



## **BAGHJAN – MADHUBAN PIPELINE PROJECT (ASSAM)**

### **BID DOCUMENT FOR PROCUREMENT OF**

**ASSORTED VALVES**

**IFB NO. CPG0097P19**

**International COMPETITIVE BIDDING**

**VOLUME II OF II**



**PREPARED AND ISSUED BY  
MECON LIMITED**

(A Govt. of India Undertaking)  
Delhi, India

**CONTENTS LIST – ASSORTED VALVES****OIL & GAS SBU, DELHI**

Page 1 of 1

Sl. No.	Document Title / Description	Document / Drawing No.	Revision		Total Pages	Tender Page Nos.
			No.	Date		
1.	MATERIAL REQUISITION - BALL VALVES	MEC/23U1/05/28/M/001/S002	0	20.09.18	06	4-9
2.	NOTES TO MR	MEC/23U1/05/28/M/001/S002	1	20.09.18	04	10-13
3.	STANDARD TECHNICAL SPECIFICATION FOR BALL VALVES	MEC/TS/05/21/002	Ed.-1; Rev.-1	—	20	15-34
4.	TECHNICAL SPECIFICATION FOR PLUG VALVES	MEC/TS/05/62/003	Rev-2	—	14	35-48
5.	TECHNICAL NOTES FOR GATE & GLOBE VALVES	—	—	—	07	49-55
6.	TECHNICAL SPECIFICATION FOR GAS OVER OIL ACTUATORS and HOV DATASHEET	MEC/ TS / 05 / E5 / 002	Rev.-1	—	18	56-73
7.	TECHNICAL SPECIFICATION FOR PACKING TRANSPORTATION AND HANDLING OF VALVES	MEC/TS/05/21/061	Ed.-1; Rev.-0	20.09.18	07	74-80
8.	DATA SHEETS FOR BALL VALVES	MEC/23U1/05/28/M/001/DS/BV/01 to 11	0	20.09.18	11	82-92
9.	DATA SHEETS FOR PLUG VALVES	MEC/23U1/05/28/M/001/DS/PV/01 to 5	0	20.09.18	5	93-97
10.	DATA SHEETS FOR GLOBE VALVES	MEC/23U1/05/28/M/001/DS/GV/01	0	20.09.18	1	98
11.	SPARES LIST (START-UP & COMMISSIONING) - ASSORTED VALVES	MEC/23U1/05/28/M/001/S002/CS	0	20.09.18	01	99
12.	SPARES LIST (2 YEARS NORMAL OPERATION) - ASSORTED VALVES	MEC/23U1/05/28/M/001/S002/OS	0	20.09.18	01	100
13.	QAP FOR BALL VALVES	MEC/23U1/05/28/M/001/S002/QAP-002	1	—	10	102-111
14.	QAP FOR GAS OVER OIL ACTUATOR Actuator	MEC/05/E5/STD./QAP/GOV	0	—	01	112
15.	QAP FOR Hydraulic Actuator	MEC/05/E5/STD./QAP/HOV	0	—	01	113

**Client :  
OIL INDIA  
LTD.****Project :  
BAGHJAN –  
MADHUBAN PIPELINE  
PROJECT****Document No. :  
MEC/23U1/05/28/M/001/S002/CONTENTS****Rev.  
No.  
0****Date :  
20.11.18**

# **MATERIAL REQUISITION**

# MATERIAL REQUISITION – BALL VALVES



OIL & GAS SBU, DELHI

Page 1 of 6

## 1.0 SCOPE OF SUPPLY

The scope of supply includes Ball Valves / Plug Valves / Globe Valves conforming to design standard API-6D /ISO 15761/ BS 1873 and meeting other technical requirements as specified in bid document (i.e. as per MR, Data Sheets & Technical Specifications), getting approvals from Purchaser/ Consultant, procurement of raw material, manufacturing, testing & inspection, packing & forwarding & transportation to Assam as per tender terms & conditions. The details of valves to be supplied are in Table 1 below:

**Table-1**

**GROUP-A: CARBON STEEL BALL VALVES - Design Standard: API-6D, MECON's specification no. MEC/TS/05/21/002 and data sheets given below :-**

MR Item No.	Size NB, mm (inches)	ANSI Pressure Rating	Opening	Ends	Stem Extension	Valve Body Construction	Valve Operation	Data Sheet No.	Qty. (nos.)	Remarks
A.1	750 (30")	300 #	FB	BW	YES	Fully welded Body	GOV	MEC/23U1/05/28/M/001/DS/BV/01	01	Remote Operated
A.2	750 (30")	300 #	FB	BW	YES	Fully welded Body	HOV	MEC/23U1/05/28/M/001/DS/BV/02	04	----
A.3	750 (30")	300 #	FB	BW	NO	Fully welded Body	HOV	MEC/23U1/05/28/M/001/DS/BV/03	02	----
A.4	600 (24")	300 #	FB	BW	NO	Fully welded Body	GOV	MEC/23U1/05/28/M/001/DS/BV/04	02	One Valve with Auto-Closure facility
A.5	600 (24")	300 #	FB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	GOV	MEC/23U1/05/28/M/001/DS/BV/05	01	Valve with Auto-Closure facility
A.6	600 (24")	300 #	RB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	HOV	MEC/23U1/05/28/M/001/DS/BV/06	03	----
A.7	400 (16")	300 #	RB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	HOV	MEC/23U1/05/28/M/001/DS/BV/06	02	----
A.8	300 (12")	300 #	FB	BW	NO	Fully welded Body	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/BV/07	02	----
A.9	300 (12")	300 #	RB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/BV/08	01	----
A.10	300 (12")	300 #	FB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	GOV	MEC/23U1/05/28/M/001/DS/BV/05	01	----
A.11	250 (10")	300 #	RB	BW	YES	Fully welded Body	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/BV/09	10	----
A.12	250 (10")	300 #	RB	BW	NO	Fully welded Body	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/BV/10	04	----
A.13	250 (10")	300 #	RB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/BV/08	04	----
A.14	250 (10")	300 #	RB	BW	NO	Fully welded Body	GOV	MEC/23U1/05/28/M/001/DS/BV/11	02	----
A.15	100 (4")	300 #	RB	BW	NO	Fully welded Body	Manual Lever Operated	MEC/23U1/05/28/M/001/DS/BV/10	07	----
A.16	100 (4")	300 #	RB	Flanged (RF)	NO	Either Welded Body or 2/3 Piece Bolted	Manual Lever Operated	MEC/23U1/05/28/M/001/DS/BV/08	06	----

<b>Client :</b> OIL INDIA LTD.	<b>Project :</b> BAGHJAN – MADHUBAN PIPELINE PROJECT	<b>Document No. :</b> MEC/23U1/05/28/M/001/S002	<b>Rev. No.</b> 0	<b>Date :</b> 20.11.18
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# MATERIAL REQUISITION – BALL VALVES



OIL & GAS SBU, DELHI

Page 2 of 6

## GROUP – B: CARBON STEEL PLUG VALVES - Design Standard: API-6D, MECON's specification no. MEC/TS/05/62/003, Rev-2 and data sheets given below:-

