INDRADHANUSH GAS GRID LIMITED (IGGL)
(Joint Venture of IOCL, ONGC, GAIL, OIL and NRL)
GUWAHATI, ASSAM

NORTH -EAST GAS GRID PIPELINE PROJECT

BID DOCUMENT FOR

PROCUREMENT OF MOBILE SCRAPPER TRAP WITH PIG SIGNALLERS, PSVs, QUICK OPENING END CLOSURES FOR FEEDER LINES

OPEN DOMESTIC COMPETITIVE BIDDING

Tender Ref. No.: 05/51/23VC/IGGL/007-FL

VOLUME – II OF II

PREPARED AND ISSUED BY
MECON LIMITED
(A Govt. of India Undertaking)
Delhi, India

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Item No.	Description	Tag No.	Qty.	Remarks	Destination / Store
Design, Manufacture & Fabrication, Procurement of Materials and bought out components, assembly at shop, inspection, testing at manufacturer's works, preparation of shipment / packing, transport, delivery, Unloading and stacking of the ***Bi-Directional Scrapper Trap System*** suitable for accommodating intelligent pigs & other cleaning / displacement / gauging pigs, welded with Quick Opening End Closure (QOEC) suitable for horizontal installation including all accessories required to make above Bi-Directional Scrapper Trap system complete operational and QOEC shall be hand operated by a single lever operation and operable by one operator. Scope of supply shall include but not limited to supply & placement of perforated SS Tray inside the Bi-Directional Scrapper Trap, supply and mounting of Pig Signaller on the Bi-Directional Scrapper Trap, supply of Non-Intrusive Pig Signaller, PSV, Ball Valves, supply of Pig Handling (insertion / retraction) System, including supply of matching flanges for all the flanged end nozzle. Required studs, Nuts, bolts, Gaskets and foundation Bolts for Bi-Directional Scrapper Trap & associated accessories as described below are included in scope of supply. Scope of supply shall include supply of all commissioning spares & documentation as per the Material Requisition, Notes to Material Requisition, Data sheet, MECON's Standard specifications etc. and other codes and standards attached or referred.					
1	For supply of Bi-Directional MOBILE PIG LAUNCHER/RECEIVER (i.e., Pig Launcher/Receiver of Size 18"x 12" NB & ANSI Class 600#) System along with accessories				To various North Eastern states
1.1	Supply of ***MOBILE Bi-Directional PIG LAUNCHER/RECEIVER (i.e., Pig Launcher/Receiver of Size 18"x 12" NB & ANSI Class 600#)*** along with Quick Opening End closure as per Specification No. MEC/TS/05/28/007, Edn.-0, Rev-0 & as per Data Sheet No. MEC/23VA/05/28/M/001/DS/ST-003	----	04 Nos.	No Tag nos.	
1.2	Supply of Non Intrusive Pig Signallers mounted on Bi-Directional Scrapper Trap mentioned in 1.1 above as per Technical specification and Data Sheet attached.	----	4 Nos.	No Tag nos.	
1.3	Supply of Door Seal for Quick Opening End Closure (QOEC) welded on Bi-Directional Scrapper Traps as mentioned in item no. 1.1 above	----	8 Nos.	Commissioning Spares (@ 2 Nos./ Scrapper Trap)	
1.4	Supply of Non Intrusive Pig Signaller for mounting on 12" NB Pipeline as per as per Technical specification and Data Sheet attached.	XXLS-2701 XXLS-2901 XXLS-29A01 XXLS-3101 XXLS-27A01 XXLS-29B02 XXLS-29C01 XXLS-29D02 XXLS-31C01	9 Nos.		
1.5	PSV suitable for mounting on scrapper trap specified in 1.1 as per Specification No. MEC/S/05/62/056, Rev-1 and attached datasheet	----	4 Nos.	No Tag nos.	
1.6	Supply of Intrusive Pig Signaler without isolation valve mounted on 18"x 12" NB Bi-Directional Scrapper Trap In Specification No. MEC/S/05/62/048, Rev-0 and Data Sheet attached	XXLS-1902 XXLS-1903	6 Nos.		

Item No.	Description	Tag No.	Qty.	Remarks	Destination / Store
1.7	2"-NB-#600-Flanged end- Full Bore- BALL VALVES as per Design Standard API 6D, MECON's specification no. MEC/TS/05/21/002, Rev-1, Ed.1 and data sheet MEC/23UU/05/28/M/001/DS/BV/M.S.T./01 attached	---	20	Including 4 nos. valves with Lock Open arrangement	To various North Eastern states
1.8	4"-NB-#600-Flanged end- Full Bore- BALL VALVES as per Design Standard API 6D, MECON's specification no. MEC/TS/05/21/002, Rev-1, Ed.1 and data sheet MEC/23UU/05/28/M/001/DS/BV/M.S.T./01 attached	---	08	---	
1.9	3/4"-NB-#800-Socket welded end- Full Bore- BALL VALVES as per Design Standard ISO 17292, MECON's specification no. MEC/TS/05/21/002, Rev-1, Ed.1 and data sheet MEC/23UU/05/28/M/001/DS/BV/M.S.T./02 attached	---	12	---	
1.10	3/4"-NB-#800-Socket welded end- PLUG VALVES as per Design Standard BS 5353, Mecon's specification no.: MEC/TS/05/62/003, Rev-2 and data sheet MEC/23UU/05/28/M/001/DS/PV/07attached	---	04	---	
1.11	2"-NB-#600-Flanged end- LTCS PLUG VALVES as per Design Standard API 6D, Mecon's specification no.: MEC/TS/05/62/003, Rev-2 and data sheet MEC/23VA/05/28/M/001/DS/PV/08 attached	---	04	---	

Notes:

1. **Compliance with Specification:** The Vendor shall be completely responsible for the design, materials, manufacture & fabrication, testing, inspection, preparation for shipment and transport of the above equipment strictly in accordance with the MR and all attachment thereto. All pressure containing parts of all the items shall be provided with EN 10204-3.2 certificates.

2. **Vendor's Scope:** Vendor scope of work includes the equipment with all internals and accessories shown on the datasheets, specifications and all unmentioned parts necessary for a satisfactory operation and testing except those which are indicated to be out of the vendor's supply.

3. **Inspection:**

   Inspection shall be in accordance with EN 10204 3.2 certification shall be issued for each dispatched valve. Vendor shall appoint anyone of the TPIA for inspection purpose. Vendor has to intimate the TPIA name from below listed agencies to IGGL/ MECON prior to perform any inspection activity.

   i. Det Norske Veritas (DNV)
   ii. Germanischer Lloyd
   iii. Bureau Veritas

iv. Moody International

v. SGS*

vi. Certification Engineer International Ltd(CEIL)

vii. Technische Ulierwachungs Verein (TUV)

viii. Velosi

ix. American Bureau Services (ABS)

x. AB-Vincotte

xi. Lloyd Register of Industrial Services

xii. VCS Quality Services Private Limited

xiii. Meenar Global

4.0 DOCUMENTS & DATA REQUIREMENTS

4.1 The table hereunder specifies the quantities and the nature of the documents to be submitted by the Vendor to Purchaser.

4.1.1 The documents required at the inquiry stage and to be included in the bid are listed under column A of table below under note no. 4.6.

4.1.2 The documents required after award of the Contract and subject to the written approval of the Purchaser are listed under column B of table below under note no. 4.6.

4.1.3 The final and certified documents are listed under column C of table below under note no. 4.6.

4.2 Any document, even when preliminary, shall be binding and therefore duly identified and signed by the Vendor. It shall bear the Purchaser's Project reference, the Material Requisition number and the identification number.

4.3 The drawings/documents shall be reviewed, checked, approved and duly signed/stamped by successful Bidder/supplier before submission. Revision number shall be changed during submission of the revised successful Bidder/supplier documents and all revisions shall be highlighted by clouds. Whenever the successful Bidder/supplier require any sub-supplier drawings to be reviewed by MECON, the same shall be submitted by the supplier after duly reviewed, approved and stamped by the successful Bidder/supplier. Direct submission of the sub-supplier's drawings without contractor's approval shall not be entertained.

4.4 Review/Approval of the successful Bidder/supplier drawings by MECON would be only to review the compatibility with basic designs and concepts and in no way absolve the successful Bidder/supplier of his responsibility/contractual obligation to comply with PR requirements, applicable codes, specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the successful

Bidder/supplier without any extra cost or time, whether or not comments on the same were received from MECON during the drawing review stage.

4.5 The successful Bidder/ Supplier shall submit a prerecorded Training pen drives and it shall comprise the basic theories and fundamentals, related standards, design parameters, manufacturing & inspection methods, operating & maintenance instructions and other relevant details. The pendrives shall have to be self-contained, user-friendly using animation/videos and other multimedia techniques.

4.6 THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTS COMPLYING FULLY WITH THE MATERIAL REQUISITION REQUIREMENTS ARE RECEIVED BY THE PURCHASER.

Item	Documents & Data	A	B		C	
		No. of Copies	No. of Copies	Required Date (from FOI)	No. of Copies	Required Date (before Despatch)
1.	Completed Data Sheets	3	3	1 Week	3	2 Weeks (with final technical file)
2.	Drawing / Data Submittal list / schedule	-	3	2 Weeks + monthly	3	2 Weeks
3.	Fabrication, test and delivery schedule (per item)	3	3	2 Weeks + monthly	3	2 Weeks
4.	Progress Report	-	3	2 Weeks + monthly	3	2 Weeks
5.	Catalogues / References	3	-	-	3	With final technical file
6.	GA drawings + Sectional drawings + Material specification + Unit weight. + Unit volume + Package dimensions per unit	3	3	2 Weeks	3	With final technical file
7.	"Way of Shipping" as per Note no. 6 of Material Requisition	3	3	7 days	-	-
8.	Packing / shipping list with weights and dimensions	3	3	2 Weeks before shipping	3	2 Weeks (with final technical file)

Item	Documents & Data	A	B		C	
		No. of Copies	No. of Copies	Required Date (from FOI)	No. of Copies	Required Date (before Despatch)
9.	Design calculations for pressure containing parts	3	3	1 Week	3	2 Weeks (with final technical file)
10.	Bill of materials (on drawings)	3	3	1 Week	3	2 Weeks (with final technical file)
11.	Recommended spare parts list (for erection and commissioning)	3	-	-	3	2 Weeks (with final technical file)
12.	Recommended spares parts list (for 2 years operation)	3	-	-	3	2 Weeks (with final technical file)
13.	Welding procedure specification and records WPS / PQR	-	3	1 Week	3	2 Weeks (with final technical file)
14.	QA / QC program	3	3	1 Week	3	2 Weeks (with final technical file)
15.	Inspection and Test Procedures alongwith Quality Assurance Plan	3	3	1 Week	3	2 Weeks (with final technical file)
16.	Test Reports	-	-	-	3	2 Weeks (with final technical file)
17.	NDE / NDT Reports	-	-	-	3	2 Weeks (with final technical file)
18.	Heat Treatment Reports	-	-	-	3	2 Weeks (with final technical file)
19.	Hydrotest and air test report	-	-	-	3	2 Weeks (with final technical file)
20.	Maintenance and operating manuals	-	-	-	3	2 Weeks (with final technical file)
21.	Installation instructions & Site inspection procedure	-	-	-	3	2 Weeks (with final technical file)

Item	Documents & Data	A	B		C	
		No. of Copies	No. of Copies	Required Date (from FOI)	No. of Copies	Required Date (before Despatch)
22.	Material certificate as per EN 10204 - 3.2	-	-	-	3	2 Weeks (with final technical file)
23.	Painting system description & procedure	3	3	1 week	3	2 Weeks (with final technical file)
24.	List of sub-vendors with their scope	3	3	1 week	-	-
25.	Training pen drives covering design, operation & maintenance	-	-	-	3	2 Weeks (with final technical file)
26.	Final technical file, preliminary copy for approval (in soft & hardcopy)	-	3	2 weeks before Despatch/ shipping	-	-
27.	Final technical file (in soft & hardcopy)	-	-	-	3	Before shipping

NOTES

I. In case of e-bids, only single copy of documents / drawings / data under column A need be uploaded.

II. Durations in column B (required date) are weeks after FOI/FOA or as indicated in Table.

   a. Durations in column C (required date) are weeks after document approval or as indicated in Table.

   b. Due date of each document may be proposed.

III. Final technical file shall be supplied in hard copy as indicated and in electronic format (.pdf Acrobat files) on six (6) CD-ROMs.

The above documents & data requirements shall also be supplemented by all requirements of clause 10.0 of MECON's T.S. No. MEC/S/05/62/007, R-1.; clause 1.3 of MECON's T.S. No. MEC/TS/05/62/056, Rev-1.; clause no. 10.0 of MECON's T.S. No. MEC/TS/05/21/013, Edn. -1, Rev-1

5. Vendor to indicate in his offer the gross weight (in kg or Metric Tonne) per unit, volume (in m3) per unit and dimensions (L x B x H) of package (wooden box, etc.) to accommodate unit quantity.

6. The successful Bidder, within 7 days from the receipt of FOI/FOA, shall provide the **"Way of Shipping"**, i.e., break bulk / container along with dimensions (length, breadth and height), weight of packaged cargo and the size(s), type(s) and nos. of containers to be used for shipment. In case Bidder fails to furnish this information within the stipulated time, the dimensions, etc., as provided in techno-commercial offer shall be used for determining ocean freight amount and decision for converting Purchase Order from FOB to CFR shall be taken accordingly. In case the ocean freight amount increases on account of changes in dimensions / weight / volume of final cargo (with respect to earlier provided information), Purchaser reserves the right to recover the excess amount paid on this account.

7. Vendor shall establish the equivalence/superiority of any material proposed (With justification of material properties and availability) other than that specified in Datasheet. Vendor shall also indicate the ASTM equivalent of his proposed material as well as of all the AISI designated materials specified in datasheets.

8. Vendors to note that for minimum inspection and testing requirement of the supplied item shall be governed by attached QAP with this MR. However, Vendor shall submit their QAP for Approval covering the requirement specified in attached QAP.

9. Bidders to note that all the documents/drawings submitted by them as a part of bid shall be considered only to assess Bidder's technical capability and shall in no way absolve them from complying with all the requirements of the Tender. All items to be supplied by the Bidder shall be strictly in accordance with tender requirements.

10. In the event of Conflict/inconsistency among the documents attached/ referred, the following order of precedence generally shall govern in interpretation of various requirements / data.
    - Material / Purchase Requisition
    - Datasheets
    - Technical Specification
    - Codes and Standards
    - Vendor's Standards

    However, Owner/Consultant reserves the right to consider most stringent requirement among the document attached / referred.

11.0 Preferred manufacturers of PSV are as follows:
    i) M/s Keystone Valves (India) Pvt. Ltd. Baroda,

ii) M/s Sebim Sarasin Valves India (P) Ltd.,
iii) M/s Tyco Sanmar Ltd,
iv) M/s Parcol Spa, Italy,
v) M/s Tai Milano SPA, Italy,
vi) M/s Emerson Process, Singapore,
vii) M/s Instrumentation Limited, Palghat

In case bidder propose PSV manufacturers other than above list of preferred manufacturers, bidder shall submit in support of PTR, all details/ documents for PSV complying to the requirement of specification and datasheet enclosed. Submitted PTR should contain successful supply record of minimum one number of respective items of same size & rating (or higher) as quoted for.

12.0 Refer to Pig Signaller Data sheet attached for Pig Signaller .

13.0 **Pipeline & Pig details:**

Pipeline Specifications	API 5L X70 PSL2, API 5L X-56
Pipeline Diameter (OD) x Thickness (mm)	12” x 8.38 mm, 8” x 7.04 mm
Pipeline Wall Material	Carbon Steel
Pipeline Coating (External)	3 LPE
Pipeline Coating (Internal)	Epoxy
Orientation of Pipe	Horizontal
Pig Materials	Steel, Plastic
Pig O.D.	90% ~ 100% of pipeline ID
Pig Velocity (max.)	6 m/s
Bolting Material (Studs) (Nuts)	ASTM A 193, Gr. B7 (Galvanized) ASTM A 194, Gr. 2H (Galvanized)

14.0 Inspection requirements pertaining to Non-Intrusive Pig Signaller shall be covered in QAP submitted by the vendor. The same shall be reviewed and finalized post award.

15.0 Spares List (Start-Up & Commissioning– Bi-Directional Scrapper Trap with Pig Signallers, PSV & QOEC And Spares List (2 Years Normal Operation)– Bi-Directional Scrapper Trap with Pig Signallers, PSV & QOEC are attached herewith.

