16-9		
PLUG	P	0.50" - 0.75"	SCRM	6000#	ASME B16-11	ASTMA 234 Gr WPB	
		1" - 1.50"	SCRM	3000#	ASME B16-11		
NIPPLES	NA	0.50" - 0.75"	PBE, SEAMLESS PBE,		ANSI B36-10	ASTM A 106 Gr.B	
	NB	1" - 1.50"	SEAMLESS		ANSI B36-10	ASTM A 106 Gr.B	
FULL COUPLINGS	CF	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTMA105	
		1" - 1.50"	SW	3000#			
HALF COUPLINGS	HC	0.50" - 0.75"	SW	6000#	ANSI B16-11	ASTMA105	
		1" - 1.50"	SW	3000#			

NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS

	PIPING MATERIAL SPECIFICATION	Document No.	Rev.
			0

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING	600#	
6A1							CODE	ANSI B 31.8	
TEMPERATURE (0 TO 60 °C)							BASIC MATERIAL		
DESIGN PRESSURE (98 bar g)							CORROSION ALLOWANCE 1.5 mm		
ITEM	SHORT CODE	SIZE FROM-THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS		



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

W N FLA NGE S	FW	2" - 14"	RF, 125 AAR H	600#	ANSI B16-5	ASTM A105	
FLG SW	FS	0.50 - 1.50	RF, 125 AARH	600#	ANSI B16-5	ASTM A105	
BLIND FLA NGES	FB	0.50"-14"	RF, 125 AAR H	600#	ANSI B16-5	ASTM A105	
FLA NGES FIG 8	FF	0.5" - 14"	FF, 125 AARH	600#	ANSI B16-48	ASTM A105	
SPCR & BLND	FSB	10" - 14"	FF, 125 AARH	600#	ANSI B16-48	ASTM A105	
STUD BOLTS	B	0.50" - 14"			ANSI B18-2	Bolt: A193 B7 Nut: A194 Gr2H	
GASKETS SPIRAL WOUND	G	0.5" - 14"		SPIRAL, 600#	B-1620 - ANSI B16.5	SP, W ND metallic with Graphite Filler (5 mmthick)	
GATE VALVE	VG	0.50 - 1.50	SW B16.11	800#, 3000#	API 602	ASTM A105	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PLUG VALVE	VP	0.50" - 0.75"	SW BS -5353	SCRM.6000#	ANSI B16-11	ASTM A105	
		1" - 1.50"		SCRM.3000#	ANSI B16-11		
		2" - 14"	FLG/ BW API 6D	600#	ANSI B16-9	ASTM A 216 Gr WCB	
NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS							
PIPING MATERIAL SPECIFICATION				Document No.		Rev.	
						0	

PIPING SPECIFICATION			CENTRAL UP GAS LIMITED				RATING	600#		
6A1							CODE	ANSI B 31.8		
TEMPERATURE (0 TO 60 °C)							BASIC MATERIAL			
DESIGN PRESSURE (98 bar g)							CORROSION ALLOWANCE		1.5 mm	
ITEM	SHORT CODE	SIZE FROM- THRU	DESCRIPTION	RATING AND/OR SCHED.	DIMENSION STANDARD	MATERIAL	REMARKS			
BALL VALVES	VBA	0.50 - 1.50	FLGD RF:ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A105 BALL: SS 316	FULL BORE FIRE SAFE WRENCH OPERATED.			
		2"	BW :ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A216 Gr. WCB BALL: (A 216 Gr. WCB) + 0.003" ENP	FULL BORE, FIRE SAFE, WRENCH OPERATED			
		3" - 4"	FLGD RF:ANSI B16-5	600 #	ANSI B16-10	BODY:	DOUBLE BLOCK AND BLEED			



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

						ASTM A216 Gr. WCB BALL: (A 216 Gr. WCB) + 0.003" ENP	FULL BORE FIRE SAFE WRENCH OPERATED.
		6"-14"	FLGD RF:ANSI B16-5 or BW :ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A216 Gr. WCB BALL: (A 216 Gr. WCB) + 0.003" ENP	DOUBLE BLOCK AND BLEED FULL BORE FIRE SAFE GEAR OPERATED.
GLOBE VALVES	VGL	0.50 - 1.50	FLGD RF:ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A 105 TRIM: ASTM A182 F6	HANDWHEEL FIRE SAFE
		2" - 4"	FLGD RF:ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	HANDWHEEL FIRE SAFE
		6" - 14"	FLGD RF:ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	GEAR OPERATED FIRE SAFE
LIFT CHECK VALVES	VCH	0.50 - 1.50	FLGD RF:ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A 105 TRIM: ASTM A182 F6	HORIZONTAL INSTALLATION VERTICAL INSTALLATION FLOW UPWARDS
SWING CHECK VALVE		2"-14"	FLGD RF:ANSI B16-5	600#	ANSI B16-10	BODY: ASTM A 216 Gr. WCB TRIM: ASTM A182 F6	HORIZONTAL INSTALLATION VERTICAL INSTALLATION FLOW UPWARDS
NOTE: M=THICKNESS TO MATCH PIPE WALL THICKNESS							
						Document No.	Rev.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

	PIPING MATERIAL SPECIFICATION		0



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

PIPING SPECIFICATION		RATING	600#																																																																																																																																																																																																																																																																																																																																																																																																															
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**PROCUREMENT OF CS FITTINGS, BALL VALVES AND
INSULATION JOINTS**

**CENTRAL UP GAS LIMITED (CUGL)
CITY GAS DISTRIBUTION PROJECT**

**TENDER FOR PROCUREMENT OF CS FITTINGS, INSULATION JOINTS
AND
BALL VALVES**

BID DOCUMENT NO.



**PROCUREMENT OF CS FITTINGS, BALL VALVES AND
INSULATION JOINTS**

SECTION-V- (B)

TECHNICAL SPECIFICATION

FOR GROUP-B



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

CONTENTS (VALVES)

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1.0 **SCOPE**

This specification covers the minimum requirements for design, manufacture and supply of carbon steel ball valves of size DN 50mm (2") and above and ANSI class 150 to 900 to be used in on-shore pipeline systems handling non-sour hydrocarbons in liquid or gaseous phase, including Liquid Petroleum Gas (LPG).

This specification does not cover ball valves for sour hydrocarbon (liquid/ gas) service as defined in NACE

2.0 **REFERENCE STANDARDS**

2.1 All valves shall be manufactured and supplied in accordance with the Twenty Second Edition, January,2002, or the latest edition of American Petroleum Institute (API) Specification 6D, with additions and modifications as indicated in the following sections of this specification.

2.2 Reference has also been made in this specification to the latest edition of the following
Codes, Standards and Specifications:

ASME B 16.5: Pipe flanges and flanged fittings ASME B 16.25 : Butt
welding ends

ASME B 16.34 : Valves – Flanged, threaded and welding end ASME B16.47 : Large



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diameter steel flanges

- ASME B 31.3 : Chemical & process plant piping system
- ASME B 31.4 : Liquid transportation systems for hydrocarbons and other liquids
- ASME B 31.8 : Gas transmission and distribution piping systems
- ASME Sec.VIII/IX : Boiler and pressure vessel code
- ASTM A 370 : Standard test methods and definitions for mechanical testing of steel products
- ASTM B 733 : Autocatalytic nickel phosphorous coating on metals API 6FA : Fire test for
valves
- API 607 : Fire test for soft-seated quarter-turn valves
- API 1104 : Welding of pipelines and related facilities
- BS:6755 (Part-II) : Testing of valves – Specification for fire type - testing
requirements
- MSS-SP-6 : Standard finishes for contact faces of pipe flanges and connecting-end flanges of valves and fittings
- MSS-SP-44 : Steel pipeline flanges
- SSPC-VIS-1 : Steel structures painting council-visual standard



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2.3 **In case of conflict** between the requirements of this specification, API 6D and the Codes, Standards and Specifications referred in clause 2.2 above, the requirements of this specification shall govern. Order of precedence shall be as follows :

- Data Sheets
- This Specification
- API 6D Specification
- Other Referred Codes & Standards
- Manufacturer's Standard

3.0 MATERIALS

3.1 Material for major components of the valves shall be as indicated in Valve Data Sheet. Other components shall be as per Manufacturer's standard (suitable for the service conditions indicated in data sheet) and shall be subject to approval by Purchaser. In addition, the material, shall also meet the requirements specified hereinafter.

3.2 Carbon steel used for the manufacture of valves shall be fully killed.

3.3 The Carbon Equivalent (CE) of valve end connections which are subject to further field welding by Purchaser, shall not exceed 0.43% (as calculated by the following formula) on check analysis for each heat of steel used:

$$CE = \%C + \frac{\%Mn}{6} + \frac{\%Cr + \%Mo + \%V}{5} + \frac{\%Ni + \%Cu}{15}$$



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- 3.4 Charpy V-Notch test on each heat of base material shall be conducted as per API 6D, for all pressure containing parts such as body, end flanges and welding ends as well as bolting material for pressure containing parts. Unless specified otherwise, the Charpy impact test shall be conducted at (-) 29°C. The test procedure shall confirm to ASTM A370.