MR Item No.	Size NB, mm (inches)	ANSI Pressure Rating	Pattern	Ends	Stem Extension	Installation	Valve Operation	Data Sheet No.	Qty. (nos.)	Remarks
B.1	250 (10")	300 #	Regular	BW	YES	UG	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/PV/01	10	----
B.2	250 (10")	300 #	Regular	BW	NO	AG	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/PV/02	05	----
B.3	250 (10")	300 #	Regular	Flanged (RF)	NO	AG	Manual with Gear Box	MEC/23U1/05/28/M/001/DS/PV/03	05	----
B.4	100 (4 ")	300 #	Short	BW	NO	AG	Manual Lever Operated	MEC/23U1/05/28/M/001/DS/PV/04	05	----
B.5	100 (4 ")	300 #	Short	Flanged (RF)	NO	AG	Manual Lever Operated	MEC/23U1/05/28/M/001/DS/PV/05	02	----

## GROUP – C: CARBON STEEL GLOBE VALVES -Design Standard : ISO:15761/ BS 1873

Item No.	Size NB, mm (inches)	ANSI Pressure Rating	Ends	Stem Extension	Valve Operation	Data Sheet No.	Qty. (nos.)	Remarks
C.1	100 (4")	300 #	Flanged (RF)	No	Manual	MEC/23U1/05/28/M/001/DS/GV/01	04	----

**Note:** Proposed Delivery Location / Destination is Duliajan, Assam or any other location within radius of 50 KM.

### LEGEND

**FB** = Full Bore  
**RB** = Reduced Bore  
**BW** = Butt Welded  
**RF** = Raised Face (Flanged)  
**GOV** = Gas Over Oil Powered Actuated Valve  
**HOV** = Hydraulic Operated Valve  
**UG** = Under Ground  
**AG** = Above Ground

## 2.0 DOCUMENTS & DATA REQUIREMENTS

2.1 The table hereunder specifies the quantities and the nature of the documents to be submitted by the Package Contractor to Purchaser.

2.1.1 The documents required at the inquiry stage and to be included in the bid are listed under column A of clause 2.6 below.

2.1.2 The documents required after award of the Contract and subject to the written approval of the Purchaser are listed under column B of clause 2.6 below.

2.1.3 The final and certified documents are listed under column C of clause 2.6 below.

Client :  
OIL INDIA  
LTD.

Project :  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

Document No. :  
MEC/23U1/05/28/M/001/S002

Rev. No.  
0

Date :  
20.11.18

## MATERIAL REQUISITION – BALL VALVES



OIL & GAS SBU, DELHI

Page 3 of 6

- 2.2 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.
- 2.3 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.
- 2.4 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 tender 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.
- 2.5 The successful Bidder/ Supplier shall submit a prerecorded Training CDs/DVDs and it shall comprise the basic theories and fundamentals, related standards, design parameters, scanned copies of approved drgs./docs., manufacturing & inspection methods, operating & maintenance instructions and other relevant details. The CDs/DVDs shall have to be self-contained, user-friendly using animation/videos and other multimedia techniques.
- 2.6 **THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTS COMPLYING FULLY WITH THE TENDER REQUIREMENTS ARE RECEIVED BY THE PURCHASER.**

Client :  
OIL INDIA  
LTD.

Project :  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

Document No. :  
MEC/23U1/05/28/M/001/S002

Rev. No.  
0

Date :  
20.11.18

# MATERIAL REQUISITION – BALL VALVES



OIL & GAS SBU, DELHI

Page 4 of 6

Item	Documents & Data	A	B		C	
		No. of Copies	No. of Copies	Required Date (from FOI)	No. of Copies	Required Date (before Dispatch)
1.	Completed Data Sheets	3	3	2 Weeks	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.	Fire Safe certificate as per API 6FA & API 607	3	-	-	-	-
5.	Progress Report	-	3	2 Weeks + monthly	3	2 Weeks
6.	Catalogues / References	3	-	-	3	With final technical file
7.	GA drawings + Sectional drawings + Material specification + Unit weight. + Unit volume + Package dimensions per unit (all above per valve and actuator)	3	3	2 Weeks	3	With final technical file
8.	"Way of Shipping" as per Notes to Material Requisition	-	3	7 days	-	-
9.	Packing / shipping list with weights and dimensions	-	3	2 Weeks before shipping	3	2 Weeks (with final technical file)
10.	Design calculations for pressure containing parts	-	3	2 Weeks	3	2 Weeks (with final technical file)
11.	Welding details for the pups	-	3	2 Weeks	3	2 Weeks (with final technical file)
12.	Torque curves + Torque calculations	3	3	2 Weeks	3	2 Weeks (with final technical file)
13.	Bill of materials (on drawings)	-	3	2 Weeks	3	2 Weeks (with final technical file)
14.	Recommended spare parts list (for erection and commissioning)	3	-	-	3	2 Weeks (with final technical file)
15.	Recommended spares parts list (for 2 years operation)	3	-	-	3	2 Weeks (with final technical file)

Client :  
OIL INDIA  
LTD.

Project :  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

Document No. :  
MEC/23U1/05/28/M/001/S002

Rev. No.  
0

Date :  
20.11.18

# MATERIAL REQUISITION – BALL VALVES



OIL & GAS SBU, DELHI

Page 5 of 6

16.	Welding procedure specification and records WPS / PQR	-	3	2 Weeks	3	2 Weeks (with final technical file)
17.	QA / QC program	3	3	2 Weeks	3	2 Weeks (with final technical file)
18.	Inspection and Test Procedures along with Quality Assurance Plan	3	3	2 Weeks	3	2 Weeks (with final technical file)
19.	Test Reports	-	-	-	3	2 Weeks (with final technical file)
20.	NDE / NDT Reports	-	-	-	3	2 Weeks (with final technical file)
21.	Heat Treatment Reports	-	-	-	3	2 Weeks (with final technical file)
22.	Hydrotest and air test report	-	-	-	3	2 Weeks (with final technical file)
23.	Maintenance and operating manuals	-	-	-	3	2 Weeks (with final technical file)
24.	Installation instructions & Site inspection procedure	-	-	-	3	2 Weeks (with final technical file)
25.	Material certificate as per EN 10204 - 3.2	-	-	-	3	2 Weeks (with final technical file)
26.	Painting system description & procedure	3	3	2 weeks	3	2 Weeks (with final technical file)
27.	List of sub-vendors with their scope	3	3	2 weeks		
28.	Training CDs/DVDs covering design, operation & maintenance	-	-	-	3	2 Weeks (with final technical file)
29.	Final technical file, preliminary copy for approval (in soft & hardcopy)	-	3	2 weeks before dispatch/ shipping	-	-
30.	Final technical file (hardcopy)	-	-	-	3	Before shipping
31.	Final technical file (softcopy – .pdf - Acrobat files in CD ROM / DVD)	-	-	-	6	

**Client :**  
OIL INDIA  
LTD.

**Project :**  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

**Document No. :**  
MEC/23U1/05/28/M/001/S002

**Rev. No.**  
0

**Date :**  
20.11.18



## MATERIAL REQUISITION – BALL VALVES



OIL & GAS SBU, DELHI

Page 6 of 6

### NOTES

- 1) In case of e-bids, only single copy of documents / drawings / data under column A need be uploaded.
- 2) Durations in column B (required date) are weeks after FOI or as indicated in Table.
- 3) Durations in column C (required date) are weeks after document approval or as indicated in Table. Due date of each document may be proposed.
- 4) The above documents & data requirements shall also be supplemented by all requirements of clause 10.0 of MECON's T.S. No. MEC/TS/05/28/002.
- 5) For documents & data requirements of GAS OVER OIL ACTUATORS valve actuators refer specification no. MEC/TS/05/E5/002 (Technical specification for GAS OVER OIL ACTUATORS).