16.0 Scrapper Trap functional test: Vendor shall demonstrate unrestricted passage of gauge plate having minimum diameter of 95% of the I.D. of minor barrel. Guage plate to be mounted on suitable bi directional pig and the same shall be inserted using pig handling provisions to be supplied with scrapper trap. Guage plate should be launched using kicker connection provided with scrapper trap.

17.0 Pig signaller functional test: During the Scrapper Trap functional test (refer cl. 16.0 above) functioning of pig signaller shall also be verified.

STANDARD TECHNICAL SPECIFICATION FOR SCRAPER TRAP

SPECIFICATION NO. : MEC/TS/05/28/007

(OIL & GAS SBU)
MECON LIMITED
DELHI 110 092

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :
(BB)	(AKJ)	(RKN)	SEPT. ,2014

AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Edition	Rev.	Date	By		Checked		Approved	
						Name	Sig.	Name	Sig.	Name	Sig
1.	Overall Revision & Tech Spec./Doc. No. Changed as MEC/TS/05/28/007 in place of previous Tech Spec. No. MEC/S/05/62/007, Rev.-1	All	0	0	Sept 2014	BB		AKJ		RKN	

Abbreviations:

ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing and Materials
API	:	American Petroleum Institute
DN	:	Nominal Size
HAZ	:	Heat Affected Zone
MSS-SP	:	Manufacturers Standardization Society – Standard Practice
NDT	:	Non Destructive Testing
NPS	:	Nominal Pipe Size
SSPC	:	Steel Structures Painting Council

CONTENTS

1.0 SCOPE

This specification covers the basic requirements for design, manufacture, inspection, testing & supply of Scraper Launching & Receiving Traps or bi-directional Scraper Traps to be installed in pipeline system transporting non-sour hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG). This specification does not cover scraper launching & receiving trap for sour hydrocarbons (liquid/ gas) services as defined in NACE Std. MR-01-75.

2.0 REFERENCE DOCUMENTS

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

a)	ASME B 31.4	:	Pipeline Transportation System for Liquid Hydrocarbons and Other Liquids
b)	ASME B 31.8	:	Gas Transmission and Distribution Piping System
c)	ASME B 16.5	:	Steel Pipe Flanges and Flanges Fittings
d)	ASME B16.9	:	Factory made Wrought Steel Butt Welding Fittings
e)	ASME B 16.11	:	Forged Steel Fittings, Socket-Welding and Threaded
f)	ASME B 16.25	:	Butt-Welding Ends
g)	ASTM A370	:	Mechanical testing of steel products
h)	ASME Sec-VIII and IX	:	Boiler and Pressure Vessels Codes.
i)	API 1104	:	Specification for Welding Pipeline and Related Facilities
j)	MSS-SP-44	:	Specification for High Test Wrought Welding Fittings.

k) MSS-SP-75 : Specification for High Test Wrought Welding Fittings

l) MSS-SP-97 : Integrally Reinforced Forged Branch Outlet Fittings Socket Welding Threaded and Butt Welding Ends

m) SSPC-VIS-1 : Steel Structure Painting Council

In case of conflict between the requirements of this specification and the requirements of above referred documents, the requirements of this specification shall govern.

3.0 MATERIALS

3.1 Materials and thicknesses of main components used in manufacture of traps shall be indicated by Manufacturer and shall be suitable for service conditions indicated in the data sheets and annexures. These shall be subject to approval by Purchaser. The steel used shall have a minimum SMYS of 35,000 psi.

3.2 Fully killed carbon steel shall be used.

3.3 Material of the ends to be field welded by purchaser shall have carbon equivalent less than or equal to 0.45 based on check analysis, for each heat of steel, calculated according to the following formula.

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

3.4 For Scraper Traps, specified to be used for Gas service or High Vapour Pressure (HVP) liquid service, Charpy V-notch test shall be conducted at 0°C for each heat of steel used in the manufacture of pressure containing parts of the traps. Test procedure shall conform to ASTM A-370. The Charpy V-notch test specimens shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of the plate or forging. The minimum average absorbed impact energy values of three full sized specimens shall be as under, unless otherwise indicated in the Data sheets:-

Diameter (inches)	Base Metal (Joules)	Weld Metal and HAZ (Joules)
For all size	27	27

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

For scraper Traps, specified to be used for other hydrocarbon service, the Charpy V-notch test requirements as stated above are not applicable. When Low Temperature Carbon Steel (LTCS) materials are specified in data sheets or offered by Manufacturer, the Charpy V-notch test requirements of applicable material standard shall be complied with.

3.5 For Scraper Traps, specified to be used for Gas service or High Vapour Pressure (HVP) liquid service, hardness test shall be carried out as per ASTM A370 for each heat of steel used. A full thickness cross section shall be taken for this purpose and the maximum hardness of the base material, weld metal and heat affected zone (HAZ) of all the pressure containing parts shall not exceed 248 HV_{10}. The maximum difference in hardness of Base metal, Weld metal and Heat affected zone (HAZ) of pressure containing parts of the traps shall be less than 80 points Vicker's HV_{10}.

For scraper Traps, specified to be used for other hydrocarbon service, the hardness test requirements as stated above are not applicable. When Low Temperature Carbon Steel (LTCS) materials are specified in data sheets or offered by Manufacturer, the hardness test requirements of applicable material standard shall be complied with.

4.0 DESIGN AND CONSTRUCTION

4.1 The cylindrical portion of the trap shall be designed as per design code and design factor indicated in the data sheets. Quick end closure shall be designed as per sec. ASME Sec. VIII, Div. 1 for design conditions indicated in data sheets. A corrosion allowance of 3 mm shall be considered in design of the traps. Quality of welding shall be such that weld efficiency factor of 1.0 is achieved.

4.2 The trap shall be capable of handling latest instrumented pigs, model like Linalog 360 of AMF Tuboscope or British gas magnetic inspection vehicle or equivalent and

scraper / cleaning / gauging / batching pigs and shall conform to the minimum dimensions given in scraper Trap data sheets. Dimensions not shown specifically in the data sheet shall be as per manufacturer's standard and shall be subject to approval by Purchaser / Purchaser's representative.

4.3 The trap body and neck, diameter has been indicated in the data sheet. Trap length to suit the purpose and thickness to meet the class rating shall be suggested by the manufacturer and approved by the purchaser. Circumferential weld on scraper trap body and neck are not permitted.

4.4 Concentric or eccentric reducer, as indicated in data sheets, used in the manufacture of traps shall be seamless types for sizes up to and including 14"NB and welded type for sizes 16"NB and above. Reducers of size up to & including 14"NB shall conform to ASME B 16.9 and size 16"NB and above shall conform to MSS-SP-75. Thickness of reducer shall match with the adjoining body/neck thickness.

4.5 Vents and drains shall be provided on each trap. The trap shall be provided with a suitable slope and the drain location shall be such that complete drainage of the trap is possible. Sizes for vent and drain shall be as indicated in data sheet.

4.6 All branch connections shall be made by weldolets/ nippolet or by extrusions as indicated in the data sheet. All weldolets shall confirm to MSS-SP-97 and nippolets shall be manufacturer's standard. The extruded opening shall be adequately heat treated and stress relieved. Stub-in or pipe-to-pipe connection shall not be used for making branch connection

4.7 End connections of traps shall be flanged or butt welded as indicated in data sheet.

a) Flanged ends, if specified shall have dimension as per ASME B16.5 for sizes upto 24" NB (excluding 22 NB) and as per ASME B16.47 / MSS-SP-44 for sizes 22 NB and 26 NB and above. Flanges shall be as indicated in data sheets.

b) Butt weld ends if specified shall have ends prepared as per ASME B16.25. However, end preparation for butt welding ends having unequal thicknesses with respect, to connecting pipe shall be as per ASME B31.4/ ASME B31.8 as applicable.

c) The location & orientation of all nozzle connections shall be submitted for purchaser's approval before manufacturing.

4.8 The quick opening end closure shall be of clamp ring or band lock type or equivalent design. The closure shall also consist of a safety relief system allowing the opening only when there is no pressure in the trap. Screwed type or plug-in types of end closures are not acceptable. End closure shall be hand operated by a single lever operation and operable by one operator. End closures of size 24" and above shall be fitted with worm gear operator for the opening of the closure.

Hinge of the closure shall be so designed that the weight of the end closure is fully supported with out sagging.

4.9 Receiving traps shall be provided with a pig indicator in the middle of the neck and the indicator shall conform to the specification issued for the purpose. Pig indicator shall be suitable for bi-directional operation and shall have visual flag and manual reset. The same shall also have provision for remote indication. Refer Pig Signaler Specification and Pig Signaler Data Sheet.

4.10 Suitable handling system for inserting and retracting the scraper and instrumented pigs from the trap shall be provided with each trap with complete handling device. Handling system shall consist of a fabricated structural steel framework comprising a bench fitted with a purpose-designed cradle for the pig. A pusher/ puller mechanism operated by a cable system employing a hand cranked winch shall be mounted on the bench framework for inserting/ retracting the pig from the trap. The bench frame should be suitable for bolting to the floor. All parts of the handling system in contact with each other shall be of the anti-spark type. In case of any rails are required for sliding of the handling system, the same shall be provided by the scraper trap manufacturer.

4.11 Fabricated steel supports, minimum two numbers at suitable spacing shall be provided with traps for mounting on concrete blocks. These supports will not be subjected to pipeline anchorage forces. The material of support shall be compatible with trap material for welding purposes. All welds shall be examined by magnetic particle method.

4.12 Completed assembly shall be stress relieved as per the provisions of the design codes.

4.13 All welds shall be made by welders and welding procedures qualified in accordance with the provisions of ASME Sec. IX. The procedure qualification shall include impact test and hardness test when required as per clause 3.4 & 3.5 of this specification and shall meet the requirements as specified therein.

4.14 Repair by 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 the welders and welding procedures duly qualified as per ASME Section IX and records for each repair shall be maintained. The repair welding procedure qualification shall include impact test and hardness test when required as per clause 3.4 & 3.5 of this specification and shall meet the requirements as specified therein.

4.15 The Pig receiving traps / Bi-directional traps shall be equipped with a half internal removable filtering basket consisting of a punched plate with a least five rows of drain holes.

4.16 The filtering basket shall be provided with suitable stops. Lock bracket shall be provided in such a manner that the filtering basket does not slide within the trap. Rear end of the basket shall be fitted with suitable lug to enable retrieval of the basket by hooks.

4.16 The filtering basket shall slide on guides on wheels and in all cases the material of the parts being in contact with each other shall be of the anti spark type.

4.17 The tolerance on internal diameter and out of roundness at the ends for the welding end of the neck (at the end where connecting pipeline will be welded or joined by flange) shall be as per applicable connected pipe specification as indicated in the data sheet.

5.0 INSPECTION AND TESTS

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

5.1.1 All trap shall be visually inspected. The internal and external surfaces of the scraper traps shall be free from any strikes, gouges and other detrimental effects.

5.1.2 Chemical composition and mechanical properties including hardness shall be checked for each heat of steel used.

5.1.3 Dimensional check shall be carried out as per the approved drawings.

5.1.4 Hydrostatic test shall be conducted for all scraper traps complete in all respects including mounting of pig indicators at a pressure equal to 1.25/1.4 times the

design pressure for liquid/gas service respectively as indicated in data sheet. The test pressure shall be held for a minimum period of one hour.

5.1.5 All butt welds shall be 100% radiographically inspected. Procedure and acceptance criteria shall be as per API 1104.

5.1.6 Ultrasonic or magnetic particle inspection shall be carried out on all welds which in Purchaser's Representative's opinion can not be radiographically inspected. Procedure and acceptance criteria shall be as per ASME Sec. VIII, Appendix-U and VI respectively.

5.1.7 All finished wrought weld shall be 100% ultrasonically inspected for lamination type defects for a distance of 50mm from the end. Any lamination larger than 6.35 mm shall not be acceptable.

5.1.8 All forgings shall be wet magnetic particle examined on 100% of the forged surfaces. Method and acceptance shall comply with MSS-SP-53.

5.1.9 A minimum of two closing and opening cycles shall be performed and correct operation of both quick opening closure and safety system shall be ascertained.

5.2 Purchaser's Representative reserves the right to perform stage wise inspection and witness tests including hydrostatic test, as indicated in specification at manufacturer's works prior to shipment. Manufacturer shall give reasonable notice of time & shall provide without charge reasonable access and facilities required for inspection, to the Purchaser's representative.

Inspection and tests performed / witnessed by Purchaser's Representative shall in no way relieve the Manufacturer's obligation of specific integrity of the scraper trap System.

Manufacturer's equipment shall be subject to examination and approval by Purchaser to ensure proper fabrication and testing of Scraper Trap System.

6.0 TEST CERTIFICATES

Manufacturer shall furnish the following certificates

a) Test certificates relevant to the chemical and Mechanical properties including Hardness of the materials used for manufacture of trap as per relevant standards and this specification.

b) Hydrostatic test certificates.

c) Test reports on radiography, ultrasonic inspection and magnetic particle examination.

d) Test reports on heat treatment carried out, if any.

e) Welding procedure and welders qualification reports

The certificate shall be considered valid only when signed by Purchaser's representative.

7.0 PAINTING, MARKING AND SHIPMENT

7.1 After all inspection and test required have been carried out, all external surfaces shall be thoroughly cleaned to remove grease, dust and rust. Surface preparation shall be carried out by shot blasting to SP-6 in accordance with "Steel Structures Painting Council Visual Standard - SSPC-VIS-1". Machined parts shall be coated with anti-rust removable paint and non machined parts shall be applied with two coats of protective paint. Manufactures shall indicate the type of paint used in the drawings submitted for approval.

7.2 Marking shall be done on a stainless steel plate and affixed to the body by means of corrosion resistant fasteners. Marking shall include the following:-

a) Manufacturer's Name
b) Trap/ Neck Diameter, Thickness
c) Material
d) ASME Class Rating
e) Tag Number
f) Design Pressure
g) Design Temperature
h) Test Pressure
i) Design Factor
j) Year of Manufacture
k) Empty weight of the trap assembly.

7.3 Before shipment, traps shall be properly packed against damage during transportation. All machined surface subject to corrosion during transit shall be

well protected by coat of grease or other suitable material. All traps shall be provided with suitable protectors, for flange faces, securely attached to the traps. Bevel ends shall be protected with metallic or high impact plastic bevel protectors.

7.4 Only those traps, which have been inspected and certified by the purchaser's inspector shall be supplied.

8.0 GUARANTEE

8.1 Manufacturer shall guarantee that the trap alongwith accessories is in compliance with the requirements of this specification for materials and workmanship. Manufacturer shall replace or repair all parts which should result defective due to inadequate design or the workmanship. In case the defect can not be eliminated, Manufacturer shall replace the trap without any delay. Any defect occurring within the time period specified elsewhere shall be repaired making all necessary modifications and repair of defective parts free of charge to the purchaser.

9.0 SPARES

9.1 Manufacturer shall furnish list of recommended spares and accessories for Scraper Traps required during start up and commissioning. As a minimum, the commissioning spares shall include 200% extra consumable spares viz. gaskets/ o-rings/ seals etc. for each trap. Cost of such spares shall be included by the Manufacturer in the item rates indicated in Purchase Requisition.

9.2 Manufacturer shall furnish separately a list of recommended spares and accessories required for two years of normal operation and maintenance of Scraper Traps.

10.0 DOCUMENTATION

10.1 Manufacturer shall furnish at the time of bidding, the following documents:-

a) General arrangement drawing of scraper trap, pig signallers, quick opening end closure with overall dimensions.

b) Clause wise list of deviations from this specification, if any listed at one place in the document.

c) Reference list of similar supplies for the past five years including project, client year of supply & contact person.

d) Quality Assurance Plan (QAP) enclosed with this tender duly signed, stamped and accepted.

10.2 Within two 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) Calculations according to the relevant codes for the body including branch connections and quick end closures.

b) Trap assembly and sectional drawings showing all parts with materials and dimensions.

c) Support Assembly Drawing.

d) Arrangement & details of foundation bolts for pig handling and lifting system, where applicable.

e) Welding procedure and method of manufacture.

Once the above said documents have been approved by the Purchaser, any changes in design, material and method of manufacturer shall be notified to the Purchaser, whose approval in writing of all changes shall be obtained before the traps are manufactured.

10.3 Within four weeks from the approval date Manufacturer shall submit one reproducible and six copies of all approved drawings, documents and specification as listed in clause 10.2 of this specification.

10.4 Prior to shipment, the manufacturer shall submit one reproducible and six copies of the following:

a) Test certificate as listed in clause 6.0 of this specification.

b) Manual for installation, erection instructions, maintenance and operations instruction for Scraper trap System.