The minimum average absorbed energy per set of three specimens shall be 27 J with an individual minimum per specimen of 22 J. No specimen shall exhibit less than 80 percent shear area.

When Low carbon steel (LTCS) materials are specified in valve data sheet or offered by manufacturer, the Charpy V-notch test requirements of applicable material standard shall be complied with.

- 3.5 For all such valves where carbon steel is used as ball material, the ball shall have 75 micrometer (0.003 inch) thick Electroless Nickel Plating (ENP) as per ASTM B733 with following classification : SC2, Type II, Class 2. The hardness of plating shall be minimum 50 RC.

- 3.6 For valves specified to be used for Gas service or LPG service, hardness test shall be carried out on each heat of base material for all pressure containing parts of the valve. A full thickness cross-section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV₁₀ based on minimum four measurements representing the entire thickness.

- 3.7 All process-wetted parts, metallic and non-metallic, shall be suitable for the fluids and service specified by the Purchaser.

4.0 DESIGN AND MANUFACTURING

- 4.1 Valve design shall meet the requirements of API 6D and other referred codes and shall be suitable for the service conditions indicated in Valve Data Sheet. The ASME Boiler & Pressure Vessel Code, Section VIII, Division 1, shall be used to design the valve body. Allowable stress requirements shall comply the provisions of ASME B31.3. In addition, corrosion allowance indicated in Valve Data Sheet shall be considered in valve design. However, the minimum wall thickness shall not be less than the minimum requirement of ASME B16.34. The Manufacturer shall have a valid license to use API 6D monogram for manufacture of ball valves.



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4.2 For above ground valves, valve body design shall be either fully welded or bolted type, as indicated in Valve Data Sheet. Valve body joints with threads are not permitted.

For buried valves, valve body design shall be fully welded type only. Valve body joints with bolts or threads are not permitted.

Ball shall be of single piece, solid type construction.

4.3 Valves shall be Full Bore (FB) or Reduced Bore (RB) as indicated in Valve Data Sheet. Full bore valves shall be suitable for the passage of all types of pipeline scraper and inspection pigs on regular basis without causing damage to either the valve component or the pig. The full bore valve shall provide an unobstructed profile for pigging operations in either direction. Full bore valves shall be designed to minimize accumulation of debris in the seat ring region to ensure that valve movement is not impeded. In case of reduced bore valves, the nominal valve size indicated in Valve Data Sheet corresponds to the end connection. Nominal valve size of reduced bore shall be as per Table below:

Nominal Valve Size	Nominal Valve Size for Reduced Opening	Nominal Valve Size	Nominal Valve Size for Reduced Opening
DNmm (NPS inches)	DNmm (NPS inches)	DNmm (NPS inches)	DNmm (NPS inches)
50(2)	50(2)	600(24)	500(20)
80(3)	50(2)	650(26)	550(22)
100(4)	80(3)	700(28)	600(24)



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150(6)	100(4)	750(30)	600(24)
200(8)	150(6)	800(32)	650(26)
250(10)	200(8)	850(34)	700(28)
300(12)	250(10)	900(36)	750(30)
350(14)	250(10)	950(38)	800(32)
400(16)	300(12)	1000(40)	850(34)
450(18)	350(14)	1050(42)	900(36)
500(20)	400(16)	1200(48)	1050(42)
550(22)	450(18)		

4.4 Ball mounting shall be trunnion/ pivot type or as indicated in Valve Data Sheet. Valve design shall minimize the possibility of debris ingress into the trunnion as far as practicable.

Ball mounting shall be trunnion / pivot type or as indicated in Valve Data Sheet. Ball mounting, either trunnion or floating, unless otherwise specified, shall be as follows.



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Sl. No.	ANSI Pressure rating	Nominal valve size (NPS inches)	
		Floating Ball	Trunnion Mounted
1	150#	< 8"	> 8"
2	300#	< 4"	> 4"
3	600#	Nil	> 2"

Valve design shall minimize the possibility of debris ingress into the trunnion as far as practicable.

- 4.5 Valve seats shall be with primary metal to metal contact. O-rings or other seals, if used for drip tight sealing, shall be encased in a suitable groove in such a manner that it can not be removed from seat ring and there is no extrusion during opening or closing operation of the valve at maximum differential pressure corresponding to valve class rating. The seat rings shall be so designed as to ensure sealing at low as well as high differential pressures.
- 4.6 Valves shall have double block and bleed feature to facilitate complete flushing, draining and venting of the valve body cavity.
For valves to be used in liquid service, the body cavity over-pressure shall be prevented by self relieving seat rings/assemblies. A pressure relief hole in the ball is not permitted. Self relieving seat rings shall relieve at a body cavity differential pressure not exceeding 50% of the valve class rating pressure.
- 4.7 When specified in Valve Data Sheet, valves shall be designed to withstand a sustained internal vacuum of at least 1 (one) milli-bar in both open and closed positions.
Full Bore Valves of nominal size 200mm(8") & above and Reduced Bore Valves of nominal size 250mm(10") & above shall have provision for secondary sealant injection under full line pressure for seat and stem seals. Sealant injection points shall be provided with a needle valve, grease fitting and non return valve. Valve design shall have a provision to replace



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the sealant injection fitting under full line pressure. Location and arrangement of sealant points shall be as per Figure-1.

4.8 Valves shall be provided with vent and drain connections. Location and arrangement of vents and drains shall be as per Figure-1. Body vent and drain shall be provided with valves (ball or plug type). Number and size shall be as per Figure-1.

4.9 Valve design shall ensure repair of gland packing under full line pressure.

- 4.10
- a) Valve ends shall be either flanged or butt welded or one end flanged and one end butt welded as indicated in Valve Data Sheet. Flanges of the flanged end cast/ forged body valves shall be integrally cast/forged with the body of valve. Face-to-face/ end-to-end dimensions shall conform to API 6D.
 - b) Flanged end shall have dimensions as per ASME B16.5 for valve sizes upto DN 600mm (24 inches) excluding DN 550mm (22 inches) and as per MSS-SP-44 for valve sizes DN 550mm (22 inches) & for DN 650mm (26 inches) and above. Flange face shall be either raised face or ring joint type as indicated in Valve Data Sheet. Flange face finish shall be serrated or smooth as indicated in Valve Data Sheet. Smooth finish when specified shall be 125 to 200 AARH.
 - c) Butt weld end preparation shall be as per ASME B16.25. The thickness of the pipe to which the valve has to be welded shall be as indicated in Valve Data Sheet. In case significant difference exists between thickness of welding ends of valve and connecting pipe, the welding ends of valve shall have bevel preparation as per ASME B31.4 or ASME B31.8, as applicable.
 - d) For soft seated valves with Butt welded end, valves shall be provided with pup pieces on **either side of length 200 mm each for size up-to 8" & 250 mm for size 10" and above**, with material same as or higher to valve body material. **Length of pup piece shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment.** Pup piece thickness shall be calculated for the class rating. Vendor shall provide for each type (considering size, grade and thickness of the pup pieces used for all



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offered valves) of pup piece, test rings (500 mm long) from pup piece material for field weld procedure qualification. Valves shall be tested along-with pup piece.

Design of weld end valves shall be such that during field welding operation, the soft seals or plastic components of the valve (wherever used) are not liable to be damaged. The Manufacturer shall furnish necessary field welding instructions and post-weld test procedure to demonstrate integrity and leak-tightness of valves after field welding operations.

4.11 Valves shall be provided with ball position indicator and stops of rugged construction at the fully open and fully closed positions.

4.12 Full Bore Valves of nominal size \square 200mm(8") and Reduced Bore Valves of nominal size \square 250mm(10") shall be equipped with support foot and lifting lugs. Tapped holes and eye bolts shall not be used for lifting lugs. Height of support foot shall be kept minimum. The location and size of support foot / lifting lugs shall ensure unrestrictive operation of vent / drain valves.

Valve design shall be such as to avoid bimetallic corrosion between carbon steel and high alloy steel components. Suitable insulation shall be provided as required.

5.14.1 When indicated in Material Requisition, valves shall have locking devices to lock the valve either in full open (LO) or full close (LC) positions. Locking devices shall be permanently attached to the valve operator and shall not interfere with operation of the valve.

4.15 Valves shall be of fire-resistant design as per API 607/BS:6755 (Part-II)/API 6FA, as indicated in Valve Data Sheet.

4.16 Valves shall be provided with anti-static devices to ensure electrical continuity between stem / ball and valve body. Valve



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design shall be such as to avoid bimetallic corrosion between carbon steel and high alloy steel components. Suitable insulation shall be provided as required.

4.17 Valves shall be suitable for either buried or above ground installation as indicated in Valve Data Sheet.

4.18 When stem extension requirement is indicated in Valve Data Sheet, the valves shall have the following provisions:

- a) Valves provided with stem extension shall have waterproof outer casing. Length of stem extension shall be as indicated in Valve Data Sheet. The length indicated corresponds to the distance between centreline of the valve opening and centreline of the rim of the hand wheel on a vertical shaft or centreline of the hand wheel on a horizontal shaft.
- b) Vent and drain connections and sealant injection lines shall be terminated adjacent to the valve operator by means of suitable piping anchored to the valve body. Pipe used shall be API 5L Gr. B/ ASTM A 106 Gr. B, with Sch. 160. Fittings shall be ASTM A 105/ ASTM 234 Gr. WPB, Socket Welded, ANSI class 6000.
- c) Stem extension and stem housing design shall be such that the complete assembly will form a rigid unit giving a positive drive under all conditions with no possibility of free movement between valve body, stem extension or its operator.