**Client :**  
OIL INDIA  
LTD.

**Project :**  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

**Document No. :**  
MEC/23U1/05/28/M/001/S002

**Rev. No.**  
0

**Date :**  
20.11.18

## NOTES TO MR



OIL & GAS SBU, DELHI

Page 1 of 4

### 1.0 Introduction

Oil India Limited intend to procure Ball, Plug and Globe valves for BAGHJAN – MADHUBAN PIPELINE PROJECT (ASSAM) project as listed in the MR.

### 2.0 Price Evaluation Basis: As per Bidder's Eligibility Criteria (BEC)

### 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:

"The Successful Vendor shall propose minimum four (4) nos. of TPIA's from the below listed TPIA's along with QAP submission. OIL/MECON shall approve any one TPIA out of the four (4) nos. proposed TPIA's. The Successful Vendor shall appoint the approved TPIA for inspection purpose and mention name of the approved TPIA in QAP.

- i. Det Norske Veritas (DNV)
- ii. BVQI
- iii. Technische Ulierwachungs Verein (TUV)
- iv. Lloyds
- v. RITES
- vi. I.R.S.
- vii. Tuboscope Vetco

Apart from inspection by TPIA, inspection shall also be performed by MECON / OIL's delegate, as set out and specified in the codes and particular documents forming this MR.

Vendor must note that stage wise inspection for complete fabrication, testing including the raw material inspection to be carried out.

Client : OIL INDIA LTD.	Project : BAGHJAN – MADHUBAN PIPELINE PROJECT	Document No. : MEC/23U1/05/28/M/001/S002/ NOTES	Rev. No. 1	Date : 20.11.18
-------------------------------	---	---	------------------	--------------------

## NOTES TO MR



OIL & GAS SBU, DELHI

Page 2 of 4

- 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 Ball 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 m<sup>3</sup>) 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** 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.
- 14.0** 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 & Notes to MR
  - Datasheets
  - Technical Specification
  - Codes and Standards
  - Vendor's Standards

**Client :**  
OIL INDIA  
LTD.

**Project :**  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

**Document No. :**  
MEC/23U1/05/28/M/001/S002/  
NOTES

**Rev.**  
**No.**  
1

**Date :**  
20.11.18

## NOTES TO MR



OIL & GAS SBU, DELHI

Page 3 of 4

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

- 15.0** Bidder/supplier shall submit hard copies of all documents/ drawings to MECON, as listed in columns B & C of table for document and data requirement under Clause 2.0 of MR and also in all technical specifications. The date of receipt of these documents/ drawings at MECON shall be deemed as the date of submission. If any documents/ drawings require re-submission due to any error/ deficiency noticed during review/ approval stage, in that event the additional time required by the bidder/supplier to get the revised document/ drawing reviewed/approved by MECON shall be solely to bidder's/supplier's account and in no case the bidder/ supplier shall be entitled for any time or cost benefit.
- 16.0** Bidders 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 shall be kept in either partial or full open condition for entire test duration and test medium will be non-corrosive water. The vendor shall be liable for repair/ replacement of valve if found faulty during site hydro test at his risk & cost. All cost for associated activities like packaging, transportation etc. in connection to repair / replacement of valve shall be borne by the bidder. No claim shall be entertained by the Owner / Purchaser in this regard.
- 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/OIL engineers as per company rules. OIL/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.

<b>Client :</b> OIL INDIA LTD.	<b>Project :</b> BAGHJAN – MADHUBAN PIPELINE PROJECT	<b>Document No. :</b> MEC/23U1/05/28/M/001/S002/ NOTES	<b>Rev.</b> <b>No.</b> 1	<b>Date :</b> 20.11.18
--------------------------------------	--	--	--------------------------------	---------------------------

## NOTES TO MR



OIL & GAS SBU, DELHI

Page 4 of 4

**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 Ball 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.

Client :  
OIL INDIA  
LTD.


Project :  
BAGHJAN –  
MADHUBAN PIPELINE PROJECT

Document No. :  
MEC/23U1/05/28/M/001/S002/  
NOTES

Rev.  
No.  
1

Date :  
20.11.18

# **TECHNICAL SPECIFICATION**

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 1 of 20
			REVISION : 1
			EDITION : 1


# 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 :

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.	Page 2 of 20
		MEC/TS/05/21/002	REVISION : 1
			EDITION : 1

### 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	



MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 3 of 20
			REVISION : 1
			EDITION : 1


**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

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 4 of 20
			REVISION : 1
			EDITION : 1

## **C O N T E N T S**

<b>Sl.No.</b>	<b>Description</b>
1.0	SCOPE
2.0	REFERENCE DOCUMENTS
3.0	MATERIALS
4.0	DESIGN AND CONSTRUCTION
5.0	INSPECTION AND TESTS
6.0	EXTENT OF INSPECTION & TESTING
7.0	TEST CERTIFICATES
8.0	PAINTING, MARKING AND SHIPMENT
9.0	SPARES AND ACCESSORIES
10.0	DOCUMENTATION
11.0	GUARANTEE
FIGURE-1	VENT, DRAIN & SEALANT INJECTION DETAILS

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.	Page 5 of 20
		MEC/TS/05/21/002	REVISION : 1
			EDITION : 1

## 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
ASME B 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

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 6 of 20
			REVISION : 1
			EDITION : 1

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

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.	Page 7 of 20
		MEC/TS/05/21/002	REVISION : 1
			EDITION : 1


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<sub>10</sub>.
- 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.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.	Page 8 of 20
		MEC/TS/05/21/002	REVISION : 1
			EDITION : 1

- 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.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.	Page 9 of 20
		MEC/TS/05/21/002	REVISION : 1
			EDITION : 1

- 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.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 10 of 20
			REVISION : 1
			EDITION : 1

- 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  $\geq$  DN 200 mm (8") and RO valves of nominal size  $\geq$  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.



MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 11 of 20
			REVISION : 1
			EDITION : 1


- 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 1/2" 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.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 12 of 20
			REVISION : 1
			EDITION : 1

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:

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 13 of 20
			REVISION : 1
			EDITION : 1

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

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 14 of 20
			REVISION : 1
			EDITION : 1

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 :

- The valve shall be subjected to at least 100 Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.
- 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.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 15 of 20
			REVISION : 1
			EDITION : 1

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.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 16 of 20
			REVISION : 1
			EDITION : 1

## 7.0 **TEST CERTIFICATES**


7.1 Manufacturer shall submit the following certificates:

- Mill test certificates relevant to the chemical analysis and mechanical properties of the materials used for valve construction as per the relevant standards.
- Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
- Test reports on radiograph and ultrasonic inspection.
- Test report on operation of valves conforming to clause 5.1.11, 5.1.12 and 5.1.13 of this specification.
- 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**

- 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.
- Manufacturer shall indicate the type of corrosion resistant paint used, in the drawings submitted for approval.
- 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.
- 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.
- All sealant lines and other cavities of the valve shall be filled with sealant before shipment.

MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 17 of 20
			REVISION : 1
			EDITION : 1

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.



MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 18 of 20
			REVISION : 1
			EDITION : 1

- 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.



MECON LIMITED REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
TITLE	BALL VALVE	DOCUMENT NO.  MEC/TS/05/21/002	Page 19 of 20
			REVISION : 1
			EDITION : 1

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.

TITLE

**BALL VALVE**

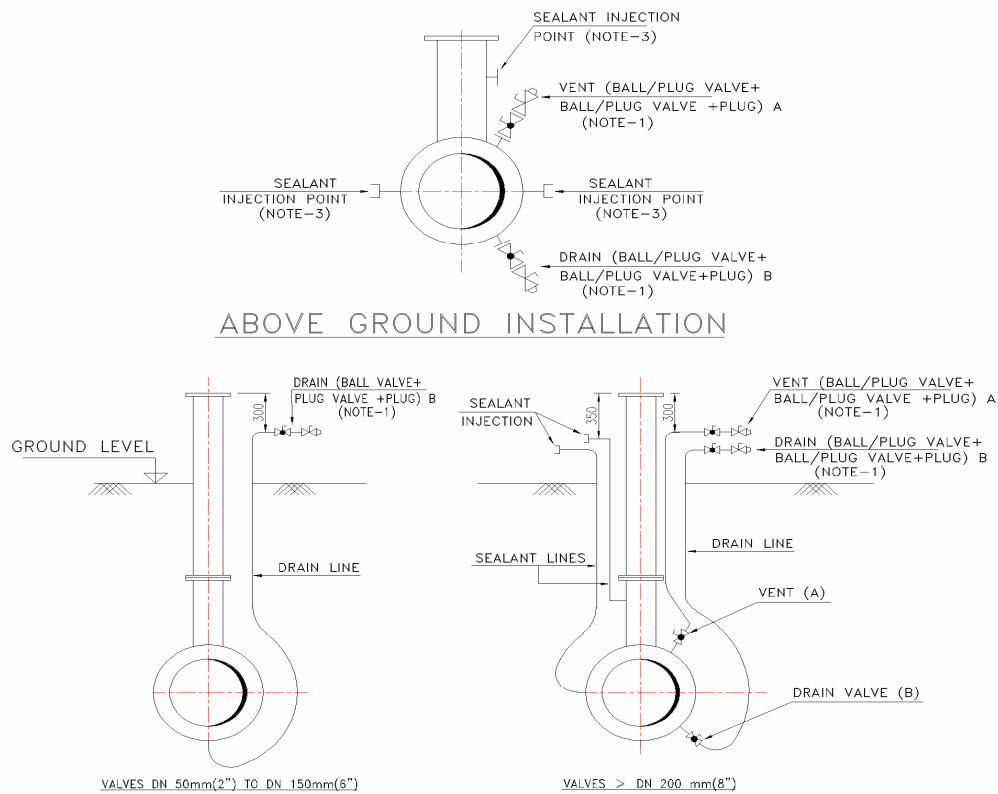
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**MEC/TS/05/21/002**

Page 20 of 20




REVISION : 1

EDITION : 1



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  $\geq$  2")


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

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 1 of 13

## C O N T E N T S

<u>Sl.No.</u>	<u>Description</u>	<u>Page No.</u>
1.0	SCOPE	2
2.0	REFERENCE DOCUMENTS	2
3.0	MATERIALS & TEST PROCEDURES	3
4.0	DESIGN & CONSTRUCTION	4
5.0	INSPECTION & TESTS	7
6.0	EXTENT OF INSPECTION & TESTING	9
7.0	TEST CERTIFICATES	9
8.0	PAINTING, MARKING & SHIPMENT	10
9.0	SPARES & ACCESSORIES	10
10.0	DOCUMENTATION	11
11.0	GUARANTEE	12

<b>PREPARED BY :</b>  <b>Gurdeep Singh</b>  <b>Date</b>	<b>CHECKED BY :</b>  <b>A.K. Sarkar</b>  <b>Date</b>	<b>APPROVED BY :</b>  <b>A.K. Johri</b>  <b>Date</b>
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<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 2 of 13

## 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

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 3 of 13

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%.

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

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 4 of 13

- 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


<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 5 of 13

- 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.



<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 6 of 13

- 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 :
- 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).
  - 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.
  - Sealant injection lines shall be extended and terminated adjacent to the valve operator in manner as indicated in (b) above.
  - 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.
  - Outer casing of stem extension shall have 3/8" or 1/2" NPT plugs at the top and bottom, for draining and filling with oil to prevent internal corrosion.
- 4.17 **Operating Devices**
- 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.
  - 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.
  - Operating device shall be designed for easy operation of valve under maximum differential pressure corresponding to the valve rating.

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 7 of 13

- 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>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 8 of 13

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

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 9 of 13

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.

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 10 of 13

## 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.

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 11 of 13

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.

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 12 of 13

- 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.

<b>MECON LIMITED</b> Delhi	PROCESS & PIPING DESIGN SECTION	TECHNICAL SPECIFICATION FOR PLUG VALVES	
TECHNICAL SPECIFICATION NO. : MEC/TS/05/62/003		REV-2	Page 13 of 13

## 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.



# **TECHNICAL NOTES FOR GATE & GLOBE VALVES**

## **TECHNICAL NOTES FOR GATE & GLOBE VALVES**

### **1.0 General**

- 1.1 Valves shall be designed, manufactured, tested, inspected, marked and supplied as per the specifications, applicable design standards & codes and manufacturing standards (latest editions) as specified.
- 1.2 Material test certificates (Physical property, Chemical composition & Heat treatment report) of the pressure containing parts shall be furnished for the valves supplied. Material test certificates of other parts shall also be furnished for verification during inspection.
- 1.3 For heavy valves, provision for lifting shall be made by way of lugs, eyebolts, or similar standard devices.
- 1.4 Unless otherwise stated, all flanged valves shall have end flanges integral with valve body. Weld on flanges are not acceptable. Flange finish shall be serrated finish 250 AARH (250 AARH to 500 AARH) or 125 AARH (125 AARH to 250 AARH) or 63 MRH (32 AARH to 63 AARH) as per valve specification sheet.
- 1.5 For all weld end valves, with bevel end as per ANSI B 16.25, the bevel contour shall be as follows:

Material	Wall Thickness	Weld Contour
Carbon Steel (Except Low Temp. Carbon Steel)	Upto 22 mm > 22 mm	Figure 2 Type A Figure 3 Type A
Alloy Steel	Upto 10 mm	Figure 4
Stainless Steel & Low Temp Carbon Steel	> 10 mm & upto 25 mm > 25mm	Figure 5 Type A Figure 6 Type A

- 1.6 If an overlay weld-deposit is used for the body seat ring, seating surface, the seat ring base material shall be at least equal to the corrosion resistance of the materials of the shell.
- 1.7 For valve body/ bonnet, forging is acceptable where castings are specified but not vice versa.
- 1.8 Material of construction of yoke shall be as a minimum equivalent to body/ bonnet material.
- 1.9 Stem shall be forged or machined from a forged bar. Castings are not permitted except integral stem.
- 1.10 Stellite/ hard facing by deposition shall have minimum 1.6mm thickness. Renewable seat rings shall be seal welded.
- 1.11 Face to face dimension of flanged valves shall conform to ANSI B 16.10 to the extent covered. For valves not covered in the ANSI specification, Contractor shall furnish certified dimensional drawings.