10.5 All documents shall be in English Language.

PROCESS & PIPING DESIGN SECTION
MECON LIMITED
DELHI – 110 092

TECHNICAL SPECIFICATION
FOR
PRESSURE SAFETY VALVES

SPECIFICATION NO. : MEC/TS/05/62/056, Rev-1

CONTENTS

1.0 **GENERAL**

1.1 **Scope**

1.1.1 This specification together with the attached data sheets covers the requirements for the design, materials, name plate marking, testing and shipping of pressure safety valves.

1.1.2 The related standards referred to herein and mentioned below shall be of the latest editions prior to the date of the Purchaser's enquiry :

ASME B 1.20.1	:	Pipe threads
ASME B 16.5	:	Pipe flanges and flanged fittings
ASME B 16.20	:	Ring joint gaskets and grooves for steel pipe flanges
ASME Sec.VIII	:	Boiler & pressure vessels codes for unfired pressure vessel
API RP 520 (Part-I & II)	:	Sizing, selection and installation of pressure relieving devices in refineries
API RP 521	:	Guide for pressure relieving and depressurising systems
API 526	:	Flanged steel safety-relief valves
API 527	:	Commercial seat tightness of refineries relief valve with metal to metal seats
DIN 50049	:	Document on material testing
IBR	:	Indian boiler regulations

1.1.3 In the event of any conflict between this specification, data sheets, related standards, codes etc, the Vendor should refer the matter to the Purchaser for clarifications and only after obtaining the same, should proceed with the manufacture of the items in question.

1.1.4 Purchaser's data sheets indicate the selected valve's relieving area, materials for the body, bonnet, disc, nozzle, spring, indicative inlet/outlet connection sizes, bellows etc. However, this does not relieve the Vendor of the responsibility for proper selection with respect to the following :

a) Sizing calculations and selection of valve with proper relieving area to meet the operating conditions indicated.
b) Selection of materials for all parts of the valve suitable for the fluid and its conditions indicated.

1.1.5 All process-wetted parts, metallic and non-metallic, shall be suitable for the fluids and service specified by the Purchaser. The service gas composition shall be as given in Annexure-I.

1.2 **Bids**

1.2.1 Vendor's quotation shall include a detailed specification sheet for each pressure safety valve which shall provide all the details regarding type, construction materials, relieving area, relieving capacity, orifice letter designation, overpressure, blowdown, operating pressure, etc., and any other valve accessories.

1.2.2 All the units of measurement for various items in the Vendor's specification sheets shall be to the same standards as those in Purchaser's data sheets.

1.2.3 All the material specifications for various parts in the Vendor's specification sheets shall be to the same standards as those in Purchaser's data sheets.

1.2.4 Deleted.

1.2.5 Vendor shall enclose catalogues giving detailed technical specifications and other information for each type of pressure safety valve covered in the bid.

1.2.6 Vendor's quotation, catalogues, drawings, operating and maintenance manual, etc., shall be in English.

1.2.7 Vendor's quotation shall include detailed sizing calculation for each pressure safety valve. Published data for certified discharge coefficient and certified flow capacities and actual discharge area shall be furnished. Data used by Vendor without the above mentioned supported documentation shall, on prima-facie basis, be rejected.

1.2.8 All valves shall have been type tested for capacity as per ASME. A copy of the certificate shall be provided.

1.2.9 Vendor shall also quote separately for the following :

a) Two years recommended operational spares for each pressure relief valve and its accessories. List of such spares without price shall be indicated alongwith technical bid and separately with price.
b) Any specific tools needed for maintenance work.

1.2.10 Vendor's quotation shall include general arrangement and sectional drawings showing all features and major parts with reference numbers and material specification.

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.

1.2.11 Vendor's quotation shall include Quality Assurance Plan (QAP) enclosed with this tender duly signed, stamped & accepted.

1.3 **Drawings and Data**

1.3.1 Detailed drawings, data, catalogues required from the Vendor are indicated by the Purchaser in this specification. The required number or reproducibles and prints should be dispatched to the address mentioned, adhering to the time limits indicated.

1.3.2 Within two weeks of placement of order, Vendor shall submit six copies of certified drawings and specification sheets for each pressure safety valve for Purchaser's final approval. These documents shall specially include the following :

a) Flange face to face dimension.
b) Height of the complete valve assembly.
c) Weight of the complete valve assembly.
d) Cold bench set pressure for the valve to be tested at atmospheric temperature and back pressure.
e) The cold test medium to be used for bench test in case it is different from air.
f) Horizontal reaction force at center line of valve outlet.
g) Relieving capacity of the valve under the same operating conditions.
h) Over pressure and blowdown/ reclosing pressure for each valve.

1.3.3 Vendor shall provide test certificates for all the tests indicated in clause 5.0 of this specification. In addition Vendor shall provide the Manufacturer's certificate of conformity to Purchaser's specifications as per clause 2.2 of Din 50049.

1.3.4 Within 30 days 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 1.3.2 above.

1.3.5 Prior to shipment, Manufacturer shall submit one reproducible and six copies of the following:

a) Test certificates for all the tests indicated in clause 5.0 of this specification.
b) Manual for installation, erection, maintenance and operation instructions, including a list of recommended spares for the valves.

2.0 VALVE SIZING

2.1 Sizing shall be carried out using the formulae mentioned in the following standards, whenever the sizing code mentioned in the Purchaser's data sheets refers to them:

Sizing Code	Standard
API	API RP 520 Part-I
ASME	ASME boiler and pressure vessel code section VIII titled - Unfired pressure vessels
IBR	Indian Boiler Regulations Paragraph – 293

2.2 Discharge co-efficient of Vendor's pressure safety valves shall be minimum 0.975 as per API – 520. However, for valves covered under IBR, regulations of IBR shall govern.

2.3 For flanged pressure safety valves, the orifice letter designation and the corresponding relieving area indicated in the Purchaser's data sheet shall be as per API 526. For a valve of given inlet and outlet sizes and letter designation, relieving area of the valves offered by Vendor shall meet those in API-526, as a minimum.

2.4 The discharge capacity of selected pressure safety valves shall be calculated based on certified ASME capacity curves or by using ASME certified discharge coefficient and actual orifice area. Higher valve size shall be selected in case pressure relief valve discharge capacity is less than the required flow rate.

2.5 The definitions of various terminologies used in Purchaser's data sheets are as per paragraph 3.1 of API RP 520 Part-I.

3.0 VALVE CONSTRUCTION

3.1 Body

3.1.1 Unless otherwise mentioned end connection details shall be as below :-

a) Threaded end connections shall be to NPT as per ASME B 1.20.1.
b) Flanged end connections shall be as per ASME B 16.5.

c) Flanged face finish shall be serrated concentric to paragraphs 6.3.4.1, 6.3.4.2 and 6.3.4.3 of ASME B 16.5. The face finish as specified in data sheets, shall have serrations as follows.

Serrated : 250 to 500 microinches AARH
125 AARH : 125 to 200 microinches AARH
63 AARH : 32 to 63 microinches AARH

3.1.2 For flanged valves, inlet and outlet sizes & ratings and center to flange face dimensions shall be in accordance with API-526. Dimensional tolerances shall be as mentioned therein.

3.1.3 Body drain with a plug shall be provided as a standard feature on every pressure safety valve.

3.2 **Trim**

3.2.1 The term `trim' covers all the parts of the valves exposed to and in contact with the process fluid except for the body and bonnet assembly.

3.2.2 Valves shall in general be of the full nozzle full lift type, unless otherwise specified.

3.2.3 Wherever stelliting of disc and nozzle has been specified, it stands for stelliting of the seat joint and the entire disc contour, unless otherwise mentioned.

3.2.4 Resilient seat/ seal or `O' rings wherever used shall be suitable for pressure and temperature conditions specified.

3.3 **Bonnet and Spring**

3.3.1 All valves shall be provided with a cap over the adjusting bolt.

3.3.2 Lifting lever shall be provided whenever the fluid to be relieved is steam or air.

3.3.3 Valve spring design shall permit an adjustment ± 5% of the set pressure as a minimum.

3.3.4 Carbon Steel spring shall be cadmium/ nickel plated.

3.3.5 The allowable tolerances in set pressures are as below :

± 0.14 kg/cm^2(g) for set pressures upto and including 5 kg/cm^2(g);
±3% for set pressure above 5 kg/cm^2(g).

3.3.6 Bonnet shall be of the enclosed type in general. Open type of bonnet may be used only for non-toxic fluids.

3.4 **Pilot**

3.4.1 Wherever pilot operated valves are specified, pilot shall be non-flowing type and shall be designed fail safe.

3.4.2 All accessories like back flow preventer, pilot filter etc. required for proper operation of pilot operated valves as per indicated service conditions shall be included.

3.4.3 Wherever the body is part of flow path, body material shall be same as trim material, as a minimum.

4.0 **NAMEPLATE**

4.1 Each pressure safety valve shall have a S.S. nameplate attached firmly to it at a visible place, furnishing the following information:

a) Tag number as per Purchaser's data sheets.
b) Manufacturer's serial no. or model no.
c) Manufacturer's name/ trade mark.
d) Nominal flanged size in inches and rating in lbs. for both inlet and outlet.
e) Orifice letter designation.
f) Valve set pressure.
g) Cold bench test set pressure.

Unit of the above pressures shall be marked in the same units as those followed in Purchaser's data sheets.

5.0 **INSPECTION & TESTING**

5.1 Unless otherwise specified, Purchaser reserves the right to test and inspect all the items at the Vendor's works.

5.1.1 Purchaser's Inspector shall perform inspection and witness test on all valves as indicated in the Quality Assurance Plan (QAP) attached with this specification.

5.2 Vendor shall submit the following test certificates and test reports for Purchaser's review:

a) Material test certificate from the foundry (MIL certificate) for each valve body and bonnet castings, nozzle, disc etc.
b) Certificate of radiography / x-ray for valve castings. 100% radiography shall be carried out for all valve castings with body rating of 600# and above. A minimum of two shots shall be taken for all curved portion of the body and bonnet.

c) Hydrostatic test reports for all valve bodies and functional test reports for all valves as per clause 5.3 and 5.4 of this specification.

d) IBR certificate in Form III item 11 and shall be furnished for all safety valves in steam service in addition to Form III C. Form III C shall also be furnished for pressure relief valves in distribution network.

5.3 **Hydrostatic Test**

5.3.1 Each pressure safety valve body and nozzle shall undergo hydrostatic test as per outlet flange and inlet flange ANSI rating, respectively. However all the safety valves castings covered under IBR shall be tested as per IBR regulations. There shall not be any visible leakage during this test.

5.4 **Functional Tests**

5.4.1 Assembled valves shall be subjected to functional tests as below :

a) Cold bench set pressure test

Pressure relief valve shall be tested for opening at specified set pressure and also for seat tightness.

b) Seat Leakage test as per API

Whenever the specified set pressure is less than or equal to 70 kg/cm^{2}g, the valve shall meet the seat tightness requirements specified in API RP-527. The maximum permissible leakage rates for conventional and balanced bellow valves against various sizes shall be as specified therein. Whenever the specified set pressure exceeds 70 kg/cm^{2}g, the Vendor shall submit the leakage rates of valves for approval by the Purchaser.

Where bubble tightness has been specified, there shall be no leakage or bubbles of air at the specified percentage of set pressure.

c) Valve lift test

5.5 **Witness Inspection**

All pressure safety valves shall be offered for pre-despatch inspection for following as a minimum :

a) Physical dimensional checks and workmanship
b) Hydrostatic test as per clause 5.3 of this specification.
c) Functional test on representative samples.
d) Review of all certificate and test reports as indicated in clause 5.2 of this specification.

In the event of tests being not witnessed by Purchaser, the tests shall anyway be completed by the Vendor and documents for same submitted for scrutiny.

6.0 SHIPPING

6.1 Valves shall be supplied as a whole, complete with all the accessories like cap, lifting lever, test gag, etc.

6.2 All threaded and flanged opening shall be suitably protected to prevent entry of foreign material.

7.0 GUARANTEE

7.1 Manufacturer shall guarantee that the materials and machining of valves and fittings comply with the requirements in this specification and in the Purchase Order.

7.2 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.

7.3 If valve defect or malfunctioning cannot be eliminated, Manufacturer shall replace the valve without delay,

7.4 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.

7.5 All expenses shall be to Manufacturer's account.

8.0 REJECTION

8.1 Vendor shall make his offer in detail with respect to every item of the Purchaser's specifications. Any offer not conforming to this shall be summarily rejected.

SPECIFICATION
FOR
PIG SIGNALLERS

SPECIFICATION NO. : MEC/S/05/62/048, Rev-0

MECON LIMITED

DELHI - 110 092

CONTENTS

PREPARED BY	CHECKED BY	APPROVED BY

1.0 **SCOPE**

This specification covers the basic requirements for the design and manufacture testing & supply of pig signallers, used for the detection of passage of scraper and instrumented gauging pigs, to be installed in pipeline systems handling hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG). This specification does not cover pig signallers for sour hydrocarbons (liquid/ gas) service as defined in NACE Standard MR 0175–98.

2.0 **MATERIALS**

2.1 All materials used in the manufacture of the main components of the pig signallers shall be as indicated in the data sheets. Other components shall be as per manufacturer's standard suitable for the service conditions indicated in Annexure – I and data sheets which will be subject to approval by Purchaser.

2.2 Scarfed welding base, shall have Carbon Equivalent (CE) not greater than 0.45 on check analysis, calculated as per the following formula :

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

2.3 Fully killed carbon steel shall be used in the manufacture of pig signallers.

2.4 The maximum hardness of the base material, weld metal heat affected zone of the pressure containing parts shall be 248 $HV^{10.}$ Hardness test shall be carried out as per ASTM A370 for each heat of steel used.

3.0 **DESIGN AND CONSTRUCTION REQUIREMENTS**

3.1 Pig signallers shall be bi-directional type having pivot-less tumbler mechanism and laminated trigger blades.

3.2 Pig signallers shall be designed to meet the requirements of pipeline material, diameter, wall thickness & service conditions indicated in the data sheet.

3.3 Design of pig signallers shall be such that any possibility of signaller being operated by line pressure is eliminated.

3.4 Design of pig signallers shall also be such that repair and installation of internals/ accessories are possible under pressure, without removing the unit from the line.

3.5 Pig signallers shall be provided with a visual indicator to indicate the passage of pigs, by means of spring loaded metal shaft. The arm shall lock in down position when manually reset.

3.7 Pig signallers shall be fitted with sealed, weather proof and explosion proof microswitch for remote signal indication. The area classification and rating of microswitch shall be as indicated in data sheet. Suitable for installation in NEC class I Division 1, hazardous area. Microswitch shall have the following rating:

2 Amp, 24 Volts, 50 Hz.
Type : SPDT.
Contacts : 2 NO and 2 NC

3.8 All welds shall be made by welders and welding procedures qualified in accordance with the provision of ASME Section IX.

The procedure qualification shall include hardness test and shall meet the requirements of clause 2.4 of this specification

3.9 Whenever specified in the data sheet, pig signallers shall be provided with extension, suitable for installation on underground pipeline.

4.0 INSPECTION AND TESTS

4.1 Manufacturer shall perform all inspection and tests required to supply the signallers as per the requirements of this specification.

4.2 All pig signallers shall be visually inspected.

4.3 Chemical composition & mechanical properties including hardness shall be checked for each heat of steel used.

4.4 All welds shall be non destructively examined.

4.5 The welding end shall be inspected ultrasonically over the entire circumference for lamination type defects. Any lamination larger than 6.35 mm shall not be acceptable.

4.6 Hydrostatic test shall be conducted at a pressure equal to 1.5 times the design pressure. Hydrotest duration shall be 15 Minutes.

4.6 Manufacturers shall perform functional tests to establish satisfactory performance of both manual and electrical indications

5.0 TEST CERTIFICATES

5.1 Manufacturer shall supply the test certificates for material compliance as per the relevant Material Standards.

5.2 Certificate for hydrostatic test and functional test

5.3 Test reports on heat treatment carried out, if any.

6.0 PAINTING, MARKING AND SHIPMENT

6.1 Exterior surface of the pig signallers shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Manufacturer shall indicate the type and corrosion resistant paint used in the drawings submitted for approval. In case of pig signallers with extension, the burried portion shall be coated with three coats of coal tar epoxy resin. The minimum dry film thickness shall be 300 microns.

6.2 A corrosion resistant metal tag shall be permanently attached with each unit, with the following marking:-

i) Manufacturer's name

i) Suitable for installation in_____mm dia. pipeline

ii) ANSI Rating

iii) Tag No.

6.3 Each unit shall be suitably protected to avoid any damage during transit. Care shall be exercised during packing to prevent any damage to the welding ends. All machined surfaces subject to corrosion shall be well protected by a coat of grease or other suitable materials.