Outer casing of stem extension shall have 3/8" or 1/2" NPT plugs at the top and bottom, for draining and filling with oil to prevent internal corrosion

4.19 Operating Devices

- a) Valves shall have a power actuator or manual operator as indicated in Valve Data Sheet. In case of manual operator, valve sizes \leq DN 100mm (4 inches) and other higher sizes shall be gear operated. Valve design shall be such that damage due to malfunctioning of the operator or its controls will only occur in the operator gear train or power cylinder and that damaged parts can be replaced without the valve cover being removed.
- b) The power actuator shall be in accordance with the Purchaser specification issued for the purpose and as indicated in Valve and Actuator Data Sheet. Operating time shall be as indicated in Valve Data Sheet. Valve operating time shall correspond to full close



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to full open/full open to full close under maximum differential pressure corresponding to the valve rating. For actuated valves, the actuator torque output shall be 1.50 times the break torque required to operate the ball valve under the maximum differential pressure corresponding to the valve class rating.

- c) For manual operator of all valves, the diameter of the hand wheel or the length of operating wrench shall conform to API 6D requirements and be such that under maximum differential pressure, the total force required to operate the valve does not exceed 350 N. Manufacturer shall also indicate the number of turns of hand wheel (in case of gear operators) required for operating the valve from full open to full close position.
- d) Direction of operation of hand wheel or wrench shall be in clock-wise direction while closing the valve. Hand wheels shall not have protruding spokes.
- e) Gear operators, when provided, shall have a self locking provision and shall be fully encased, in water proof/ splash proof/ dust proof/ weather proof enclosure and shall be filled with suitable grease.
- f) Operating devices shall be designed for easy operation of the valve under maximum differential pressure corresponding to the valve rating.

4.21 All welds shall be made by welders and welding procedures qualified in accordance with the provisions of ASME Section IX. The procedure qualification shall include impact test and hardness test and shall meet the requirements of clauses 3.4 and 3.6 of this specification, respectively.

4.22 All welds shall be stress relieved in accordance with ASME Section VIII.

4.23 Repair by welding is not permitted for fabricated and forged body valves. However repair by welding as per ASME B16.34 is permitted for cast body valves. Repair shall be carried out before any heat treatment of casting is done. Repair welding procedure qualification shall include impact test and hardness test and shall meet the requirements of clauses 3.4 & 3.6 of this specification,



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respectively.

The tolerance on internal diameter and out of roundness at the ends for welded end valves shall be as per applicable connected pipe specification as indicated in Valve Data Sheet.

- 4.24 Valve stem shall be capable of withstanding the maximum operating torque required to operate the valve against the maximum differential pressure corresponding to applicable class rating. The combined stress shall not exceed the maximum allowable stresses specified in ASME Section VIII, Division I. In case of power actuated valves, the valve stem shall be capable of withstanding maximum output of the power actuator.

5.0 INSPECTION AND TESTINGS

- 5.1 The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his works. Such inspection and tests shall be, but not limited to, the following:

All valves shall be visually inspected. The internal and external surfaces of the valves shall be free from any strikes, gouges and other detrimental defects. The surfaces shall be thoroughly cleaned and free from dirt, rust and scales.

- 5.1.1 Dimensional check on all valves shall be carried out as per the Purchaser approved drawings.
- 5.1.2 Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.



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- 5.1.4 a) Non-destructive examination of individual valve material and components consisting of, but not limited to castings, forgings, plate and assembly welds shall be carried out by the Manufacturer.
- b) Body castings of all valve shall be radiographically examined on 100% of the surface of critical areas as per ASME B16.34.
- All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B.16.34.
- c) All valves, with body fabricated from plates made or by forgings, shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B16.34. All forgings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B 16.34
- d) Bodies and bonnets made by welded assembly of segments of castings, forgings, plates or combinations thereof shall be examined, as applicable, by methods of clause 5.1.4 b) for cast components or clause 5.1.4 c) for forged components and plates.
- 5.1.5 Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.4 or ASME B31.8, as applicable, and API 1104.
- 5.1.6 Welds which in Purchaser's opinion cannot be inspected by radiographic methods, shall be checked by ultrasonic or magnetic particle methods and acceptance criteria shall be as per ASME Section VIII, Division 1, Appendix 12 and Appendix 6, respectively.
- 5.1.7 a) All finished wrought weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50mm from the end. Laminations shall not be acceptable.



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- b) Weld ends of all cast valves subject to welding in field shall be 100% radiographically examined and acceptance criteria shall be as per ASME B16.34.
 - c) After final machining, all bevel surfaces shall be inspected by dye penetrant or wet magnetic particle methods. All defects longer than 6.35 mm are rejected, as are defects between 6.35 mm and 1.59mm that are separated by a distance less than 50 times their greatest length. Rejectable defects must be removed. Weld repair of bevel surface is not permitted.

5.1.8 All valves shall be tested in compliance with the requirements of API 6D. During pressure testing, valves shall not have sealant lines and other cavities filled with sealant, grease or other foreign material. The drain, vent and sealant lines shall be either included in the hydrostatic shell test or tested independently. No leakage is permissible during hydrostatic testing. The body cavity self relieving feature meeting the requirements of clause 5.6 of this specification shall also be checked.

5.1.9 A supplementary air seat test as per API 6D shall be carried out for all valves. A bubble tight seal is required without the use of any sealant. No leakage is allowed. Test pressure shall be held for at least 15 minutes.

5.1.10 Manufacturer who intends bidding, must submit at bid stage, certificate and report for successful fire type-tests for valves in accordance with API-607/ BS:6755 (Part-II)/ API 6FA, as applicable in Valve Data Sheet. Failure to comply with this requirement shall be a cause of rejection of the offer.

5.1.11 Valves shall be subjected to Operational Torque Test as per supplementary test requirement of API 6D under hydraulic pressure equal to maximum differential pressure corresponding to the valve rating.

For manually operated valves, it shall be established that the force required to operate the valve does not exceed the requirements stated in clause 4.20(c) of this specification.



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Power actuated valves shall be tested after assembly of the valve and actuator at the valve Manufacturer's works. At least five open-close-open cycles without internal pressure and five open-close-open cycles with maximum differential pressure shall be performed on the valve actuator assembly. The time for full open to full close shall be recorded during testing. If required, the actuator shall be adjusted to ensure that the opening and closing times are within the limits stated in Actuator Data Sheet issued for the purpose.

Hand operator provided on the actuator shall also be checked after the cyclic testing, for satisfactory manual over-ride performance.

These tests shall be conducted on minimum one valve out of a lot of five(5) valves of the same size, rating and the actuator model/ type. In case the tests do not meet the requirements, retesting / rejection of the lot shall be decided by Purchaser's Inspector.

5.1.12 Subsequent to successful testing as specified in clause 5.1.11 and 5.1.12 above, one (1) valve out of the total ordered quantity shall be randomly selected by the Purchaser's Representative for cyclic testing as mentioned below:

- a) The valve shall be subjected to at least 100 Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.
- b) Subsequent to the above, the valve shall be subjected to hydrostatic test and supplementary air seat test in accordance with clause 5.1.8 and 5.1.9.

In case this valve fails to pass these tests, the valve shall be rejected and two more valves shall be selected randomly and subjected to testing as indicated above. If both valves pass these tests, all valves manufactured for the order (except the valve that failed) shall be deemed acceptable. If either of the two valves fails to pass these tests, all valves shall be rejected or each valve shall be tested at the option of Manufacturer. Previously carried out test of similar nature shall be considered acceptable if the same has been carried out by Manufacturer in last two years. Valves of two sizes below and two sizes above the size of valve previously tested, and rating similar or one



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rating lower of valve tested previously, shall be qualified.

Checks shall be carried out to demonstrate that the dissimilar metal used in the valves are successfully insulated as per the requirement of clause 4.14 of this specification.

- 5.1.13 When indicated in Valve Data Sheet, valves shall be subjected to anti-static testing as per supplementary test requirement of API 6D.
- 5.1.14 Additionally, pneumatic testing to be performed by the manufacturer on min. 10% of the valves during final inspection by purchaser's inspector/TPI.
- 5.2 SSPurchaser reserves the right to perform stage-wise inspection and witness tests as indicated in clause 5.1 above at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to the Purchaser's Inspector.

Purchaser reserves the right to require additional testing at any time to confirm or further investigate a suspected fault. The cost incurred shall be to Manufacturer's account.

In no case shall any action of Purchaser or his Inspector relieve the Manufacturer of his responsibility for material, design, quality or operation of valves.

Inspection and tests performed/ witnessed by the Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

6.0 INSPECTION & TESTING BY PURCHASER

- 6.1 Purchaser's Inspector shall perform inspection and witness tests on all valves or as indicated / Approved Quality Assurance Plan (QAP) submitted by the successful bidder. A sample QAP is enclosed as Annexure A for guidance.