1.12 Flange dimensions of steel, alloy steel and stainless steel flanged valves shall conform to ANSI B 16.5 for sizes up to 24" and API 605 for size 26" and above.

1.13 Flange dimensions for cast iron flanged valves shall conform to ANSI B 16.1 for size up to 24" class 125 and API 605 with flat face for sizes greater than 24".

1.14 Unless otherwise mentioned, various valves should conform to following standards / codes.

SW gate valves (1 1/2" and below)	:	API 602
SW Globe valves (1 1/2" and below)	:	BS 5352
Flanged gate valves	:	API 600 & API-6D
Flanged Globe valves	:	BS 1873

1.15 Wherever stellite is specified, it means facing of seat and disc are welded by Cr-Co-W alloy. Stellite facing shall maintain minimum hardness of 375 BHN at high temperature.

1.16 All weld end valves shall have bevel ends as per ANSI B 16.25.

1.17 If an overlay weld deposit is used for the body seat ring or seating surface, the seat ring base material shall be at least equal to corrosion resistance of the material of the shell.

1.18 By Pass

- Unless otherwise noted, by-pass requirement for gate valves shall be under -

150 Class	:	on sizes 26" and above
300 Class	:	on sizes 16" and above
600 Class	:	on sizes 6" and above
900 Class	:	on sizes 4" and above
1500 Class	:	on sizes 4' and above
2500 Class	:	on sizes 3" and above

- By-pass valve shall be a globe valve.

- Contractor shall supply the by-pass valve duly tested and fitted to the main valve. By-pass attachment to the main valve body shall not be screwed. All fillet welds for by-pass installation shall be 100% examined by DP / MP test.

1.19 Spiral wound bonnet gasket is to be provided with inner / outer ring except when encapsulated gaskets type body bonnet joints are employed. Outer ring may be avoided in case of non-circular spiral wound gasket used in 150# valve provided the outermost layer of spiral touches the bolts ascertaining the centering.

1.20 Pressure Test

- Valves covered under API codes shall be tested as per API 598 unless otherwise specified in the applicable valve code.

- Valves covered under BS code shall be tested as per BS 6755 unless otherwise specified in the applicable valve codes.

1.21 For all austenitic stainless valves, inter-granular corrosion test shall have to be

conducted as per following: -

- ASTM A 262 Practice 'E' with acceptance criteria of "60 mils / year (max.)".  
OR
- ASTM A 262 practice 'E' with acceptance criteria of "No cracks as observed from 20X magnification U & Microscopic structure to be observed from 250X magnification".

1.22 When specifically asked for high temperature application of some grades of austenitic stainless steel (like SS 309, 310, 316, 316H etc.) ASTM A 262 practice 'C' with acceptance criteria "15 MILS/YEAR" shall have to be conducted. When testing is conducted as per practice 'E' photograph of microscopic structure shall be submitted for record.

1.23 For the IGC test as described in 1.16.1 & 1.16.2 two sets of samples shall be drawn from each solution treatment lot, one set corresponding to highest carbon content and other set corresponding to the highest rating/ thickness.

## 2.0 **OPERATION**

2.1 Valves shall be supplied with gear operations based on the following requirements:

Valve Types	Class	Size Requiring Gear Operation
Gate & Diaphragm Valves	150	14" and larger
	300	14" and larger
	600	12" and larger
	900	6" and larger
	1500	3" and larger
	2500	3" and larger
Globe Valves	900	6" and larger
	1500	3" and larger
	2500	3" and larger

2.2 Gear operator shall be as under with position indicators for open / close positions, with limit stops.

For Gate / Globe / Diaphragm Valves	Totally enclosed bevel gear in grease case with grease nipples/ CHECK
-------------------------------------	---

2.3 Gear operators shall be so designed to operate effectively with the differential pressure across the closed valve equal to the cold non-shock pressure rating.

2.4 Hand wheel diameter shall not exceed 750 mm and effort to operate shall not exceed 35 kg at hand wheel periphery. In case these limits cannot be satisfied for any valve, a gear operation shall be provided.

## 3.0 **INSPECTION AND TESTING**

3.1 All the mandatory shop tests and inspection required by the respective data sheet and applicable standards & codes etc. shall be carried out.

3.2 The extent of inspection by shall be as under. However the exact extent with hold

points shall be decided during review of the inspection plan to be submitted to Company as part of the post-order documentation.

3.3 Valves under NACE should follow the requirements of MR-01-75

**FORGED VALVES**

- Visual and dimensional inspection
- Review of material test certificates
- Any mandatory or supplementary test
- Hydrostatic test of all valves
- Strip check on 1% of total ordered quantity of valves at random to verify compliance with specification requirements.

**CAST STEEL VALVES**

- Visual and dimensional inspection
- Review of material test certificates
- Review of radiographs / radiographic reports and reports of any other NDT tests, wherever applicable as per data sheets
- Any mandatory or supplementary tests
- Hydrostatic test 100% for body
- Strip check on 1% of total ordered quantity of valves at random to verify compliance with specification requirements.

3.4 For motor /actuator operated valves, functional / operational checks as per the requirements of the specifications shall be made on each valve.

4.0 **RADIOGRAPHY OF CAST VALVES**

4.1 When specifically not mentioned in individual data sheets, valves castings shall undergo radiographic examination as specified hereunder:

<b>MATERIAL</b>	<b>RATING</b>	<b>SIZE RANGE</b>	<b>RADIOGRAPHY</b>
All	150#	24" and below	Nil
	150#	26" and above	100%
	300#	16" and below	Nil
	300#	18" and above	100%
	600# and above	All sizes	100%

4.2 Radiography procedure areas of casting to be radiographed shall be as per ANSI B 16.34 and acceptance criteria shall be as per ANSI B 16.34 Annexure — B. However for areas of casting to be radiographed for types of valve not covered in ANSI B 16.34, Contractor shall enclose details of areas to be radiographed in line with ANSI B 16.34.

5.0 **IBR VALVES**

5.1 All valves described as "IBR Valves" shall be in accordance with the latest IBR (Indian Boiler Regulations) as well as the other requirements specified in the specification.

5.2 For BW / SW end carbon steel valves under "IBR", the chemical composition shall conform to the following:

Carbon (Max.) : 0.25%

Others (S, B, Mn) : As per IBR

Above composition is not applicable for non-IBR valves.

5.3 For all “IBR Valves”, test certificate in form III-C shall be furnished duly signed by IBR inspection authority or an IBR approved representative.

5.4 All valves shall be painted red.

## 6.0 **MARKING**

6.1 Valves markings, symbols, abbreviations, etc. shall be in accordance with MSS-SP-25 or the standard referred to in the specifications as applicable Manufacturer’s name, valve size and rating, material designation, nominal size, direction of flow (if any) etc. shall be integral on the body.