7.0 SPARES AND ACCESSORIES

7.1 Manufacturer shall furnish list of recommended spares and accessories for Pig Signallers required during start up and commissioning. Cost of such spares shall be included by the Manufacturer in the item rates indicated in Purchase Requisition.

7.2 Manufacturer shall furnish separately a list of recommended spares and accessories required for two years of normal operation and maintenance of Pig Signallers.

8.0 GUARANTEE

8.1 Manufacturer shall guarantee that the pig signallers comply with the requirements stated in this specification and in the purchase order. Manufacturer shall replace or repair all parts found to be defective due to inadequate engineering or quality of material. Manufacturer shall replace the signaller without delay, if the defect or malfunctioning cannot be eliminated.

8.2 Any defects occuring within the time period specified elsewhere shall be repaired making all necessary modifications and repair of defective parts free of charge to the purchaser.

9.0 DOCUMENTATION

9.1 At the time of bidding, bidder shall submit the following documents :-

a) General Arrangement drawing with overall dimensions.
b) Clause wise list of deviation from this specification, if any.
c) Reference list of similar supplies of pig signaller shall be furnished including project, year of supply, client, size, rating and service for last five years.
d) Quality Assurance Plan (QAP) enclosed with this tender duly signed, stamped and accepted.

9.2 Within two weeks of placement of order, the manufacturer shall submit four copies, but not limited to, of the following drawings, documents and specifications for approval.

a) Fabrication drawings/ sectional arrangement drawings showing all parts with reference numbers and material specification.

b) Assembly drawing with overall dimension.

c) Welding and testing procedure.

e) Cable connection details and cable specification.

Once the approval has been given by Purchaser, any change in design, material, etc. shall be notified to the Purchaser whose approval in writing for all changes shall be obtained before Pig Signallers are manufactured.

9.3 Within four weeks from the approval date, Manufacturer shall submit one reproducible and six copies of the approved drawings and specifications as listed in 9.2 of this specification.

9.4 Prior to shipment, Manufacturer shall submit one reproducible and six copies of following :

a) Test certificates as per clause 5.0 of this specification.

b) Manual for installation, erection instructions, maintenance and operation instructions.

9.5 All documents shall be in English Language.

STANDARD TECHNICAL SPECIFICATION FOR BALL VALVES

SPECIFICATION NO.: MEC/TS/05/21/002

(OIL & GAS SBU)
MECON LIMITED
DELHI 110 092

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :

AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Rev.	Date	By		Verified	
					Name	Sig.	Name	Sig.
1.	Cl. No. 4.6	4	1	April 09	Gurdeep Singh		K.K. De	
2.	Overall Revision	All	1	July 20	K.P. Singh		A.K. Tyagi	

Abbreviations :

ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing and Materials
API	:	American Petroleum Institute
BHN	:	Brinell hardness number
DN	:	Nominal Size
HAZ	:	Heat Affected Zone
LC	:	Lock Close (valve locked in full close position)
LO	:	Lock Open (valve locked in full open position)
MSS-SP	:	Manufacturers Standardization Society – Standard Practice
NDT	:	Non Destructive Testing
NPS	:	Nominal Pipe Size
RTJ	:	Ring Type Joint
SSPC	:	Steel Structures Painting Council

CONTENTS

1.0 SCOPE

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

This specification does not cover ball valves for sour hydrocarbon (liquid / gas) service as defined in NACE standard MR-01-75.

2.0 REFERENCE DOCUMENTS

2.1 All valves shall be manufactured and supplied in accordance with the latest edition of American Petroleum Institute (API) Specification 6D / ISO 14313, 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
ASMEB 16.10	:	Face-to-face and end-to-end dimensions of valves
ASME B 16.25	:	Butt welding ends
ASME B 16.34	:	Valves – flanged, threaded and welding ends
ASME B16.47	:	Large diameter steel flanges
ASME B 31.3	:	Process piping
ASME B 31.4	:	Pipeline transportation systems for liquid hydrocarbons and other liquids
ASME B 31.8	:	Gas transmission and distribution piping systems
ASME Sec VIII	:	Boiler and pressure vessel code - Rules for construction of pressure vessels
ASME Sec IX	:	Boiler and pressure vessel code - Welding and brazing qualifications
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 EN ISO 10497	:	Testing of valves – 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

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 :

- Valve Data Sheets
- Material Requisition
- 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:

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

3.4 For Valves specified to be used for Gas service or LPG service, Charpy V-notch test, on each heat of base material shall be conducted as per API 6D Clause 8.5, for all pressure containing parts such as body, end flanges and welding ends as well as bolting material for pressure containing parts. Unless stated otherwise, the Charpy V-notch test shall be conducted at 0 °C. Test procedure shall conform to ASTM A370. The average absorbed energy value of three full sized specimens shall be 27 J. The

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

When Low Temperature 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 as per ASTM A370 for each method of manufacture and each heat of steel used in the manufacture of valves. A full thickness cross-section shall be taken for this purpose and the maximum hardness of the materials of valve components shall not exceed 248 HV_{10} .

3.7 All process-wetted parts, metallic and non-metallic, shall be suitable for the fluids and service specified by the Purchaser. The service gas composition shall be as given elsewhere in the Material Requisition. In addition, Manufacturer shall confirm that all wetted parts are suitable for treated water / seawater environment, which may be used during field testing.

3.8 Non-metallic parts of the valves (including O-rings, soft seal etc.) intended for hydrocarbon gas service at pressures of PN 100 (600 #) and above shall be resistant to explosive decompression.

4.0 DESIGN AND CONSTRUCTION

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, may be used to design the valve body. Allowable stress requirements shall comply with 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.

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.

4.3 Ball shall be of single piece, solid type construction.

4.4 Valves shall be Full Opening (FO) or Reduced Opening (RO) as indicated in Valve Data Sheet. FO 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 FO valve shall provide an unobstructed profile for pigging operations in either direction. FO valves shall be designed to minimize accumulation of debris in the seat ring region to ensure that valve movement is not impeded.

The opening size of RO valves shall be corresponding to that of a FO valve of smaller nominal diameter as indicated in table below. For sizes of a particular rating not covered in API 6D, the opening sizes of the RO valve shall be as per Manufacturer's standard.

Nominal Valve Size	Nominal Valve Size for Reduced Opening	Nominal Valve Size	Nominal Valve Size for Reduced Opening
DN $_{mm}$ (NPS $_{inches}$)	DN $_{mm}$ (NPS $_{inches}$)	DN $_{mm}$ (NPS $_{inches}$)	DN $_{mm}$ (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)
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)		

4.5 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.

Sl. No.	ANSI Pressure Rating	Nominal Valve Size (NPS $_{inches}$)	
		Floating Ball	Trunnion Mounted
1.	150#	$\leq$ 8"	> 8"
2.	300#	$\leq$ 4"	> 4"
3.	600#	Nil	$\geq$ 2"

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

4.6 Valve seats shall have 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 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.

4.7 Valves shall have double block and bleed feature to facilitate complete flushing, draining and venting of the valve body cavity.

4.8 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.

4.9 Valves shall be designed to withstand a sustained internal vacuum of at least 1 (one) milli-bar in both open and closed positions.

4.10 FO valves of nominal size DN 200 mm (8”) & above and RO valves of nominal size DN 250 mm (10”) & above shall have provision for secondary sealant injection under full line pressure for seat and stem seals. All sealant injection connections shall be provided with a needle valve, a grease fitting and non-return valve. Valve design shall have a provision to replace the sealant injection fitting under full line pressure. Location and arrangement of sealant points shall be as per Figure-1.

4.11 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.

4.12 Valve design shall ensure repair of stem seals / packing under full line pressure.

4.13 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. Face-to-face and end-to-end dimensions for valve sizes not specified in API 6D shall be in accordance with ASME B 16.10. Face-to-face and end-to-end dimensions not shown in API 6D or in ASME B 16.10 shall be as per Manufacturer Standard and shall be subject to approval by Purchaser.

b) Flanged ends shall have flanges as per ASME B16.5 for valve sizes up to DN 600 mm (24 inches) excluding DN 550 mm (22 inches) and as per MSS-SP-44 / ASME B 16.47 series A for valve sizes DN 550 mm (22 inches) & for DN 650 mm (26 inches) and above. Flange face shall be either raised face or ring joint type (RTJ) 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 microinches AARH. In case of RTJ flanges, the groove hardness shall be minimum 140 BHN.

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. Valves shall be without transition pups, unless otherwise specified 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.

4.14 Design of weld end valves shall be such that during field welding operations, the soft seals or plastic components of the valve (where ever 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.

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

4.16 FO valves of nominal size ≥ DN 200 mm (8”) and RO valves of nominal size ≥ DN 250 mm (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 a minimum. The location and size of support foot / lifting lugs shall ensure unrestrictive operation of vent / drain valves.

4.17 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.

4.18 Valves shall be of fire resistant design as per API 607/BS EN ISO 10497/API 6FA, as indicated in Valve Data Sheet.

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

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

4.21 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 water proof outer casing. Length of stem extension shall be as indicated in Valve Data Sheet. The length indicated corresponds to the distance between centerline of the valve opening and the top of mounting flange for valve operating device (gear operator / power actuator as applicable).

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. 80. 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.

d) Outer casing of stem extension shall have 3/8" or ½" NPT plugs at the top and bottom, for draining and filling with oil to prevent internal corrosion.

4.22 **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 100 mm (4 inches) shall be wrench operated and valve sizes $\geq$ DN 150 mm (6 inches) shall be gear operated. Each wrench – operated valve shall be supplied with wrench. 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 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 1.25 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.

4.23 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.

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

4.25 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. Such repairs shall be carried out at casting supplier's care only. Repair shall be carried out before any heat treatment of casting is done. Repair welding procedure qualification shall also include impact test and hardness test and shall meet the requirements of clauses 3.4 & 3.6 of this specification, respectively.

4.26 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.

4.27 When indicated in Material Requisition, valves shall have locking device 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.

4.28 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 designed for maximum output torque of the selected power actuator (including gear box, if any) at valve stem.

5.0 INSPECTION AND TESTS

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:

5.1.1 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.

5.1.2 Dimensional check on all valves shall be carried out as per the Purchaser approved drawings.

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

5.1.4 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.

a) Body castings of all valves shall be radiographically examined on 100% of the surface of critical areas as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B16.34. The extent of radiography shall be as follows:

ANSI Pressure Rating	Valve Size	Extent of Radiography
150 #	All sizes	Nil
300 #	≤ DN 400mm (16") ≥ DN 450mm (18")	Nil 100%
≥ 600 #	All sizes	100%

All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B.16.34.

b) All valves, with body fabricated from plates or made 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

c) 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 a) for cast components or clause 5.1.4 b) 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.

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. Test pressure shall be held for at least 30 minutes. No leakage is permissible during hydrostatic testing. The body cavity self-relieving feature meeting the requirements of clause 4.8 of this specification shall also be checked.

5.1.9 A supplementary air seat test as per API 6D (Annex B, Clause B.3.3, Type II) 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 EN ISO 10497 / API 6FA, as applicable in Valve Data Sheet.

Failure to comply with this requirement shall be a cause of rejection of the Bidder's offer.

5.1.11 Valves shall be subjected to Operational Torque Test as per API 6D (Annex B, Clause B.6) under hydraulic pressure equal to maximum differential pressure corresponding to the valve pressure class rating.

For manual operator of all valves, it shall be established that the force required to operate the valve does not exceed the requirements stated in clause 4.22(c) of this specification.

5.1.12 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 above 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.

5.1.13 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 rating lower of valve tested previously, shall be qualified.

5.1.14 Checks shall be carried out to demonstrate that the dissimilar metal used in the valves are successfully insulated as per the requirement of clause 4.17 of this specification.

5.1.15 When indicated in Valve Data Sheet, valves shall be subjected to anti-static testing as per supplementary test requirement of API 6D (Annex B, Clause B.5).

5.2 Purchaser 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 EXTENT OF INSPECTION & TESTING

6.1 Purchaser's Inspector shall perform inspection and witness tests on all valves or as indicated in the Quality Assurance Plan (QAP) attached with this specification.

6.2 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 of 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, 5.1.12 and 5.1.13 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

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
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 and supply of such spares shall be included in the price quoted by Manufacturer.

9.2 Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of valves and price for such spares shall be quoted separately.

9.3 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.

b) Sectional drawing showing major parts with reference numbers and material specification. In particular, a blow-up drawing of ball-seat assembly shall be furnished complying the requirement of clause 4.6 of this specification.

c) Reference list of similar ball valves manufactured and supplied in last five years indicating all relevant details including project, year, client, location, size, rating, service, etc.

d) Torque curves for the power actuated valves along with the break torque and maximum allowable stem torque. In addition, sizing criteria and torque calculations shall also be submitted for power actuated valves.

e) Descriptive technical catalogues of the Manufacturer.

f) Copy of valid API 6D certificate.

g) Details of support foot, including dimensions and distance from valve centre line to bottom of support foot.

h) Quality Assurance Plan enclosed with this tender duly signed, stamped and accepted.

i) List of recommended spares required during start-up and commissioning.

j) List of recommended spares required for 2 years of normal operation and maintenance.

k) Other documents / drawings / data as per Material Requisition.

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) Procedure for cyclic testing.

e) Details of corrosion resistant paint to be applied on the valves.

f) Design calculation for pressure containing parts.

g) Other documents / drawings / data as per Material Requisition.

Manufacture of valves shall commence only after approval of the documents indicated in clause 10.2a) to 10.2c) above. Once 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.

10.3 Within 2 weeks from the approval date, Manufacturer shall submit to Purchaser six copies of the approved drawings, documents and specifications as listed in clause 10.2 above.

10.4 Prior to shipment, Manufacturer shall submit six hard copies and six soft copies (on CD-ROMs) 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.

c) Other documents / drawings / data as per Material Requisition.

10.5 All documents shall be in English language.

10.6 **The above documents & data requirements shall also be supplemented by all requirements of clause 2.0 of the Material Requisition.**

11.0 GUARANTEE

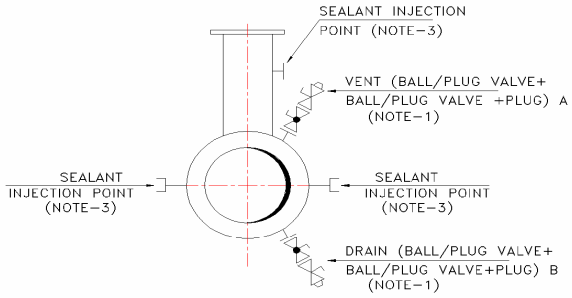
11.1 Manufacturer shall guarantee that the materials and machining of valves and fittings comply with the requirements in this specification and in the Purchase Order.

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.

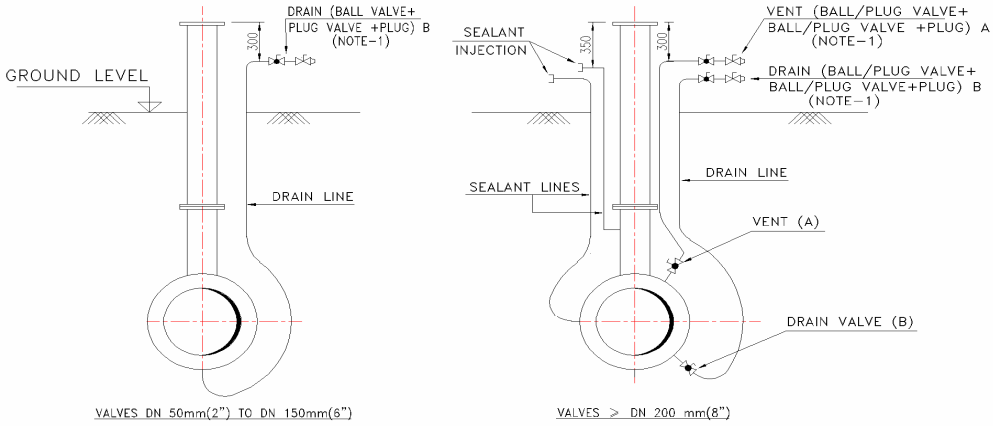
11.3 If valve defect or malfunctioning cannot be eliminated, Manufacturer shall replace the valve without delay,

11.4 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.