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6.2 Pre-Dispatch Inspection shall be arranged by the Purchaser and cost for the same shall be in scope of the purchaser.

6.3 The hydrostatic testing and cyclic opening and closing of the valves with the operator shall be witnessed by Purchaser's Inspector.

7.0 TEST CERTIFICATES

7.1 Manufacturer shall submit the following certificates:

- a) Mill test certificates relevant to the chemical analysis and mechanical properties of the materials used for valve construction as per the relevant standards.
- b) Test certificates on hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
- c) Test reports on radiograph and ultrasonic inspection.
- d) Test report on operation of valves conforming to clause 5.1.11 and 5.1.12 of this specification.
- e) All other test reports and certificates as required by API 6D and this specification.

The certificates shall be valid only when signed by Purchaser's Inspector. Only those valves which have been certified by Purchaser's Inspector shall be despatched from Manufacturer's works.

8.0 PAINTING, MARKING & SHIPMENT



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- 8.1 Valve surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Surface preparation shall be carried out by shot blasting to SP-6 in accordance with “Steel Structures Painting Council – Visual Standard SSPC-VIS-1”. For valves to be installed underground, when indicated in Valve Data Sheet, the external surfaces of the buried portion of valves shall be painted with three coats of suitable coal tar epoxy resin with a minimum dry film thickness of 300 microns.
- 8.2 Manufacturer shall indicate the type of corrosion resistant paint used, in the drawings submitted for approval
- 8.3 All valves shall be marked as per API 6D. The units of marking shall be metric except Nominal Diameter which shall be in inches. Marking shall be done by die-stamping on the bonnet or on the housing. However, for buried valves the marking shall be done on the above ground portion of the stem housing only.
- 8.4 Valve ends shall be suitably protected to avoid any damage during transit. All threaded and machined surfaces subject to corrosion shall be well protected by a coat of grease or other suitable material. All valves shall be provided with suitable protectors, for flange faces, securely attached to the valves. Bevel ends shall be protected with metallic or high impact plastic bevel protectors.
- 8.5 All sealant lines and other cavities of the valve shall be filled with sealant before shipment.
- 8.6 Packaging and shipping instructions shall be as per API 6D.
- 8.7 On packages, following shall be marked legibly with suitable marking ink :
- a) Order Number
 - b) Manufacturer's Name
 - c) Valve Size and Rating
 - d) Tag Number



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e) Serial Number

9.0 SPARES & ACCESSORIES

9.1 Manufacturer shall furnish list of recommended spares and accessories for valves required during start-up and commissioning.

9.2 Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of valves.

9.3 Vender has to be strictly ensure that all CS valve must have hard stamping of class of valve i.e.300#& 150 # along with its Standard code .

Manufacturer shall quote for spares & accessories as per Material Requisition

10.0 DOCUMENTATION

10.1 At the time of bidding, Manufacturer shall submit the following documents :

- a) General arrangement/assembly drawings showing all features and relative positions and sizes of vents, drains, gear operator / actuator, painting, coating and other external parts together with overall dimensions as well as weights of valve & actuator.
- a) Sectional drawing showing major parts with reference numbers and material specification. In particular, a blow-up drawing of ball-seat assembly shall be Furnished..
- b) Installation, Operational and Maintenance Manual.
- c) Copy of valid API 6D certificate



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

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- d) Quality Assurance Plan enclosed with this tender duly signed, stamped and accepted.
 - e) List of recommended spares required during start-up and commissioning.
 - f) List of recommended spares required for 2 years of normal operation and maintenance.
 - k) Other documents / drawings / data as per Material Requisition.

IMPORTANT

The drawings to be submitted alongwith the bid shall be in total compliance with the requirement of technical specification and data sheets of the valves with no exception & deviation.

- 10.2 Within two weeks of placement of order, the Manufacturer shall submit six copies of, but not limited to, the following drawings, documents and specifications for Purchaser's final approval :
- a) Detailed sectional arrangement drawings showing all parts with reference numbers and material specifications as referred to in clause 10.1 above.
 - b) Assembly drawings with overall dimensions and features. Drawing shall also indicate the number of turns of hand wheel (in case of gear operators) required for operating the valve from full open to full close position and the painting scheme. Complete dimensional details of support foot (where applicable) shall be indicated in these drawings as referred to in clause 10.1 above.
 - c) Welding, heat treatment and testing procedures.
 - d) Details of corrosion resistant paint to be applied on the valves.
 - e) The Quality Assurance Plan (QAP & Sampling Plan). A sample QAP is enclosed as Annexure-A for guidance.
- Manufacture of valves shall commence only after approval of the above documents. Once the approval has been given by Purchaser, any changes in design, material and method of Manufacture shall be notified to Purchaser whose approval in writing of all changes shall be obtained before the valve is manufactured.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

- 10.3 Within 2 weeks from the approval date, Manufacturer shall submit to Purchaser one reproducible and six copies of the approved drawings, documents and specifications as listed in clause 10.2 above.
- 10.4 Prior to shipment, Manufacturer shall submit one reproducible and six copies of the following:
- a) Test certificates as per clause 7.0 of this specification.
 - b) Manual for installation, erection, maintenance and operation instructions, including a list of recommended spares for the valves.
- 10.5 All documents shall be in English language.
- 11.0 GUARANTEE
- 11.1 Manufacturer shall guarantee that the materials and machining of valves and fittings comply with the requirements in this specification and in the Purchase Order.
- 11.2 Manufacturer is bound to replace or repair all valve parts which should result defective due to inadequate engineering or to the quality of materials and machining.
- 11.3 If valve defect or malfunctioning cannot be eliminated, Manufacturer shall replace the valve without delay, Any defect occurring during the period of Guarantee shall be attended to by making all necessary modifications and repair of defective parts free of charge to the Purchaser as per the relevant clause of the bid document.
- 11.4 All expenses shall be to Manufacturer's account.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

12. **Third party inspection:**

Bidder shall appoint anyone of the following TPIA for inspection purpose, wherever required as per tender document & QAP attached.

- 1) Lloyd Register of Industrial Services
- 2) TUV SUD South Asia Limited
- 3) Det Norske Veritas (DNV)
- 4) AB-Vincotte
- 5) Bureau Veritas – India
- 6) SGS India Limited
- 7) American Bureau Services
- 8) Velosi Certification Services
- 9) Dr. Amin Controllers Pvt. Limited



**PROCUREMENT OF CS FITTINGS, BALL VALVES AND
INSULATION JOINTS**

DATA SHEETS & QAP

DATA SHEET FOR BALL VALVES

1.	Valve Manufacturer	:	* (Vendor to specify)
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PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

2.	Valve Size (NB), mm (inch)	:	4 inches to 8 inches	ANSI Rating: 300#
3.	Design Standard	:	API 6D	
4.	Connecting Pipeline Design Pressure, kg/cm2(g)	:	49	Design Temperature, °C : -29 to 65 °C
5.	Maximum pressure differential, kg/cm2(g)	:	49	
6.	Connecting Pipe Specification			
7.	Material	:	API-5L Gr.X-42/	
8.	Diameter (OD), mm (inch)	:	Refer Material Requisition	
9.	Thickness, mm	:	6.4 mm	
10.	Valve Construction Design			
11.	Bore	:	Reduced <input type="checkbox"/>	Full <input type="checkbox"/> Refer Material Requisition
12.	End Connections	:	Refer material requisition	
13.	Flanges (wherever applicable)		a) RF <input type="checkbox"/> FF <input type="checkbox"/> RTJ <input type="checkbox"/> NA <input type="checkbox"/>	
14.			b) Serrated <input type="checkbox"/> Smooth (125 to 200 u AARH) <input type="checkbox"/> NA <input type="checkbox"/>	
15.	Valve Type	:	Valves Size 4" and above shall be Trunnion Mounted	
16.	Valve Material Specification			
17.	Part		Specified Material	Material Offered
18.	Body		ASTM A 216 Gr.WCB/A234 Gr.WPB	
19.	Ball		(ASTM A 216 Gr.WCB/A234 Gr.WPB)+ 75 microns ENP/ AISI 410	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

20.	Body seat ring	(ASTM A 216 Gr.WCB/A234 Gr.WPB)+ 75 microns ENP/ AISI 410	
21.	Seat seal	RPTFE/ PTFE	
22.	Gland	13% Cr Steel	
23.	Stem	(AISI 4140 + 75 microns ENP)/ AISI 410	
24.	Stem Seal	Grafoil/PTFE	
25.	Studs Bolts & Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	
26.	Corrosion Allowance	1.5 mm	
27.	Service	: Natural gas	
28.	Location	: Above Ground <input type="checkbox"/> Buried <input type="checkbox"/>	
29.	Stem Extension Requirement	: Yes <input type="checkbox"/> No <input type="checkbox"/> Length of stem Extension, 01 meter	
30.	Gear Operator Requirement	: Yes <input type="checkbox"/> No <input type="checkbox"/>	
31.	Lock Open/ Lock Close Requirement		During approval of data sheet
32.	Fire Resistant Design Requirement	: API 607 for floating ball valve design, API 6FA for trunnion mounted ball valve design	
33.	Valve Testing Requirement		
34.	Testing standard	: API 6D	
35.	Hydrostatic Body Test Pressure (min.), kg/cm2(g)	: 76	
36.	Hydrostatic seat Test Pressure (min.), kg/cm2(g)	: 57	
37.	Air test Pressure, kg/cm2(g)	: 5.6-7	
38.	Anti-Static Testing Requirement	: As per standard API 6D	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS



39.	Valve Painting Specification		
40.	Suitable for Environment Type		Corrosive Industrial Environment
41.	Painting specification no.		Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-05-5900-1967. 1 Coat of Inorganic Zinc Silicate primer with 65-75 μ DFT/coat +2 coats of Chlorinated rubber zinc Phosphate primer @40 μ DFT/coat + 2 coats of Chlorinated rubber based finish paint @40 μ DFT/coat. Total DFT -225 μ (min.).