6.2 Each valve shall have a corrosion resistant tag giving size and valve tag/code no. securely attached on the valve body.

6.3 Paint or ink used for marking shall not contain any harmful metal or metal salts such as zinc, lead or copper which may result in corrosive attack on heating.

6.4 Carbon steel valves shall be painted with two coats of red oxide zinc chromate primer.

6.5 All alloy steel high temp valves shall be painted with heat resistant silicone paint suitable for intended temperature.

## 7.0 **DESPATCH**

7.1 Valves shall be dry, clean and free from moisture, dirt and loose foreign material of any kind.

7.2 Valves shall be protected from rust, corrosion and any mechanical damage during transportation, shipment, and storage.

7.3 Rust preventative applied on machined surfaces to be welded shall be easily removable with a petroleum solvent or shall not be harmful to welding.

7.4 Each end of valves shall be protected as follows:

Flange Face	:	Wood, plastic or metal cover
Beveled End	:	Wood, plastic or metal cover
SW / Screwed End	:	Plastics cap

7.5 End protectors to be used on flange faces shall be attached by at least three bolts or wires through bolt holes and shall not be smaller than the outside diameter of the flange. Plastic caps for SW / Screwed and valves shall be press fit type.

7.6 End protectors to be used on beveled ends shall be securely attached.

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<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 1 of 15

# TECHNICAL SPECIFICATION

FOR


GAS OVER OIL ACTUATORS

***SPECIFICATION NO.: MEC/ TS / 05 / E5 / 002***



**ELECTRICAL & INSTRUMENTATION  
(OIL & GAS SBU)  
MECON LIMITED  
DELHI 110 092**



<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 2 of 15

## 1.0 SCOPE

This specification covers the minimum requirements for design, manufacture, inspection and testing of quarter turn hydraulic actuators suitable for operation of ball valves in pipeline/piping systems handling hydrocarbons in gaseous phase.

## 2.0 REFERENCE DOCUMENTS

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

- |    |               |  |
|----|---------------|--|
| a) | ASME B 31.8   | - Gas transmission and distribution piping System  |
| b) | ASME B 16.5   | - Steel Pipe Flanges and Flanged Fittings  |
| c) | ASME Sec VIII | - Boiler and Pressure Vessels Code & Sec IX  |
| d) | MSS-SP-101    | - Quarter-Turn Valve Actuator Attachment – Flange and Driving Component Dimensions and Performance Characteristics |
| e) | SSPC-VIS-1    | - Steel Structures Painting Council Visual Standard  |

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


## 3.0 MATERIALS

Actuators shall be supplied with SS 316 stainless steel trim. Materials of all parts and seals shall be compatible with the operating hydraulic fluid. All materials shall be suitable for the ambient conditions indicated in the Actuator Data Sheets.


## 4.0 GAS OVER OIL ACTUATOR

4.1 The basic requirements for Actuators are as follows:

- Actuator shall be quarter turn Gas over Oil type.
- Actuator torque shall be minimum 1.25 times the maximum valve's break torque required at full rated differential pressure of valve.

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 3 of 15

- c) Vendor shall indicate actuator model no., valve torque and actuator torque in a tabular form along with the quotation. Vendor shall submit the same for Buyer's review.
  - d) Pneumatic connections shall be of 3/8" NPT (F) size as minimum. Pneumatic tubing shall be SS 316L, 3/8" OD x 0.049" WT minimum exact size shall be decided based on actual requirements.
  - e) Valve with actuator shall be suitable for installation in horizontal pipeline.
  - f) All Pneumatic tube fittings shall be of SS 316L and of SWAGELOK / PARKER make.
  - g) All accessories as applicable shall be mounted on the SS back plate, which in turn shall be mounted on the actuator.
  - h) Actuators shall be equipped with adjustable stoppers for opening and closing of the valves. At normal operating conditions these stoppers at the actuators shall be limiting the opening and closing of the valves.
- 4.2 The actuator local control panel shall be weatherproof to IP-65. The logic components / tubing inside the panel shall be of SS 316 L materials as minimum. All the electrical components mounted inside the panel shall be intrinsic safe and shall be certified by a statutory body like UL/BASIEFA/FM/CENENEC and PTB etc.,
- 4.3 Proximity type switches shall be provided for indication of valve position. These shall be mounted in intrinsic safe enclosure and necessary certificate has to be provided.
- 4.4 The Control logic shall enable the following (Refer enclosed typical sketch):
- a) Local and Remote operation of the Valve.
  - b) Local Function shall include open/close facilities.
  - c) Remote function shall facilitate remote closure and opening of the valve (without any manual intervention if all the process interlocks are met). In case electrical signal to solenoid valve fails, the valve shall remain in the stay put position
  - d) Manual local hydraulic operation of the valve, with hand pump, in case of non-availability of the pneumatic (gas).
  - e) High differential pressure switch shall inhibit the remote operation of the valve, when the differential pressure becomes high. In this case, it shall be possible to operate the valve locally. Also, provision shall be kept to bypass the diff. pressure switch in case not required and valve shall operate normally at any differential pressure.
  - f) Close command (or open command) shall be inhibited during valve opening (or valve closing) and be made effective only after 100% opening (or closing) is achieved.
- 4.5 Hydraulic cylinders shall be sized so that the Actuator/operator shall be capable of minimum,


<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 4 of 15

two open & close operations in the event of loss of line pressure.

- 4.6 Vendor shall supply gas filter regulators to derive power gas pressure to required level for the operation of the logic. Actuator sizing shall be based on minimum gas pressure as indicated in data sheet.
- 4.7 Solenoid valves shall be mounted inside the actuator control panel for the remote open/close operation of the valve actuators. Solenoid Valves shall be intrinsically fire safe and necessary certificate has to be certified.
- 4.8 All equipment and accessories shall be tropicalised and provided with anticorrosion protection, suitable for use in corrosive atmosphere.
- 4.9 All material shall be new, clean and free from rust, pits and obvious defects.
- 4.10 Steel castings, if any, of actuators shall be radiographically examined as per the procedure and acceptance criteria specified in ANSI B16.34, Annexure - B.
- 4.11 The range (minimum/max.) of opening/closing timings for gas over oil-actuated valves shall be as per datasheet.
- 4.12 Material for Studs shall be ASTM A193, Grade B7 and Nuts material shall be ASTM A194 Grade 2H.
- 4.13 All equipment's and valves shall be coated with anticorrosive paints for a corrosive, near shore Environment. Vendor in compliance with the written procedures recommended by the Manufacturer shall prepare his own coating procedures including surface preparation and Application of coating and curing. Vendor's painting/coating system shall be submitted along With the bid for Buyer's review and approval.
- 4.14 Vendor shall provide the following potential free contacts for PURCHASERs use.
  - a. Local/Remote selector switch in LOCAL position
  - b. Local/Remote selector switch in REMOTE position
  - c. High Differential Pressure
  - d. Valve OPEN indication
  - e. Valve CLOSE indication

All the potential free contacts and the REMOTE OPEN & CLOSED Commands shall be provided at a terminal block in the actuator control panel. Suitable provision for double compression cable entry/exit shall also be provided.