11.5 All expenses shall be to Manufacturer's account.



ABOVE GROUND INSTALLATION



UNDERGROUND INSTALLATION

SIZES OF VENT & DRAIN CONNECTIONS		
NOM. VALVE SIZE	A, DN(mm)	B, DN(mm)
50 TO 150	–	15
200 TO 600	15	25
750 & ABOVE	15	50 (REFER NOTE-2)

LEGEND:
- BALL VALVE
- PLUG VALVE
- PLUG

NOTES:
1. ALL VALVES (BALL OR PLUG) AND PLUGS FOR A AND B SHALL BE APPROVED BY THE PURCHASER.
2. VALVES OF SIZE 50mm SHALL BE MANUFACTURED AS PER API-6D.
3. SEALANT INJECTION POINTS SHALL BE PROVIDED FOR FULL OPENING VALVES OF NOMINAL VALVE SIZE 200mm (8") & ABOVE AND REDUCED OPENING VALVES OF NOMINAL VALVE SIZE, DN 250mm (10") AND ABOVE ONLY.
3. IN BURIED SECTION, ALL VENT & DRAIN CONNECTION SHALL BE OF WELDED CONSTRUCTION.

FIGURE-1

VENT, DRAIN & SEALANT INJECTION DETAILS

PROCESS & PIPING DESIGN SECTION
MECON LIMITED

DELHI - 110 092

TECHNICAL SPECIFICATION
FOR
PLUG VALVES
(NB ≥ 2")

SPECIFICATION NO.: MEC/TS/05/62/003, Rev-2

CONTENTS

1.0 **SCOPE**

This specification covers the minimum requirements for design, manufacture and supply of carbon steel plug valves of size DN 50mm (2") and above and ANSI Class 150# thru 900# for use in onshore pipeline systems handling non sour hydrocarbons in liquid phase or gaseous phase including Liquefied Petroleum Gas (LPG).

2.0 **REFERENCE DOCUMENTS**

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, twenty first edition, 1994 including supplement 1 & 2 thereof 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	:	Buttwelding ends
ASME B 16.34	:	Valves – Flanged, threaded and welding end
ASME B16.47	:	Large 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	:	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 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

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 & TEST PROCEDURES

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 which will be subject to approval by Purchaser.

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

3.3 Chemical composition (check analysis) of valve end connection which are subject to further welding by Purchaser shall meet the following requirements for each heat of steel used:

a) Carbon : 0.22% (max.)
b) Manganese : 1.70 % (max.)
c) Silicon : 0.55 % (max.)
d) Phosphorus : 0.030 % (max.)
e) Sulphur : 0.030 % (max.)

Total percentage of Vanadium, Niobium and Titanium shall not exceed 0.20. Residual elements shall not exceed the following limits :

a) Nitrogen : 0.019 %
b) Nickel : 0.30 %
c) Copper : 0.20 %
d) Aluminum : 0.070 %
e) Chromium : 0.15 %
f) Molybdenum : 0.05 %

Carbon equivalent (CE) as calculated by the following shall not exceed 0.45%.

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

3.4 For valves specified for Gas Service or high vapour pressure liquid service, 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 the bolting material for pressure containing parts. Unless specified otherwise in Valve Data Sheets, the Charpy impact test shall be conducted at 0°C. The Charpy impact test specimen shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of plate or forging.

Unless specified otherwise in Valve Data Sheets, the minimum average absorbed energy per set of three specimens shall be 27 J with an individual minimum per specimen of 22 J.

3.5 For valves specified for Gas Service or high vapour pressure liquid service, the hardness of base material of body and principal parts of the valve such as plug, stem, etc., shall not exceed 22 RC.

3.6 Plug for valve size DN 200mm (8") and above or as specified in Valve Data Sheets shall have Electroless Nickel Plating (ENP) or equivalent. The hardness of plating shall be minimum 50 RC. Manufacturer shall ensure that the adhesive strength of plating is sufficient so as to prevent peeling of plating during operation of the valve.

3.7 All process-wetted parts, metallic and non-metallic, shall be suitable for the fluids and service specified by the Purchaser. The service gas composition when applicable shall be as given in Annexure-I.

4.0 DESIGN & CONSTRUCTION

4.1 The Manufacturer shall have a valid license to use API 6D monogram for manufacture of Plug Valves.

4.2 Valve pattern shall be short, regular or venturi as specified in the following table:

Class	Size Range, NB mm (inch)	Pattern
150	50-100 (2-4)	Short
	150-300 (6-12)	Regular
	350 (14) & above	Venturi
300	50-100 (2-4)	Short
	150-250 (6-10)	Regular
	300 (12) & above	Venturi
600	50-250 (2-10)	Regular
	300 (12) & above	Venturi
900	50-250 (2-10)	Regular
	300 (12) & above	Venturi

4.3 Valve shall have an inherent feature using line pressure to ensure that the line pressure cannot cause taper locking of the plug/ plug movement into taper i.e. valves shall be of pressure balanced design.

4.4 Cover shall be bolted to the body and screwed connections are not acceptable.

4.5 Soft seats to achieve a seal between plug and body are not permitted.

4.6 All valves shall have provisions for secondary sealant injection under full line pressure for seat and stem seals. Sealant injection points shall be provided with a ball type check valve or needle valve to replace the sealant injection fitting under full line pressure.

4.7 Valves shall have vent and drain connections as per API 6D.

4.8 When specified in the Valve Data Sheet, valves shall be designed to withstand a sustained internal vacuum of at least one milli-bar in both open and closed position.

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. In case of RTJ flanges, the groove hardness shall be minimum 140 BHN.

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. Valves shall be without transition pups. 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.

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

4.12 Valves of size DN 200mm (8") and above shall be equipped with lifting lugs. Tapped holes and eye bolts shall not be used for lifting lugs.

4.13 Valves shall have locking devices to be locked either in full open or full close position when indicated in the Valve Data Sheets. Locking devices shall be permanently attached to the valve operator and shall not interfere with operation of the valve.

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

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

4.16 Valves with stem extension, when indicated in Valve Data Sheet shall have following provisions :

a) Valves provided with stem extension shall have water proof outer casing. Length of stem extension shall be as indicated in the Valve Data Sheet. The length indicated corresponds to the distance between the centreline of the valve opening and the top of the mounting flange for valve operating device (gear operator/ power actuator as applicable).

b) Vent and drain connections 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 A106 Gr. B, with Sch. 160. Fittings shall be ASTM A105/ ASTM A 234 Gr. WPB, Socket Welded, ANSI class 6000.

c) Sealant injection lines shall be extended and terminated adjacent to the valve operator in manner as indicated in (b) above.

d) 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 movements between valve body stem extension or its operator.

e) Outer casing of stem extension shall have 3/8" or ½" NPT plugs at the top and bottom, for draining and filling with oil to prevent internal corrosion.

4.17 **Operating Devices**

a) Valves shall have a power actuator or manual operator as indicated in the Valve Data Sheet. Manual operated valves of size $\leq$ DN 100mm (4") shall be wrench operated and valves of sizes $\geq$ DN 150mm (6") shall be gear operated. Each wrench operated valve shall be supplied with wrench. 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 damaged parts can be replaced without the bonnet being removed.

b) The power actuator shall be in accordance with the specification issued for the purpose and as indicated in the valve and actuator data sheet. Operating time shall be as indicated in valve data sheet. Valve operating time shall correspond to full close to full open / full open to full close under maximum differential pressure corresponding to the valve rating. For actuated valves, the actuator torque shall be atleast 1.25 times the maximum torque required to operate the valve under maximum differential pressure corresponding to the valve class rating.

c) Operating device shall be designed for easy operation of valve under maximum differential pressure corresponding to the valve rating.

d) For manual operation of all valves, the diameter of the hand wheel or the length of operating lever shall be such that under the 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 operator), required to operate the valve from full open to full close position.

e) 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.

f) Gear operators, if specified, shall have a self locking provision and shall be fully encased in waterproof/ dustproof/ weatherproof/ splashproof enclosure and shall be filled with suitable grease.

4.18 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 also include impact test and hardness test when required as per Clause 3.4 and 3.6 of this specification and shall meet the requirements as specified therein.

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

4.20 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-1.

For Power Actuated Valves, the valve stem shall be designed for maximum output torque of the selected power actuator (including gear box, if any) at the valves stem.

5.0 INSPECTION & TESTS

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 :

5.1.1 All valves shall be visually inspected.

5.1.2 Dimensional check shall be carried out as per the Purchaser approved drawings.

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

5.1.4 a) Non-destructive examination of individual valve material and component consisting of but not limited to castings, forgings, plates and assembly welds shall be carried out by the Manufacturer.

b) Valves castings shall be radiographically examined at the cover and body portion, seat location, flanged body ends and circumference of ends to be field welded. Procedure and acceptance criteria shall be as per ASME B16.34. The extent of radiography shall be as follows :

ANSI Class 150-	All Sizes	-	Nil
ANSI Class 300-	≤ DN 400mm (16")	-	Nil
	≥ DN 450mm (18")	-	100%
ANSI Class 600- and above	All Sizes	-	100%

All castings shall be wet magnetic particle inspected 100 % of the internal surfaces. Method and acceptance shall comply with ASME B16.34.

c) Valve forgings shall be examined by ultrasonic method. Inspection procedure and acceptance criteria shall be as per Annexure E of ASME B16.34.

5.1.5 Areas which, in Purchaser's Inspector'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 Sec-VIII, Division I, Appendix 12 and Appendix 6 respectively.

5.1.6 a) Weld ends of all cast valves shall be 100% radiographically examined and acceptance criteria shall be as per ASME B16.34.

b) After final machining all bevel surfaces shall be inspected by dye penetrant, or wet magnetic particle methods. Any defects longer than 6.35mm shall be rejected and also defects between 6.35mm and 1.59mm that are separated by a distance less than 50 times their greatest length. Weld repair of bevel surface is not permitted. Rejectable defects must be removed.

c) All finished wrought weld ends subject to welding in the field shall be 100% ultrasonically tested for lamination type defects for a distance of 50mm from the end. Laminations shall not be acceptable.

5.1.7 All valves shall be tested in compliance with the requirements of API 6D. Hydrostatic shell testing shall ensure that the whole of the shell is subjected to the test pressure. If necessary, the empty shell shall be pressure tested prior to assembly of the plug. 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.

5.1.8 A supplementary air seat test as per API 6D shall be carried out for all valves. No leakage is allowed. Test pressure shall be held for at least 15 minutes.

5.1.9 Manufacturer who intends bidding must submit at bid stage, certificate and report for successful fire safe tests for all types of valves in accordance with BS:6755 (Part-II)/ API 6FA, as applicable in Valve Data Sheet.

Failure to comply with the requirement shall be a cause of rejection of the offer.

5.1.10 Valve shall be subjected to Operational Torque Test as per supplementary test requirement of API 6D under hydraulic pressure equal to the maximum differential pressure corresponding to the valve rating. The maximum handwheel force shall not exceed 350 N.

5.1.11 Power actuated valves shall be tested after assembly at the valve Manufacturer's works. Actuator shall be capable to allow minimum five consecutive "opening" and "closing" cycles. To achieve this, the Manufacturer shall provide "closing" and "opening" operations. This test shall be conducted on one valve out of a lot of five valves of the same size, rating and actuator type. In case the test result dose not meet the requirements, retesting/ rejection of the lot shall be as decided by Purchaser's Inspector.

The actuator shall be adjusted to ensure that opening and closing time is within the limits stated in Actuator Data Sheet issued for the purpose.

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

5.2 Purchaser reserves the right to perform stagewise inspection and witness tests as indicated in para 5.1 at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to Purchaser's Inspector.

Purchaser reserves the right to request additional testing at any time to confirm or further investigate a suspected fault. If the suspected fault is confirmed, the cost incurred shall be to Manufacturer's account.

In no case shall any action of Purchaser or his representative 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 EXTENT OF INSPECTION & TESTING

6.1 Purchaser's Inspector shall perform inspection and witness test on all valves as indicated in the Quality Assurance Plan (QAP) attached with this specification.

6.2 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 test complete with records of timing and pressure of each test.

c) Test reports conforming to clause 5.1.9 of this specification, if applicable.

d) Test reports on radiographic and ultrasonic inspection.

e) Test reports on operation of valves conforming to clause 5.1.10 and 5.1.11 of this specification.

f) 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 dispatched from Manufacturer's works.

8.0 PAINTING, MARKING & SHIPMENT

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 the valves to be installed underground, when indicated in Valve Data Sheet, 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 bevel protectors.

8.5 All sealant lines and other cavities of the valves shall be filled with sealant before shipment.

8.6 Packaging and shipping instructions shall be as per API 6D.

8.7 Packages shall be marked legibly, with suitable marking ink, the following.

a) Order Number
b) Manufacturer's Name
c) Valve Size and Rating
d) Tag Number
e) Serial Number

9.0 SPARES & ACCESSORIES

9.1 Manufacturer shall recommend and quote separately the spares for valves required for commissioning and two years of normal operation. List of such spares without price shall be indicated alongwith technical bid and separately with price.

9.2 Manufacturer shall recommend and quote unit price separately for the accessories (like wrench, sealant injector, etc.), sealant and special tools required for maintenance of valves.

10.0 DOCUMENTATION

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

a) General arrangement/ assembly drawings showing all features and relative positions & sizes of vents, drains, gear box & other external parts together with overall dimensions.

b) Sectional drawing showing major parts with reference numbers and material specification.

c) Reference list of similar plug valves manufactured and supplied in last five years, indicating all relevant details including project, year, client, location, size rating, service, etc.

d) Torque curves for the power actuated valves alongwith break torque and maximum allowable stem torque. In addition, sizing criteria and torque calculations shall also be submitted for power actuated valves.

e) Descriptive technical catalogues of the Manufacturer.

f) Copy of valid API 6D certificate, wherever applicable.

g) Details of support foot, including dimensions and distance from valve centre line to bottom of support foot.

h) Quality Assurance Plan enclosed with this tender duly signed, stamped and accepted.

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 approval :

a) Design drawings and relevant calculations for pressure containing parts and other principle parts.

b) Detailed sectional arrangement drawing showing all parts with reference numbers and materials specification.

c) Assembly drawings with overall dimensions & clearances required and showing all features. Drawing shall also indicate the numbers of turns of handwheel (in case of gear operator) required for operating the valve from full open to full close position and the painting scheme.

d) Welding, heat treatment, testing and quality control procedures.

e) Details of corrosion resistant paint to be applied on the valves.

f) Design calculation for pressure containing parts.

Manufacture of valves shall commence only after approval of the above documents. Once approval has been given by Purchaser, any change in design, material and method of manufacture shall be notified to the Purchaser, whose approval in writing for all changes shall be obtained before the valves are manufactured.

10.3 Within 30 days from the approval date, Manufacturer shall submit one reproducible and six copies of the approved drawings, documents and specification as listed in clause 10.2 of this specification.

10.4 Prior to shipment, Manufacturer shall submit one reproducible and six copies of following :-

a) Test certificates as listed in clause 7.0 of this specification.
b) Manual for installation, erection instructions, 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.

11.4 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.

11.5 All expenses shall be to Manufacturer's account.

1.0 Introduction

INDRADHANUSH GAS GRID LIMITED intends to procure ball, plug valve for installation on Mobile Pig Launcher in NORTH EAST GAS GRID PIPELINE PROJECT as listed in the MR.

2.0 Ball / Plug Valve Vendor Selection Basis:

For procuring ball / plug valves from vendors may be acceptable subject to the following: -

a) The vendor/ supplier of ball / plug valves shall possess valid API 6D certification.

b) The vendor/ supplier should not be in the Holiday list of IGGL/ MECON/ OTHER PSU.

c) The vendor/ supplier should have supplied at least 50% of required quantity or minimum 1 number whichever is higher of maximum size and rating of ball / plug (as the case may be) valves as required for intended services.

Successful bidder shall submit documentary evidences i.e. PO copies, Inspection Certificate etc. for the above at the time of drawing approval. Bidder may fulfill the above requirement using multiple PO in last seven years reckoned from bid due date.

3.0 Compliance with Specification: The Vendor shall be completely responsible for the design, materials, manufacture & fabrication, testing, inspection, preparation for shipment and transport of the above equipment strictly in accordance with the MR and all attachments thereto. Minimum all pressure containing and pressure controlling parts of Valves and Actuators shall be provided with EN 10204-3.2 certificates.

4.0 Vendor's Scope: Vendor scope of work includes the equipment with all internals and accessories shown on the datasheets, specifications and all unmentioned parts necessary for a satisfactory operation and testing, except those which are indicated to be out of the vendor's supply.

5.0 Inspection:

Inspection shall be in accordance with EN 10204 3.2 certification shall be issued for each dispatched valve. Vendor shall appoint anyone of the TPIA for inspection purpose. Vendor has to intimate the TPIA name from below listed agencies to IGGL / MECON prior to perform any inspection activity.

i. Det Norske Veritas (DNV)
ii. Germanischer Lloyd
iii. Bureau Veritas

iv. Moody International

v. SGS

vi. Certification Engineer International Ltd (CEIL)

vii. Technische Ulierwachungs Verein (TUV)

viii. Velosi

ix. American Bureau Services (ABS)

x. AB-Vincotte

xi. Lloyd Register of Industrial Services

xii. VCS Quality Services Private Limited

xiii. Meenar Global

6.0 For all valves to be used in Gaseous Hydrocarbons service, impact & hardness tests / values as per clause 3.4, 3.5 & 3.6 of specification no. MEC/TS/05/21/002 shall be applicable.