Notes:

- 1). This Valve Data Sheet shall be read in conjunction with CUGL 's Technical Specification
- 2) For Flanged valves, bolted design is acceptable. For BW X Flanged end valves, if the jointing of the body pieces is before the flanged end of the valve then bolted design is acceptable. If the jointing of body pieces is towards BW end , then the body pieces shall be welded instead of bolting.
- 3) Inspection and Testing shall be as per QAP, this Data Sheet, CUGL T.S., API 6D and other relevant standards. 4). Stops shall be provided to ensure positive alignment of ball with ports and ensure proper installation of handle. 5). Short pattern valves as per API 6D are not permitted, only long pattern valves are to be supplied.
- 6) Charpy V- notch test for body, ball, body seat rings, stem & studs/nuts will be conducted as per relevant material code.
- 7) For soft seated valves with Butt welded end, valves shall be provided with pup pieces on either side of length 200 mm each for size up-to 8" .
for 4", 6" & 8" NB API 5L Gr., X42 6.4mm thk.
The length of pup piece shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment.
- 8) For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

- 9) Valves shall be inspected and approved by Purchaser before despatch.
- 10) The requirement of Full Bore or Reduced bore shall be as per Material Requisition and Price schedule
- 11). Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.
- 12). * Denotes vendor to indicate
- 13). * Ball & stem shall be ENP coated for minimum thickness of 75microns.
- 14)Valves must have clear indication of valve position (i.e open & close) and flow direction.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

DATA SHEET FOR BALL VALVES

1.	Valve Manufacturer	:	* (Vendor to specify)	
2.	Valve Size (NB), mm (inch)	:	2inch & > 4	ANSI Rating: 300#
3.	Design Standard	:	API 6D	
4.	Connecting Pipeline Design Pressure, kg/cm2(g)	:	49	Design Temperature, °C : -29 to 65 °C
5.	Maximum pressure differential, kg/cm2(g)	:	49	
6.	Connecting Pipe Specification			
7.	Material	:	ASTM A106 Gr.B (for 2" NB) /API-5L Gr.X-42 for 4" NB/ API-5L Gr.X-52 for 8" NB	
8.	Diameter (OD), mm (inch)	:	Refer Material Requisition	
9.	Thickness, mm	:	6.4 mm	
10.	Valve Construction Design			
11.	Bore	:	Reduced <input type="checkbox"/>	Full <input type="checkbox"/>
12.	End Connections	:	BW (Refer Material Requisition)	
13.	Flanges (wherever applicable)	:	a) RF <input type="checkbox"/> FF <input type="checkbox"/> RTJ <input type="checkbox"/> NA <input type="checkbox"/>	
14.		:	b) Serrated <input type="checkbox"/> Smooth (125 to 200 u AARH) <input type="checkbox"/> NA <input type="checkbox"/>	
15.	Valve Type	:	Double Block & Bleed type Bolted valve design is not acceptable	
16.	Valve Material Specification			
17.	Part		Specified Material	Material Offered
18.	Body		ASTM A 216 Gr.WCB/A234 Gr.WPB	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

19.	Ball	(ASTM A 216 Gr.WCB/A234 Gr.WPB)+ 75 microns ENP/ AISI 410	
20.	Body seat ring	(ASTM A 216 Gr.WCB/A234 Gr.WPB)+ 75 microns ENP/ AISI 410	
21.	Seat seal	RPTFE/ PTFE	
22.	Stem	(AISI 4140 + 75 microns ENP)/ AISI 410	
23.	Stem Seal	Grafoil/PTFE	
24.	Studs Bolts & Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	
25.	Corrosion Allowance	1.5 mm	
26.	Service	: Natural gas	
27.	Location	: Above Ground <input type="checkbox"/> Buried <input type="checkbox"/> valve are installed inside valve pit /chamber.	
28.	Stem Extension Requirement	: Yes <input type="checkbox"/> No <input type="checkbox"/> Length of stem Extension, m : N.A	
29.	Gear Operator Requirement	: Yes <input type="checkbox"/> No <input type="checkbox"/>	
30.	Lock Open/ Lock Close Requirement	During approval of data sheet	
31.	Fire Resistant Design Requirement	: API 607 for floating ball valve design, API 6FA for trunnion mounted ball valve design	
32.	Valve Testing Requirement		
33.	Testing standard	: API 6D	
34.	Hydrostatic Body Test Pressure (min.), kg/cm2(g)	: 76	
35.	Hydrostatic seat Test Pressure (min.), kg/cm2(g)	: 57	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS



36.	Air test Pressure, kg/cm ² (g)	:	5.6-7
37.	Anti-Static Testing Requirement	:	As per standard API 6D
38.	Valve Painting Specification		As per standard
39.	Suitable for Environment Type		Corrosive Industrial Environment
40.	Painting specification no.		Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-05-5900-1967. 1 Coat of Inorganic Zinc Silicate primer with 65-75 μ DFT/coat +3 coats of High Build coal tar Epoxy primer @100 μ DFT/coat . Total DFT -365 μ (min.)

Notes: 1). This Valve Data Sheet shall be read in conjunction with CUGL Technical Specification

2) Inspection and Testing shall be as per QAP, this Data Sheet, CUGL T.S., API 6D and other relevant standards. 3). Stops shall be provided to ensure positive alignment of ball with ports and ensure proper installation of handle. 4). Short pattern valves as per API 6D are not permitted, only long pattern valves are to be supplied.

5) Charpy V- notch test for body, ball, body seat rings, stem & studs/nuts will be conducted as per relevant material code.

6) For soft seated valves with Butt welded end, valves shall be provided with pup pieces on either side of length 200 mm each for size up-to 8" . The MOC of pup piece for 2" valves are A106 Gr.B Sch.80, for 4" API 5L Gr., X42 6.4mm thk, for 8" API 5L Gr., X52 6.4mm thk. Length of pup piece shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment.

7) For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.

8) Valves shall be inspected and approved by Purchaser before despatch.

9) The requirement of Full Bore or Reduced bore shall be as per Material Requisition and Price schedule 10).Detailed dimensional drawings



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.

11). * Denotes vendor to indicate

12). * Ball & stem shall be ENP coated for minimum thickness of 75microns

13) Valves must have clear indication of valve position (i.e open & close) and flow direction.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

Data Sheet for Ball valve, one end Flange one side welded.

1.	Valve Manufacturer	:	* (Vendor to specify)	
2.	Valve Size (NB), mm (inch)	:	2 inches	ANSI Rating: 300#
3.	Design Standard	:	API 6D	
4.	Connecting Pipeline Design Pressure, kg/cm2(g)	:	49	Design Temperature, °C -29 to 65 ⁰ C
5.	Maximum pressure differential, kg/cm2(g)	:	49	
6.	Connecting Pipe Specification			
7.	Material	:	ASTM A106 Gr.B (for 2" NB)	
8.	Diameter (OD), mm (inch)	:	Refer Material Requisition	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

9.	Thickness, mm	:	6.4 mm	
10.	Valve Construction Design			
11.	Bore	:	Reduced <input type="checkbox"/>	Full <input type="checkbox"/>
12.	End Connections	:	one end Flange one side welded (Refer Material Requisition)	
13.	Flanges (wherever applicable)		a) RF <input type="checkbox"/> FF <input type="checkbox"/> RTJ <input type="checkbox"/> NA <input type="checkbox"/>	
14.			b) Serrated <input type="checkbox"/> Smooth (125 to 200 u AARH) <input type="checkbox"/> NA <input type="checkbox"/>	
15.	Valve Type	:	Double Block & Bleed type Bolted valve design is not acceptable	
16.	Valve Material Specification			
17.	Part		Specified Material	Material Offered
18.	Body		ASTM A 216 Gr.WCB/A234 Gr.WPB	
19.	Ball		(ASTM A 216 Gr.WCB/A234 Gr.WPB)+ 75 microns ENP/ AISI 410	
20.	Body seat ring		(ASTM A 216 Gr.WCB/A234 Gr.WPB)+ 75 microns ENP/ AISI 410	
21.	Seat seal		RPTFE/ PTFE	
22.	Stem		(AISI 4140 + 75 microns ENP)/ AISI 410	
23.	Stem Seal		Grafoil/PTFE	
24.	Studs Bolts & Nuts		ASTM A193 Gr. B7/ A194 Gr. 2H	
25.	Corrosion Allowance		1.5 mm	
26.	Service	:	Natural gas	
27.	Location	:	Above Ground <input type="checkbox"/> Buried <input type="checkbox"/> valve is installed inside valve pit /chamber.	
28.	Stem Extension Requirement	:	Yes <input type="checkbox"/> No <input type="checkbox"/> Length of stem Extension, m : N.A	