All the Solenoid valves/ switches shall be suitable for operation of 24V DC only(to be provided by client)

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 5 of 15

## **5.0 HYDRAULIC ACTUATOR (MANUALLY ACTUATED)**

### **DESIGN AND CONSTRUCTION**


- 5.1 Hydraulic actuator shall be of rotary vane mechanism type or double acting scotch yoke mechanism type with pistons and shall maintain the selected valve position fully open or closed with pressure equalized.
- 5.2 Actuator body shall be designed and all body joints shall be in accordance with ASME Section VIII, Division.
- 5.3 Actuator shall be suitable for direct mounting on the ball valves without changing the standard top works of the valve and shall have the capability to be mounted or removed from the valve when the valve is in service.
- 5.4 All pressure and load carrying components in the actuator shall be designed to withstand the maximum output thrust without affecting valve performance.
- 5.5 Actuator shall be sized considering the break-away thrust corresponding to maximum differential pressure of valve ANSI Rating required at the valve stem to open and close the valve A factor of safety of 1.25 shall be considered in the actuator design. Due correction factor shall be applied for the temperature and pressure.
- 5.6 Actuator maximum thrust shall be limited such that the allowable stress values of valve stem is not exceeded during valve operation.
- 5.7 Actuator – valve interface shall meet the applicable requirements of MSS-SP-101. To assure geometrically accurate valve/actuator alignment, a centering ring as required may be provided.
- 5.8 Actuator shall be capable of opening or closing the valves within the operating time indicated in the Actuator Data Sheet and. Provision shall be made for slower actuation during maintenance and field testing activities.
- 5.9 Actuator shall be provided with valve position switch/indicator which shall clearly show whether the valve in open, close or in partially open position.
- 5.10 Mechanical stops shall be provided to limit the actuator travel independently from any valve stops.
- 5.11 Threading connection shall be NPT as per ASME B 1.20.1 and flange connection shall be as per ASME B 16.5. The tubing, fitting and valves shall be SS 316 stainless steel. All the fittings should be of dielectric type. All tubing shall be properly supported and shielded from damage by a suitable protective cover.

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 6 of 15

- 5.12 Each actuator shall be provided with a manual hydraulic module incorporating a positive displacement piston pump, directional control valve, hydraulic reservoir, level indicator and pressure relief. In addition, by-pass for high speed operation shall also be provided. This manual hydraulic pump module shall be mounted as an integral component of actuator.
- 5.13 Hydraulic reservoir required to be provided as a part of the manual hydraulic pump module shall be manufactured from 316 stainless steel and be fitted with internal weir /baffles to prevent return oil channeling directly to pump suction, level gauge with isolating valves, inspection/cleaning cover and vent/breather.
- 5.14 Positive displacement hand pump to be provided as a part of the manual hydraulic pump module shall eliminate cavitations or sucking air. It shall be possible to stroke the hand-pump at any speed without drawing a vacuum into the pumping chamber. The hand pump shall be provided with an individual suction filter, block valves, pressure gauge, relief valve and check valve.
- 5.15 Hydraulic fluid used shall be oil based and shall have a cleanliness level of NAS 1638, Class 6. The actuator shall be supplied filled with hydraulic fluid approved by Purchaser.
- 5.16 Actuator and its accessories shall be suitable for outdoor installation and shall be provided with weather proof enclosures as per NEMA 4X or equivalent.
- 5.17 All compartments and housing containing electrical devices such as switches, etc. shall be intrinsic fire safe suitable for Zone- 2, group IIA/IIB, Temp. Class T3 as per IEC/IS.
- 5.18 Actuators shall be provided with limit switches for open and close positions. Limit switch shall be of proximity type with NAMUR design. Limit switch shall be provided with integral junction box having 2 no. of ½” NPT F cable entries. One cable entry shall be plugged. Flying leads shall not be acceptable. Contact type shall be DPDT type of rating 2A @ 24 VDC. Two no.of potential free NO contacts shall be provided at AV cabinet for open and close status of the valve.
- 5.19 All mounting accessories needed for installing the actuator and its accessories are in manufacturer's scope of supply.
- 5.20 The interconnecting cabling, interconnecting pipe work between the actuator and the manual hydraulic module, adapters, tubing, cable glands, junction box as required are in manufacturer's scope of supply.

## **6.0 INSPECTIONS AND TESTING**


- 6.1 The actuator Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes at his Works, prior to shipment to valve Manufacturer's works.

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 7 of 15

Such inspection and tests shall be but not limited to the following:

- a) All actuators shall be visually inspected.
- b) Dimensional check shall be carried out as per the Purchaser approved drawings.
- c) Chemical and mechanical properties as per relevant materials standards and this specification shall be checked.
- d) Complete actuator housing with internals including the open/close hydraulic circuits of all actuators shall be subjected to a hydrostatic pressure test by applying 1.5 times the actuator design pressure for a minimum period of 2 hours. Chart recorder shall monitor pressure. No leakage shall be permitted during the hydrostatic test.
- e) Actuator functional test shall be carried out by mounting the actuator on a test rig, and applying the hydraulic fluid pressure. The actuator shall be successfully stroked five times for open and close by suitably applying the hydraulic fluid pressure through hand provided. Actuator position indication shall be checked for correct operations during the test.
- f) Non-destructive examination of individual actuator material and components consisting of but not limited to castings, forgings, plate and assembly welds shall be carried out by the Manufacturer. As a minimum, the following shall be carried out as applicable
  - g) All casting of pressure containing parts shall be radio graphically examined as per ASTM E-94 and E-186/E-280 or E-446 as applicable, at quality level 2-2T. Category A, B or C defects shall not exceed the severity level for Class 2. Category D, E, F or G defects shall not be accepted.
    - ii) All forgings shall be ultrasonically examined to ASTM E-609. Quality 1 will be the minimum level of acceptance.
    - iii) All machined surfaces shall be liquid penetrate examined as per ASTM E-165. Surface discontinuities shall not be acceptable.
    - iv) Sealing areas within the actuator body shall be completely inspected by magnetic particle methods in accordance with ASTM E-709. Surface discontinuities shall not be acceptable.
- h) Valve/Actuator Assembly Test


After testing of individual actuators has been completed, the actuators shall be mounted on valves. Integrated valve and actuator tests shall be carried out at the Valve Manufacturer's

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 8 of 15

Works, in compliance with the requirements stated in Purchaser Specification for Ball Valves enclosed with the material requisition/purchase order.

- 6.2 Purchaser reserves the right to perform stage wise inspection and witness tests as indicated in Cl. 6.1 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's Inspector relieve the Manufacturer of his responsibility for material, design, quality or operation of the actuators. 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.
- 6.3 Gas Over Oil Actuator shall be mounted on the valve and tested as follows:  
(For Buried valves stem extension shall be installed before testing)
- Cycle (open and shut) each valve with its actuator, at least five (5) times to ensure smoothness of operation. Valve/Operator shall be adjusted and tested for 100% opening and closing at actuator stoppers. It shall be tested for both Local/Remote operations.
  - Apply the actual differential pressure as given in the data sheet, across the valve and check the valve operation. Valve operation should not be jerky or binding. This shall be repeated at least 3 times and shutdown time noted at minimum supply pressure.
  - The actuator shall be adjusted to ensure that the opening and closing times is within limits as per data sheets.
  - The electrical signal to the solenoid valves on the actuator control panel shall be disconnected and valve shall be tested for stay put conditions.
  - Test shall be witnessed by Purchaser or their representatives.
  - Final testing and approval made by Purchaser's representative inspector shall not relieve the manufacturer from his own responsibilities, guarantees and contract obligations.
  - The torque required to open and close the valve shall be measured and a curve produced considering various valve positions from 0° to 90° at 15° intervals. This should be done for three opening and three closing cycles without internal pressure and three opening cycles and three closing cycles with maximum differential pressure.