7.0 Vendor shall quote separately spares for two years normal operation for valves & actuators as per price schedule Performa. List of spares quoted shall be furnished as per attached Format.

8.0 Vendor to include the start up and commissioning spares for valves & actuators (if applicable) in the quoted price for the valves. However, list of spares (start up and commissioning) to be made available without prices as per attached Format.

9.0 Vendor to indicate in his offer the gross weight (in kg or Metric Tonne) per unit, volume (in m3) per unit and dimensions (L x B x H) of package (wooden box, etc.) to accommodate unit quantity or number of quantities (as applicable).

10.0 Vendor must submit duly filled up & signed data sheets, check list and forms along with his offer.

11.0 Vendor shall establish the equivalence/superiority of any material proposed (With justification of material properties and availability) other than that specified in Datasheet. Vendor shall also indicate the ASTM equivalent of his proposed material as well as of all the AISI designated materials specified in datasheets.

12.0 Vendors to note that for minimum inspection and testing requirement of the valves shall be governed by attached QAP with this MR. However, vendor shall submit their QAP for approval covering the requirement specified in attached QAP.

13.0 VOID

14.0 VOID

15.0 VOID

16.0 Vendor to note that the valves supplied by them shall be capable to withstand the field hydro test pressure (i.e. 1.5 times of design pressure) for 6 to 24 hours test holding duration under field / site conditions. The valve's ball / plug (BALL VALVES / PLUG VALVES) shall be kept in either partial or full open condition for entire test duration and test medium will be non-corrosive water.

17.0 Vendors to note that packing & transportation of the valves shall be done strictly as per attached technical specification for handling and transportation.

18.0 Vendors to note that the entire ordered quantity shall be offered for MECON inspection as per following table. In case no. of visits of MECON engineer become more than as specified in table below for complete order quantity, vendor shall bear the touring expenditure of MECON/IGGL engineers as per company rules.
IGGL/MECON reserves the right to waive off this requirement in case of project exigencies.

S.No.	Size	Minimum Quantity for one lot
1	30" and higher	Upto 5 valves
2	16" to 28"	Upto 8 valves
3	8" to 14"	Upto 20 valves
4	¾" to 6"	Upto 200 valves

In case of any multiple of the ordered quantity the no. of valves shall be divided by quantity specified for one lot in above mentioned table to arrive at the no. of lots. No. of lots shall be determined by rounding off to next integer.

19.0 Vendors to note that TPI inspection is either to be conducted before MECON inspection or in parallel. In no case TPI inspection shall be permitted after MECON inspection. For the valves where MECON inspection extent is 100% witness, TPI inspection maybe allowed in parallel with MECON. However, for valves requiring 10% MECON witness inspection, vendor has to finish TPI inspection before raising call and upload TPI inspection report in Inspection Management System of MECON.

20.0 Extent of MECON witness during final inspection shall be as follows:

Sl. No.	Size range	Class	Mecon Inspection extent
1.	2” to 8”	150	10% random witness and document review for 100% valves.
2.	10” and more	150	100% witness.
3.	2” to 6”	300 and higher	10% random witness and document review for 100% valves.
4.	8” and more	300 and higher	100% witness.
5.	Below 2”	All classes	10% random witness and document review for 100% valves.

21.0 Strip Test: Vendor need to demonstrate strip test of bolted body valves. For this test one valve of each ordered size and rating shall be selected at random after successful hydro and pneumatic tests by TPI & MECON inspector. The valve shall be dismantled completely. Alloy steel parts shall be checked for compliance to relevant material code using Positive material identification technique. Selected valve(s) shall then be re-assembled after replacing sacrificial parts like gasket & O-rings and complete final inspection as per approved QAP shall be carried out once again to ensure the repeatability of body seals and seats.

22.0 For Trunnion Mounted Ball Valves, where ever, DIB-1 seats are specified in datasheets, Self – relieving seats are not applicable as per cl. 4.8 of TS no. MEC/TS/05/21/002.

DATA SHEET FOR BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch): 4" , 2" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure Design Temperature, °C : -29°C to + 65°C

5.0 Connecting Pipe Specification:

5.1 Material N.A.

5.2 Diameter (OD) N.A.

5.3 Thickness N.A.

6.0 **Valve Construction Design**

6.1. Configuration [√] Full Bore [ ]

6.2. End Connections Flanged Ends [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) [√] RT [ ] NA [ ]

[ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

6.4 Ball Mounting

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted [ ] Either [√]

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB**	
7.2	Ball	**A 216 Gr.WCB +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Fire Safe Certificate of valve manufacturer**	
7.7	Trunnion	**A 216 Gr. WCB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance Service : **Natural Gas**

9.0 Stem extension

10.0 Operator

11.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

12.0 **Valve Testing Requirement**

		Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
12.1	Hydrostatic Test	**157**	**As per API 6D**
		114	**As per API 6D**
12.2	Air Test	**5.6 - 7**	**As per API 6D**

13.0 Anti-Static Testing Requirement

14.0 **Valve Painting Specification**

14.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

14.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

15.0 Lock Open Requirement : **N.A.**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2 Minimum thickness of valve body / adapter shall not be less than as per ASME B16.34 + 1.5 mm CA
3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
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.**NA**
9 Valves shall be inspected and approved by Purchaser before despatch.
10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12 Valve seat design shall conform to DIB-1 design .

REV. NO.	DATE	ZONE		BY	APPRD	
						REFERENCES DRG. NO.

SECTION Oil & Gas					
	PREPARED	CHECKED	APPROVED	CLIENT : INDRADHANUSH GAS GRID LIMITED	MECON LIMITED
NAME	AM	AM	HK		
DATE	1.11.2024	1.11.2024	13.03.2024	NORTH -EAST NATURAL GAS PIPELINE	
SIGN				PROJECT: GRID (PHASE-2) PROJECT	SCALE : REV
				DATA SHEET FOR BALL VALVES (NB ≥ 2")	DATA SHEET NO.: MEC/23UU/05/28/M/001/DS/BV/M.S.T./01 0

DATA SHEET FOR SOCKET WELDED BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch) : ¾ ” ANSI RATING : 600# / 800# Design Standard **: ISO 17292**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification:

5.1	size	DN 20 (3/4")
5.2	Diameter (OD)	26.7 mm
5.3	Thickness	5.56 mm

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections **Socket Welded as per ASME B16.11**
100mm Extension Pups in ASTM A106 Gr.B (Sch. 160) for 3/4"

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]
b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Floating Ball Type

6.5 Valve body type : Bolted body

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**ASTM A105**	
7.2	Ball	**13% Cr Steel**	
7.3	Body Seat	**As per Fire Safe Certificate of valve manufacturer**	
7.4	Gland	**13% Cr Steel**	
7.5	Stem (No Casting)	**13% Cr Steel**	
7.6	Stem Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.7	Body Studs/Nuts	**ASTM A193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **1.5 mm** Service : **Natural Gas**

9.0 Stem extension : NA

10.0 Operator : Lever operated

11.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

12.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration, minutes
12.1	Hydrostatic Test	Body	**157**	**As per ISO 17292**
		Seat	**114**	**As per ISO 17292**
12.2	Air Test		**5.6 - 7**	**As per ISO 17292**

13.0 Anti-Static Testing Requirement :**As per ISO 17292**

14.0 Valve Painting Specification

14.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

14.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

15.0 Lock Open/ Lock Close/Normally Close Requirement : **NA**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than that specified in ISO 17292 plus 1.5 mm corrosion allowance specified in this datasheet .
3. Charpy V-notch test for body, ball, body seat, gland, stem & studs/nuts shall be conducted as per A370. The test shall be conducted at 0°C. The minimum average absorbed energy per set of three specimen shall be 27 J with an individual minimum per specimen of 22 J.
4. Material test certificates and hydrostatic test reports shall be furnished prior to despatch.
5. Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.
6. All tests shall be as per BS EN 12266.
7. Valves shall have ball position indicator.
8. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
9. Each valve shall be provided with a wrench.
10. Valves shall be inspected and approved by Purchaser before dispatch.
11. Gland packing assembly shall permit repair of gland packing under full line pressure.
12. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
REVISIONS					

REFERENCES DRG. NO.

SECTION Oil & Gas	PREPARED	CHECKED	APPROVED
NAME	AM	AM	HK
DATE	1.11.2024	1.11.2024	1.11.2024
SIGN			

CLIENT : INDRADHANUSH GAS GRID LIMITED

Project: NORTH -EAST NATURAL GAS PIPELINE GRID PROJECT

DATA SHEET FOR BALL VALVES (NB < 2")

MECON LIMITED

SCALE :

DATA SHEET NO.:MEC/23UU/05/28/M/001/DS/BV/M.S.T./02

REV 0

DATA SHEET FOR PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN50 (2") ANSI Rating : 600# Design Standard : API 6D

3.0 MECON's Technical Specification No.: MEC/TS/05/62/003, Rev-2

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -46°C to 65°C

5.0 **Connecting Pipe Specification** N.A.
5.1 Material :
5.2 Diameter (OD), mm :
5.3 Thickness (mm) / Schedule :

6.0 **Valve Construction Design**

6.1.	Pattern	: Short		Regular	√	Venturi	
6.2.	End Connections	: Flanged both ends			√	Flanged as per ASME B 16.5	
		: Butt Weld both ends				Butt Weld as per ASME B16.25	
		: Flanged one end, butt weld other end					
		: Socket weld both ends				Socket Weld as per ASME B16.11	

6.3. Flanges : a) RF √ FF RTJ NA
b) Serrated Smooth (125 to 200 microinches AARH) √ NA

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	A 352 Gr. LCB/A 350 Gr. LF2	
7.2	Plug	(SS316/ A 352 Gr.LCB/A 350 Gr. LF2) with 75 µENP coating	
7.3	Cover	ASTM A350 Gr. LF2/ A352 Gr. LCB	
7.4	Stem	SS 316 (No casting) / A 350 Gr. LF2	
7.5	Stem Seal	PTFE/Graphite	
7.6	Stud Bolts/ Nuts	ASTM A320 Gr.L7 / ASTM A194 Gr.4	

8.0 Corrosion Allowance : **1.5 mm** Service : **Natural Gas**

9.0 Location : Above Ground √ Buried
10.0 Stem Extension Requirement : Yes No √
11.0 Gear Operator Requirement : Yes No √
12.0 Actuator Requirement : Yes No √

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

14.0 **Valve Testing Requirement**

14.1

Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
Body	**157**	**As per API 6D**
Seat	**114**	**As per API 6D**

14.2 Air Test **5.6 - 7** **As per API 6D**

15.0 **Valve Painting Specification**
15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.
15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
4. Charpy V- notch & Hardness test for body, plug, cover, stem & studs/nuts shall be conducted as per Clause No.: 3.4 & 3.5 of TS respectively.
5. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
6. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
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. **NA**
8. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**
9. Minimum thickness of valve body / adapter / cover shall not be less than that specified in ASME B16.34.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

	PREPARED	CHECKED	APPROVED
NAME	AM	AM	HK
DATE	16.11.2024	16.11.2024	16.11.2024
SIGN			

SECTION Oil & Gas

CLIENT : INDRADHANUSH GAS GRID LIMITED

PROJECT: NORTH -EAST NATURAL GAS PIPELINE GRID PROJECT

DATASHEET FOR PLUG VALVES (NB ≥ 2")

REFERENCES DRG. NO.

MECON LIMITED

DATA SHEET NO.: MEC/23VA/05/28/M/001/DS/PV/08 REV 0

DATA SHEET FOR SOCKET WELDED PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN 20 (3/4") ANSI Rating : 800# Design Standard : BS 5353

3.0 MECON's Technical Specification No.: N.A.

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -29°C to 65°C

5.0	**Connecting Pipe Specification**		DN 20 (3/4")
5.1	Material	:	ASTM A106, Gr. B
5.2	Diameter (OD), mm	:	26.7
5.3	Thickness, mm	:	5.56

6.0 **Valve Construction Design**

6.1.	Pattern	:	Short	√	Regular		Venturi
6.2.	End Connections	:	Flanged both ends				Flanged as per ASME B 16.5
		:	Butt Weld both ends				Butt Weld as per ASME B16.25
		:	Flanged one end, butt weld other end				
		:	Socket weld both ends	√			Socket Weld as per ASME B16.11

100 mm Extension Pups in ASTM A106 Gr. B,Sch. 160 at both ends

6.3. Flanges : a) RF FF RTJ NA √
b) Serrated Smooth (125 to 200 microinches AARH) NA √

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	ASTM A105	
7.2	Plug (Lubricated)	ASTM A105 + 75 microns ENP	
7.3	Cover	ASTM A105	
7.4	Stem (No Casting)	ASTM A105	
7.5	Stem Seal	Graphite/ PTFE	
7.6	Stud Bolts/ Nuts (If applicable)	ASTM A193 Gr. B7/ ASTM A194 Gr. 2H	

8.0 Corrosion Allowance : **1.5 mm** Service : **Natural Gas**

9.0	Location	:	Above Ground	√	Buried	
10.0	Stem Extension Requirement	:	Yes		No	√
11.0	Gear Operator Requirement	:	Yes		No	√
12.0	Actuator Requirement	:	Yes		No	√

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

14.0 **Valve Testing Requirement**

14.1

Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
Body	**210**	**2**
Seat	**155**	**2**

14.2 Air Test **5.6-7** **2**

15.0 **Valve Painting Specification**

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. Valves shall have an inherent feature using the line pressure to ensure that the line pressure cannot cause taper locking of the plug/ plug movement into the taper, i.e., valves shall be of "pressure-balanced design".
2. Painting procedure of valves shall be as per Manufacturer's standard.
3. Valve shall be designed for intrinsically fire safe.
4. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
5. Valves shall have valve position indicator.
6. Each valve shall be provided with a wrench.
7. Gland packing assembly shall permit repair of gland packing under full line pressure.
8. All pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
9. Material Test Certificates and Hydro Test Reports shall be furnished prior to dispatch.
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.Valves shall be inspected and approved by Purchaser before despatch.
11. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
12. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
13. Minimum thickness of valve body / adapter / cover shall not be less than that specified in the design standard + corrosion allowance .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

CLIENT : INDRADHANUSH GAS GRID LIMITED

NAME		PREPARED	CHECKED	APPROVED
DATE		AM	AM	HK
SIGN		13.03.2024	13.03.2024	13.03.2024

PROJECT: NORTH -EAST NATURAL GAS PIPELINE GRID PROJECT

MECON LIMITED

DATASHEET FOR PLUG VAVES (NB < 2")

DATA SHEET NO.: MEC/23UU/05/28/M/001/DS/PV/07 REV 0

Pig Signaller Make & Model	Vendor to specify
Pig Signaller Tag Nos.	To be finalised during detail engineering
General	
Service	Natural Gas
Area Classification	Zone 1 ,Gr. IIA, IIB, T3 as per IEC 60079
Pig Detection	At Passage
Sensing Element	
Type	Non-intrusive
Sensor Element	Piezo electrical crystal
Sensor repeatability	1% Minimum
Detection	Passive acoustics based (Ultrasonic type)
Connection	Universal Clamp-on type
Self testing capability	Required
Detection Speed	(Vendor to Advice)
Signal Output	2 No. Potential free contact (DPDT)(2NO +2 NC) (24 VDC 2A)
Housing	Hermetically sealed SS316
Terminal Box	
Body Material	SS316 as a minimum.
Degree of Protection	Explosion proof with IP65 as per IEC 60529, PESO approved
Power Supply	24V DC
Signal Interface	To Control Panel for pig detection through potential free contacts.
Cable Entry	1 Nos. power ½" NPTF /3 Nos. Signal ½" NPTF. Cable glands shall be Double compression type with PVC shroud, explosion proof and PESO Approved.
Cables	Vendor to provide sensor cable between sensor & termination box. Vendor to consider a length of 5 meters between sensor & termination box. All cables shall be terminated in terminal strips. Flying leads shall not be provided. Separate terminal strips to be considered for power & signals.
Earthing	Shall be provided as per IEC 60364.
Local Indicator	Required Green LED for Power Available Red LED for Pig detection Amber for Sensor Fault.
Local Reset Button	Required (Mushroom head) with cover.
Terminal Box Mounting	Station mounted, vendor to provide suitable mounting brackets & accessories.
	The Manufacturer shall perform all inspections and tests as per the requirements of this specification and the relevant

INSPECTION AND TESTS	codes, standards and specifications, prior to shipment at his Works. Such inspections and tests shall be, but not limited to, the following: All pig signallers shall be visually inspected. The internal and external surfaces shall be free from any strikes, gouges and other detrimental defects. The surfaces shall be thoroughly cleaned and free from dirt, rust and scales. Testing and assembly procedure shall be detailed by Manufacturer and implemented during the work. Welding Inspection and testing shall be performed before any coating or painting is applied.
SPARES AND ACCESSORIES	Manufacturer shall furnish list of recommended spares and accessories for pig signallers required during start-up and commissioning and supply of such spares shall be included in the price quoted by Manufacturer. Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of pig signallers and price for such spares shall be quoted separately. Manufacturer shall provide special tools required for operation and maintenance as a part of supply, this includes but not limited to
	Any type of communicator/ cables/ connectors for configurations; Any Special tools required for maintenance like special type of Allen Key etc.