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

29.	Gear Operator Requirement	:	Yes <input type="checkbox"/> No <input type="checkbox"/>
30.	Lock Open/ Lock Close Requirement		During approval of data sheet
31.	Fire Resistant Design Requirement	:	API 607 for floating ball valve design, API 6FA for trunnion mounted ball valve design
32.	Valve Testing Requirement		
33.	Testing standard	:	API 6D
34.	Hydrostatic Body Test Pressure (min.), kg/cm2(g)	:	76
35.	Hydrostatic seat Test Pressure (min.), kg/cm2(g)	:	57
36.	Air test Pressure, kg/cm2(g)	:	5.6-7
37.	Anti-Static Testing Requirement	:	As per standard API 6D
38.	Valve Painting Specification		As per standard
39.	Suitable for Environment Type		Corrosive Industrial Environment
40.	Painting specification no.		Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-05-5900-1967. 1 Coat of Inorganic Zinc Silicate primer with 65-75 μ DFT/coat +3 coats of High Build coal tar Epoxy primer @100 μ DFT/coat . Total DFT -365 μ (min.)

Notes:

- 1). This Valve Data Sheet shall be read in conjunction with CUGL 's Technical Specification.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

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- 2) Inspection and Testing shall be as per QAP, this Data Sheet, CUGL T.S., API 6D and other relevant standards.
 - 3). Stops shall be provided to ensure positive alignment of ball with ports and ensure proper installation of handle.
 - 4). Short pattern valves as per API 6D are not permitted, only long pattern valves are to be supplied.
 - 10) Charpy V- notch test for body, ball, body seat rings, stem & studs/nuts will be conducted as per relevant material code.
 - 11) For soft seated valves with Butt welded end, valves shall be provided with pup pieces one side of length 200 mm and one side 2inch 300 # WNRF Flanged ends shall have flanges as per ASME B16.5. The MOC of pup piece for 2" valves are A106 Gr.B Sch.80, Length of pup piece shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment.
 - 12) For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
 - 13) Valves shall be inspected and approved by Purchaser before despatch.
 - 14) The requirement of Full Bore or Reduced bore shall be as per Material Requisition and Price schedule
 - 10). Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.
 - 11). * Denotes vendor to indicate.
 - 12). * Ball & stem shall be ENP coated for minimum thickness of 75microns.
 - 13) Valves must have clear indication of valve position (i.e open & close) and flow direction.



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Data Sheet for Globe Valve,

1.	Valve Manufacturer	:	* (Vendor to specify)	
2.	Valve Size (NB), mm (inch)	:	2 inches	ANSI Rating: 300#
3.	Design Standard	:	API 6D	
4.	Connecting Pipeline Design Pressure, kg/cm2(g)	:	49	Design Temperature, °C -29 to 65 °C
5.	Maximum pressure differential, kg/cm2(g)	:	49	
6.	Connecting Pipe Specification			
7.	Material	:	ASTM A106 Gr.B (for 2" NB)	
8.	Diameter (OD), mm (inch)	:	Refer Material Requisition	
9.	Thickness, mm	:	6.4 mm	
10.	Valve Construction Design			
11.	Bore	:	Reduced <input type="checkbox"/>	Full <input type="checkbox"/>



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

32.	Valve Testing Requirement	
33.	Testing standard	: API 6D
34.	Hydrostatic Body Test Pressure (min.), kg/cm2(g)	: 76
35.	Hydrostatic seat Test Pressure (min.), kg/cm2(g)	: 57
36.	Air test Pressure, kg/cm2(g)	: 5.6-7
37.	Anti-Static Testing Requirement	: As per standard API 6D
38.	Valve Painting Specification	As per standard
39.	Suitable for Environment Type	Corrosive Industrial Environment
40.	Painting specification no.	Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-05-5900-1967. 1 Coat of Inorganic Zinc Silicate primer with 65-75 μ DFT/coat +3 coats of High Build coal tar Epoxy primer @100 μ DFT/coat . Total DFT -365 μ (min.)

Notes:

- 1). This Valve Data Sheet shall be read in conjunction with CUGL 's Technical Specification.
- 2) Inspection and Testing shall be as per QAP, this Data Sheet, CUGL T.S., API 6D and other relevant standards.
- 3). Stops shall be provided to ensure positive alignment of ball with ports and ensure proper installation of handle.
- 4). Short pattern valves as per API 6D are not permitted, only long pattern valves are to be supplied.
- 15) Charpy V- notch test for body, ball, body seat rings, stem & studs/nuts will be conducted as per relevant material code.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

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- 16) For soft seated valves with Flange End, 2 inch 300 # WNRF Flanged ends shall have flanges as per ASME B16.5. shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment.
 - 17) For Flange end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
 - 18) Valves shall be inspected and approved by Purchaser before despatch.
 - 19) The requirement of Full Bore or Reduced bore shall be as per Material Requisition and Price schedule
 - 10). Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.
 - 11). * Denotes vendor to indicate.
 - 12). * Globe Ball & stem shall be ENP coated for minimum thickness of 75microns.
 - 13) Valves must have clear indication of valve position (i.e open & close) and flow direction.



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Annexure A : Sample QAP for Ball valves

Manufacturer/Contractor :					QAP No, Rev No.& Date				
Name of Client: CENTRAL UP GAS LIMITED					FOA No.& Date:				
PROJECT :									
Sl. No.	Components & operation	Type of check	Quantum of check	Reference document	Acceptance Norms	Format of record	Inspection		
							Manufacturer	TPI	CUGL
1	Raw material								
	Body, side piece, Bonnet, trunnion	Chemical & Physical test	Per Heat	ATSM A 216 Gr. WCB/ASTM A105	ATSM A 216 Gr. WCB/ASTM A105	Foundry TC.	R	W	W/R
		Impact test for WCB at (-) 29 ° C	Per Heat	ASTM A370s	22J single /27 J average	Supplier TC/ Impact report	R	W	W/R
		Hardness test	Per Heat	ASTM A370	As per ASTM A 105/ 248 HV10 for WCB	Supplier TC	R	W	W/R
		Ultrasonic test	100 % For forgings	Design std.	ASME B 16.34	UT Report	R	W	W/R
		Wet MPT	100%		ASME B 16.34	MPT	P/R	W	R



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				ASME B 16.34	Appendix II	Report			
		Visual & Dimensional	100%	MSS SP 55	MSS SP 55	Incoming GRN	P	R	R
Ball & Seat	Chemical & Physical test	Per Heat		ATSM A 216 Gr. WCB+75 μENP/AIS I 410	ATSM A 216 Gr. WCB+75 μENP/AIS I 410	Foundry TC.	R	W	R
	Hardness test	Per Heat			ATSM A 216 Gr. WCB+75 μENP (50 HRC) /AIS I 410 & Hardness of ENP Plating 50 RC	Supplier TC	R	W	R
	Impact test for WCB at (-) 29 °C	Per Heat		ASTM A370	22J single /27 J average	Supplier TC/ Impact report	R	W	R
	Visual & Dimensional	100%		MSS SP 55	MSS SP 55	Incoming GRN	P	R	R
	Wet MPT	100%		ASME B 16.34	ASME B 16.34 Appendix II	MPT Report	P/R	W	R



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	Stem	Chemical & Physical Test	Per Heat	Approved Drg.	Approved Drg.	Foundry TC.	P/R	R	R
		Hardness test	Per Heat	Approved Drg.	Approved Drg.	Foundry TC.	P/R	R	R
		Impact test for WCB at (-) 29 0 C	Per Heat	ASTM A370	22J single /27 J average	Supplier TC/ Impact report	R	R	R
1 A	Manufacturing Welding								
	Approved WPS, PQR, WQT (Note1)	Welding parameters	100%	ASME Section -IX	ASME Section - IX	WPS, PQR, WPS	P	R	R
	Radiography for welded valves & pup pieces	100%	TS & Design std.	ASME B 16.34/API 6D	ASME B 16.34/API 6D	RT Report & film	R	Review of film & Report	R
2	In process Inspection								



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	Body & S/P	Transfer of Heat No. & Dimensions	100%	-	-	In process report	P	R	R
	Ball & Stem	Dimensions	100%	-	-	In process report	P	R	R
3	Bought out items								
	Fasteners	Chemical & Physical test	100%	ASTM A 193 Gr. B7 & A194 Gr.2H	ASTM A 193 Gr. B7 & A194 Gr.2H	Supplier TC	R	R	R
		Dimensions	Per lot			Inspection report	P	R	R
4	Final inspection & Testing								
		Visual	100%	Design standard	Design standard	Final inspection report	P	100 %W	R
		Dimensions	100%	Approved Drg.	Approved Drg.	-do-	P	10% W	10% W
		Hydro body test	100%	Approved Drg. & API6D	Approved Drg. & API 6D	-do-	P	100 %W	100% W
		Pneumatic body test	10%	Approved Drg./TS/API 6D	Approved Drg. /TS/API6D	-do-	P	10% W	10% W



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Hydro Seat test	100%	Approved Drg	Approved Drg	-do-	P	20% W	10% W
Air Seat test	100%	Approved Drg	Approved Drg	-do-	P	20% W	10% W
DBB hydro seat test for DBBV valves	100%	Approved Drg.& API6D	Approved Drg.& API6D	-do-	P	20% W	10% W
DBB air seat test for DBBV valves	100%	Approved Drg. &API 6D	Approved Drg. &API 6D	-do-	P	20% W	10% W
Functional test	100%	Approved Drg& data sheet	Approved Drg& data sheet	-do-	P	20% W	10% W
Anti static test	100%	Approved Drg& data sheet	Approved Drg& data sheet & resistance 10 Ohm	-do-	P	1 no. per size per type	1 no per size per type
Painting	100%	Approved Drg& data sheet	Approved Drg& data sheet	Paint report	P	10% W	5% W
Fire safe test	Type test	API 607/API 6FA	API 607/API 6FA	Test report		R	R



**PROCUREMENT OF CS FITTINGS, BALL VALVES AND
INSULATION JOINTS**

CENTRAL UP GAS LIMITED (CUGL)

CITY GAS DISTRIBUTION PROJECT

TENDER FOR PROCUREMENT OF CS FITTINGS, INSULATION JOINTS

AND

BALL VALVES

BID DOCUMENT NO.

SECTION-V- (C)

TECHNICAL SPECIFICATION



**PROCUREMENT OF CS FITTINGS, BALL VALVES AND
INSULATION JOINTS**



FOR GROUP-C



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

C O N T E N T S (INSULATING JOINTS)

<u>Sl.No.</u>	<u>Description</u>
1.0	SCOPE
2.0	REFERENCE DOCUMENTS
3.0	MATERIALS
4.0	DESIGN & CONSTRUCTION REQUIREMENTS
5.0	INSPECTION AND TESTS
6.0	TEST CERTIFICATES
7.0	PAINTING, MARKING AND SHIPMENT
8.0	GUARANTEE
9.0	DOCUMENTATION



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

1.0 **SCOPE**

This specification cover the basic requirements for design manufacture, testing and supply of carbon steel insulating joints to be installed in onshore pipeline systems handling hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG).

2.0 **REFERENCE DOCUMENTS**

2.1 Reference has been made in this specification to the latest edition of, the following Codes, Standards and Specifications.

- | | | |
|----|--------------|---|
| a) | ASME B 31.8 | Gas Transmission & Distribution piping System |
| b) | ASME B 31.4 | Liquid transportation systems for Hydrocarbons, LPG, Anhydrous Ammonia and Alcohols |
| c) | ASTM A 370 | Mechanical testing of Steel Product |
| d) | ANSI B 16.25 | Butt Welding Ends |



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

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- | | | |
|----|------------------------|--|
| e) | ASME Section | Boiler & pressure Vessel Code viii & ix |
| f) | API 1104 | Standard for welding pipelines and related facilities. |
| g) | SSPC-VIS-1 | Steel Structures painting Council Visual Standard. |
| h) | MSS-SP-53 | Quality standard for steel castings and forgings for valves flanges and fittings and other piping components - magnetic particle examination method. |
| i) | MSS-SP-75
isolation | Specification for high test wrought welding fittings. NACE RP 0286 The electrical of cathodically Protected pipelines. |

2.2 In case of conflict between the requirements of this specification and any code, Standard or Specification referred to in this Specification, the requirements of this specification shall govern.

3.0 MATERIALS

3.1 Material for the pressure containing parts of the insulating joints shall be as indicated in the data sheets. Material for pups shall be equivalent or superior to the material of connecting pipeline which is indicated in the data sheets. Other part shall be as per manufacturer's standard suitable for the service condition indicated in Insulating Joint Data Sheets and shall be subject to approval by purchaser.

3.2 Insulating joints which are subject to field welding by purchaser, shall have carbon equivalent (CE) not exceeding 0.45 based on



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

check analysis for each heat of steel calculated according to the following formula :

$$CE = C + Mn/6 + (Cr+Mo+V)/5 + (Ni +Cu)/15$$

- 3.3 When specified in the IJ Data Sheet, Charpy V-notch test shall be conducted on each heat of base material, weld metal and heat affected zone of all pressure containing parts such as body, welding ends in accordance with the impact test provisions of ASTM A 370 at a temperature of 0° C. The charpy impact test specimens shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of the plate of forging. Average impact energy value of three full sized specimens shall be 27 joules. Minimum impact energy value of any one specimen shall not be less than 80% of the average impact energy specified. No specimen shall exhibit less than 80% shear area.
- 3.4 Carbon steel used for the manufacture shall be fully killed
- 3.5 When specified in data sheet, hardness test shall be carried out as per ASTM A370 for each heat of steel used. The maximum hardness of base metal, weld metal and heat affected zone of all pressure parts shall be 248 HV₁₀, unless specified otherwise. Insulation material shall be minimum 20 mm thick and shall comply section 5, NACE RP 0286.

4.0 DESIGN & CONSTRUCTION REQUIREMENTS

4.1 Mechanical

- 4.1.1 Insulating joints shall be of integral type fabricated by welding and with pups on either side as shown in data sheet. A corrosion allowance as indicated in data sheet shall be considered in design. Bolted and threaded joints are not acceptable.
- 4.1.2 All materials used for the manufacture of the insulating joint shall be in accordance with clause 3.0 of this Specification.



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4.13 Insulating joints shall be designed using the design principles of ASME Section- VIII Div. 1. The design shall be checked for the following two cases:

Case-I : Design Pressure (as per Data Sheet) + Axial Force (F) The Axial force shall be calculated as under :

$$F = 0.1 \times S \times A$$

Where

S = SMYS of connected pipe (refer Data Sheet) A = Metal cross-sectional area of connected pipe.

The allowable stress in this case shall be less than or equal to 0.5 x SMYS of insulating joint material.

Case-II : Hydrostatic Test Pressure

The allowable stress in this case shall be less than or equal to 90% of SMYS of insulating joint material.

4.14 All design parameters shall be as per Insulating Joint Data Sheet. Detailed calculations shall be submitted for Purchaser approval. Insulating joint design and materials shall be capable of being vacuum tested to 1 millibar.

4.15 The joint between pipe pup pieces and main forging shall be full penetration butt weld type. Weld design shall be such as resulting in a weld joint factor of 1.0.



PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

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- 4.1.6 Butt weld ends shall have ends as per ASME B16.25. However, end preparation for butt welding ends having unequal thickness with respect to connecting pipe, shall be as per ASME B31.4/ B31.8 as applicable.
- 4.1.7 The reinforcement of inside weld seam, in case pipes fabricated from LSAW pipes, shall be removed for a distance of at least 50mm from each end.
- 4.1.8 Insulating joints shall allow free passage of scraper/ instrumented pigs. The internal bore shall be same as that of connecting pipe including its tolerances.
- 4.1.9 The insulating joint shall be formed by sandwiching and locking in position the insulating material in a bell and spigot type of joint. The joint shall be assembled in such a way that its various components are firmly locked in position and the completed joint is capable of withstanding stresses due to designed operating conditions and field hydrostatic testing.
- 4.1.10 Insulating joints shall be suitable for aboveground or underground installations as indicated in the data sheets.
- 4.1.11 All welds shall be made by welders and welding procedures qualified in accordance with the provisions ASME section IX. The procedure qualification shall include impact test and hardness test and shall meet the requirements of clause 3.3, 3.5 of this specification.
- 4.1.12 Repair welding on parent metal is not allowed. Repair of welds shall be carried out only after specific approval by purchaser's representative for each repair. The repair welding shall be carried out by welders and welding procedures duly qualified as per ASME section IX and records for each repair shall be maintained.
- 4.1.13 Internal diameter at the welding end shall not vary more than + 1, -3 mm from the nominal internal diameter Out of roundness



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measured at the root face of the welding ends shall not be more than 0.5% of the specified inside diameter.

4.2 Electrical

4.2.1 The average dielectric strength of the insulating joint shall be minimum 15 kilo Volts.

4.2.2 Two cleats as shown in data sheet shall be provided on the pups on either side of the insulating joint for connecting 10 mm² and 50 mm² cables for measurement/ shorting purposes. Cleats shall be attached to the insulating joint by welding.

5.0 INSPECTION AND TESTS

5.1 The manufacture shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment at his works. Such inspection and tests shall be, but not limited to the following:

5.1.1 All insulating joints shall be visually inspected.

5.1.2 Dimensional checks shall be carried out as per the purchaser approved drawings.

5.1.3 Chemical composition and mechanical properties including hardness shall be checked as per relevant material standards and this specification, for each heat of steel used.