1. Reference has been made in this specification to the latest edition (edition inforce at the time of issue of enquiry) of the following codes, standards and specifications.

2. The Pig Signaller shall be capable of detecting all type of pigging devices as indicated below :

Pig Material	Carbon Steel, Steel and Plastic
Pig Length	Need to follow current industry practice to accommodate all types of tools
Pig Diameter (OD)	90% - 100% of Pipeline ID
Pig Velocity (max.)	6 m/s

3. The Pig Signaller shall be clamped to the external surface of the pipe or the scraper trap's major & minor barrel through which the pig passes.

4. Documents (Purchase Order (P.O.) / Work Order (W.O.), Inspection Release Note of relevant previous supplies (having cross reference to P.O.), Datasheet, Performance Certificate and any other relevant document deemed necessary) of similar supplies of pig signaller which have been successfully commissioned and working for 6 months in last seven (07) years reckoned from the bid due date have to be submitted for prior approval.

5. Documentation (Hard copies / soft copies etc.) to be submitted by Manufacturer is summarized below.

Manufacturer shall submit the following documents (in English only) :

a) General arrangement drawings with overall dimensions and cross-sectional drawings.
b) Power consumption details.

c) Sectional arrangement drawings showing all parts with reference numbers and material specification including mounting details of pig signallers on the pipeline.

d) Cable connection details and cable specification.

e) Test Certificates.

f) Manual for installation, erection instructions, maintenance and operation instructions.

g) Manufacturer shall provide standard installation drawing for mounting of sensor on pipe, which should indicate the welding details of the support brackets to the pipe as a minimum

PRESSURE SAFETY VALVES

UNITS : Flow > Liquid - m^3/hr , Gas-Sm^3/day, Steam - kg/hr. Pressure -> kg/cm^2g, Temperature-°C, Level/ Length-> mm

General	01	Tag No.	**PSV-**			
	02	Line No./ Size	As per P&ID			
	03	Vessel Protected (Scrapper Trap)	**SLR / SRL-**			
	04	Quantity	As per MR			
	05	Safety/ Relief	Safety Relief			
	06	Vendor	⌖			
Valve	07	Type	Standard			
	08	Full Nozzle Full Lift /Mod. Nozzle	Full Nozzle Full Lift			
	09	Bonnet Type	Closed			
	10	Conv./ Bellows/ PIlot Operated	Conventional			
	11	Inlet Conn. : Size & Rating	⌖			
	12	Inlet Conn. : Facing & Finish	RF,⌖			
	13	Outlet Conn. : Size & Rating	⌖			
	14	Outlet Conn. : Facing & Finish	RF,⌖			
	15	Cap Over Adj. Bolt :	Required			
	16	Screwed /Bolted	Bolted			
	17	Lifting Gear - Type	-			
	18	Test Gag	Required			
Material	19	Body and Bonnet	ASTM A216 Gr. WCB			
	20	Nozzle and Disc	SS 316			
	21	Spring	SS 316			
	22	Bellows				
Options	23	Resilient Seat Seal				
Basis	24	Code	API 520, 521 & 526			
	25	Basis of Selection	Vessel Under Ext. Fire Case			
Service	26	Fluid and State	Natural Gas Vapour/RLNG-Gas			
Conditions	27	Corrosive Constituent	Tot sulphur incl. H2S (max.)-10 PPM(by wt)			
			H2S content (max)- 5PPM (by wt.)			
	28	Corr. Allowance	2 mm			
	29	Required Flow Capacity	⌖			
	30	Mol. Wgt. /S.G. at Rel. Temp.	⌖⌖	⌖⌖		
	31	Oper. Pressure, kg/cm^2g	⌖⌖			
	32	Oper. Temp.°C /Rel. Temp.°C	0-55	⌖		
	33	Valve Discharges to	Atm.			
	34	Back Press. /Const. Or Variable	Atm.	Constant		
	35	Set Pressure, kg/cm^2g	92			
	36	Cold Bench Test Pressure	⌖			
	37	% Over Pressure /% Blow Down	20	⌖		
	38	Cp/Cv /Compressibility Factor	⌖⌖	⌖⌖		
	39	Viscosity at Rel. Temp. (cP)	⌖⌖			
	40	Vess. : Wall Temp.,°C /Surf. Area-m^2	593	⌖		
Orifice	41	Calculated Area-$inch^2$	⌖			
	42	Sel. Area-$inch^2$ /Orifice Design	⌖	⌖		
	43	No. of Valves Reqd. for capacity	⌖			
	44	Total Area-$inch^2$	⌖			
	45	Actual Flow Capacity, SCFM	-			
	46	Relief Load	⌖			
	47	Spring Range	⌖			
	48	Model No.	⌖			
	49	Radiography & Charpy Test	Reqd. (100%)			
	50	IBR Certification	Not Required			

Notes:

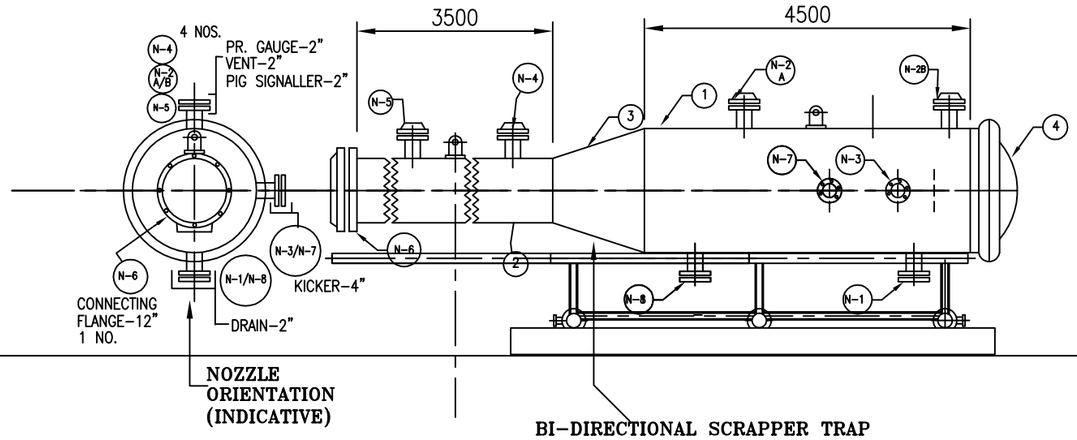
⌖ VENDOR TO SPECIFY/ CONFIRM.

⌖⌖ GAS COMPOSITION & OTHER PROPERTIES WILL BE PROVIDED TO SUCESSFUL BIDDER.

1. VENDOR SHALL FURNISH SIZING CALCULATIONS TO SUPPORT HIS VALVE SELECTION.
2. VALVES SHALL BE 100% RADIOGRAPHED.
3. VENDOR TO CONSIDER COEFFICIENT OF DISCHARGE AS PER ASME-SEC-VIII (Latest).
4. FOR SAFETY VALVE SIZING, FURNISH CERTIFIED CAPACITIES AS PER API-520.
5. SIZE, SET PRESSURE & RATING OF PSVs SHALL BE DECIDED DURING DETAIL ENGINEERING.
6. PSV SHALL BE SUPPLIED WITH INLET AND OUTLET COMPANION FLANGE.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	
			REVISIONS		DRG. NO.

SECTION : OIL & GAS					**CLIENT** :	
	NAME	DATE	CHKD	DATE	**PROJECT** :	**MECON LIMITED**
DSGN						
DRWN						
APPROVED					**PSV**	DATASHEET NO: MEC/U999/05/28/M/001/DS/001 REV-0



TYPICAL GENERAL ARRANGEMENT

CONNECTING PIPELINE DETAILS:-

ANSI RATING (#)	: 600#
DESIGN PRESSURE (KG/CM² G)	: 92
OPERATING PRESSURE (KG/CM² G)	: **
DESIGN TEMPERATURE (°C)	: (−)29 to (+)65
OPERATING TEMPERATURE (°C)	: 0 TO +55
DESIGN FACTOR	: 0.5
OUTSIDE DIAMETER (MM)	: 323.8
THICKNESS (MM)	: 8.38
MATERIAL	: API 5L GR. X−70, PSL−2
SERVICE	: NATURAL GAS
DESIGN CODE	: ASME B 31.8

SCRAPPER TRAP SPECIFICATION :-

MECON'S SPECIFICATION NO. MEC/S/05/62/007 Ed.0 Rev0

ITEM NO./ NOZZLE NO.	DESCRIPTION	COMPONENT	ENDS/TYPES	DESIGN CODE	MINIMUM SPECIFIED MATERIAL	MATERIAL AS GIVEN BY THE BIDDER	NB/THICKNESS
1.	BODY(MAJOR BARREL)	PIPE	BW	API 5L	API 5L Gr.X−70/X−52,PSL 2	*	18"/*
2.	NECK(MINOR BARREL)	PIPE	BW	API 5L	API 5L Gr X−70, PSL 2	*	12"/8.38
3.	REDUCER	CONCENTRIC	BW, WELDED	MSS−SP−75	MSS−SP−75 Gr WPHY−70	*	18"x12"/*
4.	END CLOSURE	FORGED	QUICK OPENING	ASME SECTION VIII	ASTM A 105(CHARPY)/ASTM A 694 GR. F−70 (CHARPY)	*	18", 600#
N−1/N−8	DRAIN CONN.	WELDOLET/PIPE/FL	FL−WNRF	MSS−SP−97/B 16.5	A106 Gr.B(CHARPY)/ ASTM A105(CHARPY)	*	2"/S−80
N−2A/B	VENT (1 NO.)	WELDOLET/PIPE/FL	FL−WNRF	MSS−SP−97/B 16.5	A106 Gr.B(CHARPY)/ ASTM A105(CHARPY)	*	2"/S−80
N−3/N−7	KICKER/BY PASS CONN.	WELDOLET/PIPE/FL	FL−WNRF	MSS−SP−97/B 16.5	ASTM A106 Gr.B/ ASTM A105(CHARPY)	*	4"/S−XS
N−4.	PR. GAUGE (1 NO.)	WELDOLET/PIPE/FL	FL−WNRF	MSS−SP−97	ASTM A106 Gr B	*	2"/S−80
N−5.	Intrusive type pig Signaller	WELDOLET/PIPE/FL	FL−WNRF	MSS−SP−97/B 16.5	A106 Gr.B(CHARPY)/ ASTM A105(CHARPY)	*	2"/S−80
N−6.	CONNECTING FLANGE (1 NO.)	FLANGE	FL−WNRF	B 16.5	ASTM A694 Gr F−70 (CHARPY)	*	12"/8.38

NOTES :

* VENDOR TO INDICATE

** TO BE FURNISHED LATER

WELD NECK END THICKNESS OF MATCHING FLANGE (WNRF) FOR NOZZLE N7 SHALL SAME AS THAT OF CONNECTING PIPELINE THICKNESS.

NOTES:

1. ORIENTATION OF ALL NOZZLES IS INDICATIVE AND SHALL BE CONFIRMED DURING DRAWING APPROVAL STAGE.
2. THICKNESS OF BODY & REDUCER SHALL BE INDICATED BY MANUFACTURER BASED ON PIPELINE DESIGN CONDITIONS AND MANUFACTURING REQUIREMENTS. NECESSARY CALCULATIONS SHALL BE SUBMITTED TO MECON FOR REVIEW/ APPROVAL.
3. THICKNESS CAL. OF MAJOR BARREL AND REDUCER SHALL BE CALCULATED WITH 3MM CA AND 0.5 DESIGN FACTOR.
4. FLANGES – AS PER ASME B 16.5, 16.47A AS APPLICABLE.
5. HYDRAULIC TEST PR.=1.5 TIMES THE DESIGN PR., DURATION−1 Hr.
6. RADIOGRAPHY 100% ALL BUTT WELDED JOINTS.
7. BI−DIRECTIONAL SCRAPPER TRAP SHALL BE COMPATIBLE FOR ACCOMODATING LATEST ONLINE INSPECTION TOOL/ INTELLIGENT PIGGING (LONGEST).
8. PAINTING:−
   (i) SURFACE PREPARATION BY SHOT BLASTING AS PER GRADE SA 2 1/2 SWEDISH STD. SIS−055909.
   (ii) THREE COATS OF PAINT SHALL BE APPLIED WITH MINIMUM THICKNESS OF 300 MICRON (PERMISSIBLE THICKNESS IN EACH COAT SHALL BE 80−120 MICRON)
   (iii) FINAL SHADE OF PAINTING SHALL BE DECIDED DURING DRAWING APPROVAL STAGE.
9. CHARPY−V NOTCH TEST AND HARDNESS TEST SHALL BE CONDUCTED AS PER CLAUSE NO. 3.4 & 3.5 RESPECTIVELY OF MECON TS.
10. DOORLOCK OF QOC OF EACH SCRAPER TRAP SHALL HAVE A SAFETY RELIEF SYSTEM ALLOWING THE OPENING OF DOOR ONLY WHEN THERE IS NO PRESSURE IN THE TRAP.
11. QUICK OPENING CLOSURE SHALL BE OF HINGED TYPE AND INCLUDE SAFETY DEVICE TO PREVENT OPENING BEFORE DEPRESSURISING IN COMPLIANCE WITH ASME−SECTION VIII, DIV 1 UG−35(b) OF ASME BOILER AND PRESSURE VESSEL CODE.
12. MATCHING FLANGES(WNRF) FOR ALL NOZZLES SHALL BE PROVIDED EXCEPT FOR NOZZLES N−1 (A/B) FOR WHICH BLIND FLANGES(BLRF) ARE TO BE PROVIDED. ALL FLANGES/BLINDS SUPPLIED WITH SCRAPPER TRAPS SHALL HAVE SMOOTH FACE FINISH TO 125−250 AARH.
13. REINFORCEMENT PAD FOR SUPPORT FOR BARREL SHALL BE PROVIDED OF SAME MATERIAL AS PROVIDED FOR BARREL.
14. ALL NOZZLES SHALL HAVE A MINIMUM PROJECTION OF 200MM AND INTER DISTANCE BETWEEN NOZZLES SHALL BE MINIMUM 300MM.
15. PIG SIGNALLER AS PER DS No. : MEC/05/E5/DS−NIPS

NOZZLE DETAILS:

- N−1/N−8 – 2" DRAIN
- N−2A/B – 2" VENT
- N−3/N−7 – 4" KICKER/BYPASS LINE
- N−4 – 2" PRESSURE GAUGE
- N−5 – 2" Intrusive type pig signaller
- N−6 – 12" CONNECTING FLANGE

LEGEND:

SMLS – SEAMLESS, BW – BUTT WELDED,
SW – SOCKET WELDED, SWRF−SOCKET WELD RAISED FACE
FL−FLANGE, WNRF−WELDNECK RAISED FACE

FOR TENDER PURPOSE ONLY

IGGL

INDRADHANUSH GAS GRID LIMITED

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MECON LIMITED

REV	DESCRIPTION	BY	VERIFIED
0	–		

REV/SEC — CONCURRED BY

REFERENCES — DRG.NO.

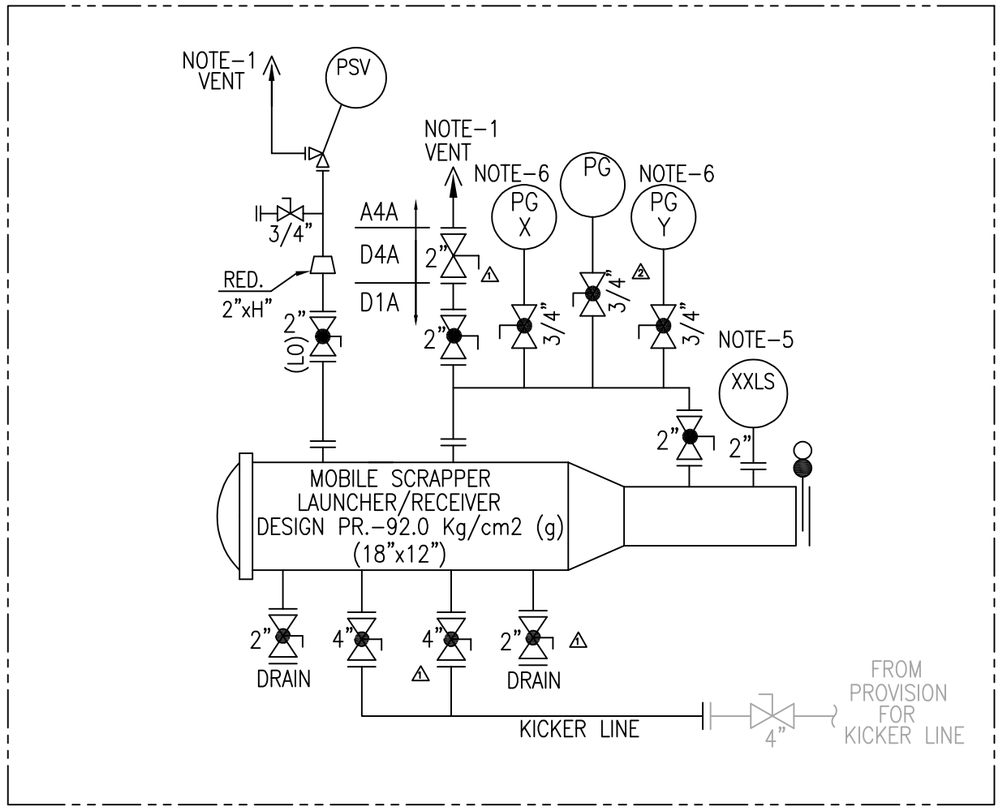
SECTION	OIL & GAS
LOCATION	NEW DELHI
DESIGNED	CSV
DRAWN	AM
CHECKED AND VERIFIED	AM
APPROVED	SIG Harsh Kumar
DATE	14.11.2024

NORTH-EAST GAS GRID

MOBILE BI-DIRECTIONAL SCRAPPER LAUNCHER/ RECEIVER, (18" X 12", 600#)

SCALE : NTS | SHEET 1 OF 1 | REV 2

DATASHEET NO.-MEC/23VC/05/28/M/001/DS/ST-002



MOBILE PIG LAUNCHER/RECEIVER

NOTES:

1. ALL VENTS SHALL BE LOCATED MIN. HEIGHT OF 3 MTR. ABOVE THE HIGHEST OPERATING LEVEL.
2. SCRAPPER LAUNCHER/RECEIVER SHALL BE SUITABLE FOR HANDLING INTELLIGENT PIGS.
3. SCRAPPER LAUNCHER/RECEIVER SHALL HAVE QUICK OPPENING CLOSURE.
4. SCRAPPER DOOR MECHANISM TO BE CONSTRUCTED SUCH THAT THE DOOR CAN NOT BE OPENED UNLESS SCRAPPER TRAP IS FULLY DEPRESSURISED.
5. INTRUSIVE TYPE PIG SIGNALLER.
6. PG-X & PG-Y SHALL HAVE A RANGE OF 0-1 KG/CM2(g) WITH A GAUGE SAVER.

PROCESS DATA

FLUID: NATURAL GAS(DRY)/RLNG FLOW: - MMSCMD (APPX.) OPER. PRESS.: - KG/CM2(G) DESIGN PRESS.: 92 KG/CM2(G) DESIGN CLASS: 600#	TEMPERATURE WORKING : 0°-55° C DESIGN : -29 TO 65°C

LINE LEGEND

- PROPOSED LINE A/G
- LINE A/G (OTHER'S SCOPE)

VALVE LEGEND

- BALL VALVE FLANGE END
- BALL VALVE BW END/UPTO 1 1/2" SW END.
- PLUG VALVE BW END/UPTO 1 1/2" SW END.
- PLUG VALVE FLANGE END
- GLOBE VALVE.

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INDRADHANUSH GAS GRID LIMITED

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MECON LIMITED

REV	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISION		
2	02.09.24		REVISED AS PER CLIENT COMMENT/ REQUIREMENT	UMAR	AKB
1	20.08.24		REVISED AS PER CLIENT COMMENT/ REQUIREMENT	UMAR	AKB

PIPELINE SCHEMATIC ROUTE DIAGRAM

REFERENCES | DRG.NO.

SECTION	OIL & GAS
LOCATION	DELHI
DESIGNED	UMAR
DRAWN	UMAR
CHECKED AND VERIFIED	AKB
APPROVED	SIG S.GUPTA
	DATE 02.09.24

ONGC FEEDER LINES UNDER NORTH EAST GAS GRID (PHASE-I P/L SECTION)

TYPICAL P&ID FOR MOBILE PIG LAUNCHER/RECEIVER FOR 12"NB PIPELINE

SCALE : NTS

DRG. NO. MEC/23VC/05/28/M/MP/0001 REV 2

REV / SEC	CONCURRED BY
	PIPING
	ELEC.
	INST.

	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT : NORTH -EAST NATURAL GAS PIPELINE GRID PROJECT
	ORDER NO. & DATE			PACKAGE NO.:05/51/23UU/IGGL/002A
	SUB-CONTRACTOR			PACKAGE NAME : BALL VALVE
	ORDER NO. & DATE			

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

SV : SUB VENDOR
MFR : MANUFACTURER
TPI : DESIGNATED THIRD PARTY INSPECTION AGENCY
H : HOLD
R : REVIEW
W : WITNESS

KEY TO SYMBOLS :

* : TO BE FILLED BY VENDOR
** : TEST TO BE PERFORMED, IF APPLICABLE

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*
1.	Visual
2.	Dimensional
3.	Fitment & Alignment
4.	Physical Test (Sample)
5.	Chemical Test (Sample)
6.	Ultrasonic Test
7.	Magnetic Particle Test (MPI)
8.	Radiography Test
9.	Dye Penetration Test
10.	Metallographic Exam.
11.	Welder's Qualification & Weld Procedure Test
12.	Approval of Test and Repair Procedure
13.	Heat Treatment
14.	Pressure Test
15.	Leakage Test
16.	Balancing
17.	Vibration Test
18.	Amplitude Test
19.	Sponge Test
20.	Dust/ Water Ingress Test
21.	Friction Factor Test
22.	Adhesion Test
23.	Performance Test/Characteristic Curve
24.	No Load/ Free Running Test
25.	Load/ Overload Test
26.	Measurement of Speeds
27.	Accoustical Test
28.	Geometrical Accuracy
29.	Repeatability and Positioning Accuracy
30.	Proving Test
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
34.	Internal Inspection Report
35.	Hardness Test
36.	Spark Test for Lining
37.	Calibration
38.	Safety Device Test
39.	Ease of Maintenance
40.	Fire Test (Type Test)
41.	Charpy V-Notch Test
42.	Operational Torque Test
43.	ENP (Electroless Nickel Plating) Execution
44.	Painting
45.	Anti-Static Test
46.	Hydrostatic DIB-1
47.	Functional Test
48.	Pneumatic DIB-1
49.	Cyclic Test
50.	Strip test

Code	*DOCUMENTS:*
D1.	Approved GA drawings
D2.	Information and other reference drg/ stamped drgs released for mfg.
D3.	Relevant catalogues
D4.	Bill of matl./Item no./ Identification
D5.	Matchmarks details
D6.	Line/ Layout diagram
D7.	Approved erection procedures
D8.	Unpriced sub P.O. with specification and amend-ments, if any
D9.	Calibration Certificate of all measuring instruments and gauges
D10.	X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS								
							Raw Material and In-Process Stage Inspection			Final Inspection/ Test by			Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	BALL Valve / Plug Valves		Refer MR/SOR	*	*	*	As per attached sheet 2 to 10								

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/23UU/05/28/M/001/QAP-002A

REV **0**

SHEET 1 OF 10

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by					MFR/SV	TPI	MECON	
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON						
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.01	Body	Material As per MR/ Alternate Material accepted by MECON			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6 **	6 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8 **	8 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.02	Closure/ Body Adapter/ Tail Piece	Material Manufacturer to indicate (to be approved by MECON)			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.03	Top Cover	Material Manufacturer to indicate (to be approved by MECON)			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6 **	6 **	-	-	-	-	Test Report	1. ASME B16.34, Annex-E 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. ASME B16.34, Annex-C 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8 **	8 **	-	-	-	-	Test Report	1. ASME B16.34 Annex-B 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	R	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	R	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by					MFR/SV	TPI	MECON	
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON						
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.04	Trunnion (for Trunnion Mounted Valves)	Material Manufacturer to indicate (to be approved by MECON)			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					43 **	43 **	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.05	Ball / PLUG	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by					MFR/SV	TPI	MECON	
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON						
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.06	Stem	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.07	Seats	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by					MFR/SV	TPI	MECON	
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON						
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	
1.08	Bolting Material (Studs & Nuts)	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	Alongwith thickness measurement for ENP Coating.
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.09	Assembled Valves				-	-	-	1,2	1,2	1,2	Report	1. D1 2. MECON's T.S.	H	H	W	
					-	-	-	3	3	3	Report		H	H	W	
					-	-	-	14	14	14	1. Report 2. Test Certificates	1. D1 2. MECON's T.S. 3. MECON's D.S. 4. API 6D Std./ BS EN 12266 (as applicable)	H	H	W	
					-	-	-	15	15	15	1. Report 2. Test Certificates	1. D1 2. MECON's T.S. 3. MECON's D.S. 4. API 6D Std./ BS EN 12266 (as applicable)	H	H	W	
								40	40	40	1. Report 2. Test Certificates	1. API 607/ API 6FA / BS EN ISO 10497 (as applicable) 2. MECON's T.S. 3. MECON's D.S.	R	R	R	
								42	42	42	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std. (as applicable)	H	H	W	
					-	-	-	37	37	37	Certificates		-	R	R	
					-	-	-	44	44	44	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. Manufacturer's Specification	H	W	R / W	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					-	-	-	45	45	45	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	W	
					-	-	-	46	46	46	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. (as applicable)	H	H	W	Applicable for TMBV
					-	-	-	47	47	47	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	W	Refer Note 3 of Table 2 of TS no. MEC/ TS / 05 / E5 / 002A
					-	-	-	48	48	48	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. (as applicable)	H	H	W	Applicable for TMBV
					-	-	-	49	49	49	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S.	H	H	W	
					-	-	-	50	50	50	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S.	H	H	W	Refer cl 21.0 of notes to MR
1.10	Complete documentation check and compilation							3	3	3	1. Final Report 2. Final Certificates	1. MECON's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	-	
1.11	Complete and compiled documentation check and dispatch clearance				-	-	-	3	3	3	1. Final Report 2. Final Certificates	1. MECON's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	-	H	
1.12	Actuator Tests				**As per Actuator Quality Assurance Plan (to be submitted by vendor for approval)**											

1) VENDOR shall establish approved WPS-PQR-WPQ for the weldings duly witnessed by TPIA .
2) Vendor shall do RT for Body adapter to PUP piece welding and RT report shall be reviewed by MECON & TPIA
3) Vendor shall do UT/RT for Bodt to Body adapter welding witnessed by TPIA

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR

QAP NO.: MEC/23UU/05/28/M/001/QAP-002A	REV **0**

CONTRACTOR		**QUALITY ASSURANCE PLAN**	PROJECT :
ORDER NO. & DATE		**FOR**	BID DOCUMENT NO. :
SUB-CONTRACTOR		STRUCTURAL AND MECHANICAL	ITEM NAME : PRESSURE SAFETY VALVE
ORDER NO. & DATE		EQUIPMENT	SPEC. NO.: MEC/TS/05/62/056, REV-01

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS
P : PERFORM

KEY TO SYMBOLS :

* : MFR/ CONTRACTOR - AS APPLICABLE
** : TEST TO BE PERFORMED, IF APPLICABLE

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*	*Code*	*Description*	*Code*	*Description*	*Code*	*DOCUMENTS:*
1.	Visual	18.	Amplitude Test	34.	Internal Inspection Report by Contractor	D1.	Approved GA drawings
2.	Dimensional	19.	Sponge Test	35.	Hardness Test	D2.	Information and other reference drg/ stamped drgs released for mfg.
3.	Fitment & Alignment	20.	Dust/ Water Ingress Test	36.	Spark Test for Lining	D3.	Relevant catalogues
4.	Physical Test (Sample)	21.	Friction Factor Test	37.	Calibration	D4.	Bill of matl./Item no./ Identification
5.	Chemical Test (Sample)	22.	Adhesion Test	38.	Safety Device Test	D5.	Matchmarks details
6.	Ultrasonic Test	23.	Performance Test/Characteristic Curve	39.	Ease of Maintenance	D6.	Line/ Layout diagram
7.	Magnetic Particle Test (MPI)	24.	No Load/ Free Running Test	40.	Fire Test (Type Test)	D7.	Approved erection procedures
8.	Radiography Test	25.	Load/ Overload Test	41.	Charpy V-Notch Test	D8.	Unpriced sub P.O. with specification and amend-ments, if any
9.	Dye Penetration Test	26.	Measurement of Speeds	42.	Operational Torque Test	D9.	Calibration Certificate of all measuring instruments and gauges
10.	Metallographic Exam.	27.	Accoustical Test	43.	ENP (Electroless Nickel Plating) Execution	D10.	X-Ray Reports
11.	Welder's Qualification & Weld Procedure Test	28.	Geometrical Accuracy	44.	Painting		
12.	Approval of Test and Repa Procedure	29.	Repeatability and Positioning Accuracy	45.	Anti-Static Test		
13.	Heat Treatment	30.	Proving Test	46.	Hydrostatic Double Block & Bleed Test		
14.	Pressure Test	31.	Surface Preparation	47.	Functional Test		
15.	Leakage Test	32.	Manufacturer's Test Certificates for bought-out items	48.	Pneumatic Double Block & Bleed Test		
16.	Balancing						
17.	Vibration Test	33.	IBR/ Other Statutory agencies compliance certificate				

EQUIPMENT DETAILS							INSPECTION AND TESTS										Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection						Final Inspection/ Test by									
							MFR		TPI		MECON		MFR		TPI		MECON				
1	2	3	4	5	6	7	8		9		10		11		12		13		14	15	16
	SAFETY RELIEF VALVE (PSV)	-	-	-			1,2,3	P	1,2,4	W	-		1,2,3	P	1,2,3	W	1,2,3	R	1,2,3,4,5,8,14,15	D1,D3,D8,D10	47
							4,5	P	5,41	W	-		14,15	P	14,15	W	14,47	R	31,32,34,41,44,47	ASME SEC-VIII,DIV-1	100%
							8,41	P	8	R			31,32	P	44,47	W				MECON TS	
													44,47	P	31,32	R				APPROVED DS	

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO.

REV 0

SHEET 1 OF 1

*** To be field by party as per index above & approved by MECON**

LIST OF COMMISSIONING SPARES AND ACCESSORIES FOR START-UP & COMMISSIONING FOR SCRAPPER TRAPS, QOC, PIG SIGNALLERS, PSV & QOEC

Sl. No.	Item No.	Description	Quantity
1.			
2.			
3.			
4.			
5.			

NOTES:

1. Bidder to indicate in the table above, the start-up and commissioning spares required for Scrapper Traps, QOC, Pig Signallers, PSV & QOEC other than those already mentioned in Material Requisition.
2. Bidder to include the cost of above start-up and commissioning spares for Scrapper Traps & Pig Signallers in the quoted price for Scrapper Traps, QOC, Pig Signallers, PSV & QOEC.

To be filled, signed and stamped by Bidder.

Bidder's Seal **Signature of Bidder**

LIST OF SPARES AND ACCESSORIES FOR TWO YEARS OF NORMAL OPERATION FOR FOR SCRAPPER TRAPS, QOEC, PIG SIGNALLERS, PSV & QOEC

Sl. No.	MR Item No.	Description	Quantity
1.			
2.			
3.			
4.			
5.			

NOTE:

1. **Bidder to indicate in the table above, the spares & accessories for two years normal operation for scraper traps, QOC, pig signallers, PSV & QOECs as per price schedule Format / Performa.**
2. **Bidder to quote must for item mentioned above in SL. No. 1 separately as per price schedule Format / Performa.**

To be filled, signed and stamped by Bidder.

Bidder's Seal **Signature of Bidder**

Summary of PTR Documents

1.	2.	3.	4.
MR Sl. No.	Purchase Order no. & dtd. supplied in past 7 years from Bid Due Date (Enclose copy of the same)	Corresponding IRN / Completion letter /Dispatch Clearance / Proof of supply with document no. & dtd. (Enclose copy of the same)	Maximum Size along with corresponding highest Rating Supplied
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			