5.1.4 Non-destructive inspection of insulating joints shall be carried out as given below:

- a) 100% radiography shall be carried out on all butt & repair welds of pressure containing parts. Acceptance limits shall be as per API 1104.



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- b) Welds which in purchaser's Representative opinion can not be inspected by radiographic methods, shall be checked by ultrasonic or magnetic particle methods. Acceptance criteria shall be as per ASME Section VIII Appendix-12 and Appendix-6 respectively. All finished weld ends shall be 100% ultrasonically tested for lamination type defects for a distance of 50mm from the ends. Any lamination larger than 6.35 mm shall not be acceptable.
 - c) All forgings shall be wet magnetic particle inspected on 100% of forged surfaces. Method and acceptance shall comply MSS-SP-53.
 - d) All fillet weld of thickness < 6mm shall be examined 100% by magnetic particle inspection and \geq 6mm shall be examined 100% by UT. Acceptance criteria for MPI & UT shall be as per ASME Sec.VIII Appendix- 6 & Appendix-12 respectively.

5.1.5 Insulating joint shall be hydrostatically tested to a pressure as indicated in data sheet. The test duration shall be of 15 minutes.

5.1.6 After the hydrostatic test insulating joints shall be tested with air at 5 kg/cm² for 10 minutes. The tightness shall be checked by immersion or with a frothing agent. No leakage will be accepted.

5.1.7 Dielectric Test

- a) Insulation resistance of each insulating joint shall be atleast 25 mega- ohms when checked with 500-1000 V DC.
- b) Insulating joint before and after the hydrostatic test, shall be tested for dielectric integrity for one minute at 5000 V A.C., 50 cycles and the leakage current before and after hydrostatic test shall be equal. Testing time voltage and leakage shall be recorded and certified. No repair shall be permitted to the insulating joints failed in the above mentioned tests.



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5.2 Purchaser reserves the right to perform stagewise inspection and witness test as indicated in Para 5.1 at Manufacturer's works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charge reasonable access and facilities required for inspection to the purchaser's Representative .

Inspection and tests performed/witnessed by the Purchaser's Representative shall in no way relieve the Manufacturer's obligation to perform the required inspection and test.

6.0 TEST CERTIFICATES

6.1 Manufacturer shall submit following certificates to Purchaser's Representative.

- a) Test certificates relevant to the chemical analysis and mechanical properties including hardness of the materials used for construction of insulating joint as per this specification and relevant standards.
- b) Test reports on non-destructive testing.
- c) Test certificates for hydrostatic and air tests.
- d) Test certificate for electrical test.
- e) Test report on vacuum test.

7.0 PAINTING, MARKING AND SHIPMENT.

7.1 Insulating joint surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Surface preparation shall be carried out by shot blasting to SP-6 in accordance with "steel structures painting



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council - Visual standard SSPC-VIS-1". External surfaces of buried insulating joints shall be painted with three coats of suitable coal tar epoxy resin with a minimum dry film thickness of 300 microns.

Manufacturer shall indicate the type of corrosion resistant paint used, in the drawings submitted for approval.

7.2 Insulating joints shall be marked with indelible paint with the following data:-

- a. Manufacturer's name
- b. Suitable for inch nominal diameter pipeline
- c. End thickness in mm
- d. Material
- e. Design Pressure/ Hydrostatic Test Pressure
- f. ANSI Class Rating
- g. Tag No.
- h. Year of Manufacture

7.3 Insulating joints shall be suitably protected to avoid any damage during transit. Metallic bevel protectors shall be provided to weld ends.

7.4 Only those insulating joints which have been inspected and certified by Purchaser shall be shipped.

7.5 Vender has to be strictly ensure that all IJ must have hard stamping of class .300#& 150 # along with its Standard code .



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8.0 GUARANTEE

- 8.1 The manufacturer shall guarantee that the materials used comply with the requirements of this specification.
- 8.2 Manufacturer shall replace or repair insulating joints found defective due to inadequate engineering or quality of material.
- 8.3 Manufacturer shall replace the insulating joint without delay if the defect or malfunctioning can not be eliminated.
- 8.4 Any defects occurring within 12 months from the date of installation or within 30 months from the date of despatch, whichever is earlier, shall be repaired making all necessary modifications and repair of defective parts free of charge to the purchaser.

9.0 DOCUMENTATION

- 9.1 All documents shall be in English Language.
- 9.2 At the time of bidding, Bidder shall submit the following documents:-
- a) General arrangement drawing along with cross sectional view, overall dimensions and details of insulating materials recommended.
 - b) Reference lists of previous supplies of insulating joint of similar specification
Clause wise list of deviation from this specification, if any.



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9.3 Within three weeks of placement of order, the Manufacturer shall submit four copies of but not limited to the following drawings, documents and specifications for approval.

- a) Fabrication drawings and relevant calculations for pressure containing parts.
- b) Welding procedure and method of manufacture for all phases of manufacture.
- c) Quality Assurance Plan (QAP)

Once the approval has been given by purchaser any changes in design, material and method of manufacture shall be notified to the Purchaser whose approval in writing of all changes shall be obtained before the insulting joint are manufactured.

9.4 Within four weeks from the approval date Manufacturer shall submit one reproducible and six copies of the approved drawings, documents and specifications as listed in 9.3 of this specification.

9.5 Prior to shipment, the manufacturer shall submit one reproducible and six copies of the test certificates as listed in Clause 6.0 of this specification .



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ANNEXURE-I

GAS COMPOSITION FOR NATURAL GAS SUPPLY PIPELINE PROJECT

Components	Mole%
C ₁	94.63
C ₂	1.31
C ₃	1.46
i-C ₄	0.33
n-C ₄	0.40
i-C ₅	0.20
n-C ₅	0.10
C ₆₊	0.30
N ₂	0.34
O ₂	Nil



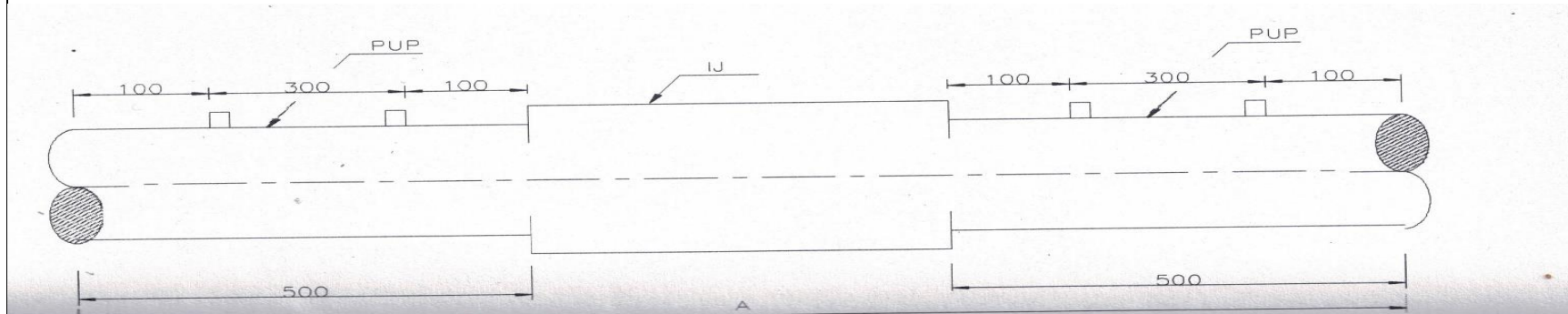
PROCUREMENT OF CS FITTINGS, BALL VALVES AND INSULATION JOINTS

CO ₂	0.27
H ₂ S	N.A.
Gas Quality	N.A.
Specific Gravity	0.601



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DATA SHEET FOR INSULATING JOINTS



A = OVERALL LENGTH OF IJ TO BE CONFIRMED BY MANUFACTURER.

1. INSULATING JOINTS MFR. :
2. PURCHASER'S SPECIFICATION NO. :
3. RATING :300#
4. DESIGN PRESSURE : 49 KG/CM²(G)
5. DESIGN TEMPERATURE : 65°C



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-
6. SERVICE : Natural Gas
 7. CORROSION ALLOWANCE : 1.5 MM
 8. SIZE NB (INCHES) : 4"
 9. END CONNECTION : BUTT-WELD AT BOTH ENDS
 10. DESIGN CODE : ASME SECTION-VIII DIV-I
 11. DESIGN FACTOR : 0.5
 12. HYDROSTATIC TEST PRESSURE : 72 KG/CM2(G)
 13. CHARPY TEST : REQUIRED AS PER SPEC.
 14. HARDNESS TEST : REQUIRED AS PER SPEC.
 15. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
 - A) BODY : ASTM A-694, F-70
 - B) PUPS : API 5L GR. X-42, 6.4 mm THK.
 - C) INSULATING MATERIAL : AS PER MANUFACTURER'S STANDARD
 16. CONNECTING PIPE SPECIFICATION



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SIZE (INCHES)	
WALL THICKNESS, MM	
GRADE	

17. SPECIAL REQUIREMENTS : INSULATION JOINT SHALL BE SUITABLE FOR ABOVE
GROUND INSTALLATION

18. QUANTITY : 16 NOS



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INSULATION JOINTS**

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