#### 6.4 EXTENT OF INSPECTION AND TESTING

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 9 of 15

All actuators shall be tested in accordance with the requirements of Section 6.0 of this specification.

## 6.5 TEST CERTIFICATES/REPORTS

Manufacturer shall submit the following certificates:

- Mill test certificates relevant to the chemical analysis and mechanical properties of the materials used for the actuator pressure containing parts as per the relevant standards and specifications.
- NDT reports for radiography, ultrasonic, magnetic particle and liquid penetrant inspection.
- Test report on operation of actuators including operating time.
- Test report on hydrostatic test of actuators.
- Test report on actuator/valve assembly tests.
- All other actuator test reports and certificates as required by this specification.

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

## 7.0 PAINTING AND MARKING


Actuator surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint suitable for marine/industrial environment as indicated in the Actuator Data Sheet. Surface preparation shall be carried out by shot blasting to SP-6 in accordance with "Steel Structures Painting Council-Visual Standard SSPC-VIS-1". Manufacturer shall indicate the type of corrosion resistant paint used in the drawings submitted for approval.

7.1 All actuators shall be marked as per Manufacturer's standard and shall have a permanently attached stainless steel plate with the following, as a minimum, details:

- Tag Nos.
- Manufacturer's Name
- Actuator Type, Model No., Serial No.
- Suitable for mounting on Valve \_\_\_" Size, \_\_\_ ANSI Rating Ball Valve
- Area Classification


7.2 All threaded and flanged opening shall be suitably protected to prevent entry of foreign material. The actuator shall be supplied pre-assembled.




<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 10 of 15

**DATA SHEET for GAS OVER - OIL ACTUATORS FOR BALL VALVES**

1. Actuator Manufacturer : BY VENDOR
2. Specification for Gas Over Oil Actuator : MEC/ TS / 05 / E5 / 002
3. Actuator Type : On-Off
4. Tag No. : -----
5. Line No. : -----
6. Service : Wet Natural Gas
7. Vendor to furnish after sizing the actuator, the filled in torque Table no-2
8. Actuator Shut-off Pressure : As per the Table-1
9. **Process Conditions**
  - Power Gas : Wet Natural Gas
  - Gas Temperature : As per Table-1
  - Line Gas Pressure : As per Table-1
  - Molecular Weight : As per Attached Sheet
  - Cp/Cv : As per Attached Sheet
  - Compressibility Factor : As per Attached Sheet
- 10.. Power Gas Feed Connection from main line : ¾" SW
11. Actuator remote operation (For open and close) : Required
12. Actuator Feed Gas :
  - a) Line gas
  - b) N<sub>2</sub> Bottles
  - C) Oil


<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 11 of 15

- |     |  |   |   |
|-----|--|---|---|
| 13. | Valve Position Limit Switch  | : | Required (SPDT contact for open and SPDT Contact for close position separately)             |
| 14. | Local/ Remote selector switch and its status contact   | : | Required (shall be wired up to junction box as per circuit diagram)                         |
| 15. | Pneumatic limit valves and solenoid, pilot valves to shut-off gas supply to Actuator when valve reaches one of its end positions | : | Required  |
| 16. | Self retaining system for retaining momentary open or close signals in the control circuit                                       | : | Required  |
| 17. | Electrical conduit connection (cable entries to junction box for purchaser's cable)  | : | 1" NPT  |
| 18. | Operating voltage for<br>a) Solenoid Valves<br>b) Relays   | : | 24V D.C. $\pm$ 10%  |
| 19. | Contact rating for<br>a) Limit Switches<br>b) L/R Switch (Status)  | : | 2A at 24V D.C.  |
| 20. | Pad lock with L/R Switch   | : | Required  |
| 21. | Enclosure for<br>a) Actuator   | : | Certified weatherproof as per IP-55   |
|     | b) Electrical items like solenoid valves, junction boxes, relays, cable glands   | : | Certified weatherproof to IP55 & Explosion proof certified for Class 1, Div. 2 Gr. C & D T3 |
| 22. | Area Classification  | : | NEC (Class 1 Div. 2 Gr. C & D T3)/equiv   |
| 23. | Material of construction for all tubing,   | : | SS 316  |

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 12 of 15

Valves, piping and fittings etc.

- |     |  |   |   |
|-----|--|---|---|
| 24. | Make & Model No. of Actuator                                 | : | By Vendor                                     |
| 25. | Accessories Required   | : | Required as per Specification                 |
| 26. | Manual/ Hydraulic Override                                   | : | Required as per Specification                 |
| 27. | Time required for full opening/<br>Closing of the ball valve | : | 2–3 sec. per inch. Nominal<br>valve port Dia. |


<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 13 of 15

**TABLE-1**

**ITEM : GAS OVER – OIL BALL VALVE ACTUATORS**

<b>Sl. no</b>	<b>Tag No.</b>	<b>Size/ Class</b>	<b>Type of Valve</b>	<b>Line No.</b>	<b>Gas Temp (°C)</b>		<b>Line Gas Pressure (kg/cm<sup>2</sup>g)</b>		<b>Delta P Shut Off (kg/cm<sup>2</sup>g)</b>	<b>Location</b>
					<b>Min</b>	<b>Max</b>	<b>Min</b>	<b>Max</b>		
		*	*	-	-29	65	-	-	49	

\*As per MR.

<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 14 of 15


**TABLE-2**

**ITEM : GAS OVER OIL BALL VALVE ACTUATORS**

Sl. No.	Tag No.	Data from Ball Valve Vendor for (@ Max. Diff. Press.)			Ball Valve Torque Figure with a safety Factor of 1.25		Actuator Generated Torque at 10 Kg/cm2g regulated pressure (Note-1)		Model Selected
		Break Torque (Nm)	Running Torque (Nm)	Max Allowable Valve Stem Torque (Nm)	Break Torque (Nm)	Running Torque (Nm)	Break Torque (Nm)	Running Torque (Nm)	
1.0	As per MR.								
2.0									
3.0									

**NOTE :**

1. THESE FIGURES SHALL BE USED AS BASIS FOR TESTING THE ACTUATOR PERFORMANCE DURING FACTORY TESTING THE ACTUATOR ACCEPTANCE WOULD BE CARRIED OUT AFTER VERIFYING SUCCESSFUL TESTING COMPLETE BALL VALVE WITH ACTUATOR ASSEMBLY.
2. ALL TORQUE FIGURES MUST BE IN Nm.
3. Opening / Closing time shall be achieved at max. Design Differential pressure across the valve & actuator set at pressure 15 kg/cm2(g) (approx.). However, the actuator shall open/close the valve at actuator set pressure of 10 kg/cm2(g) at max. Design Differential pressure and without timing restriction.

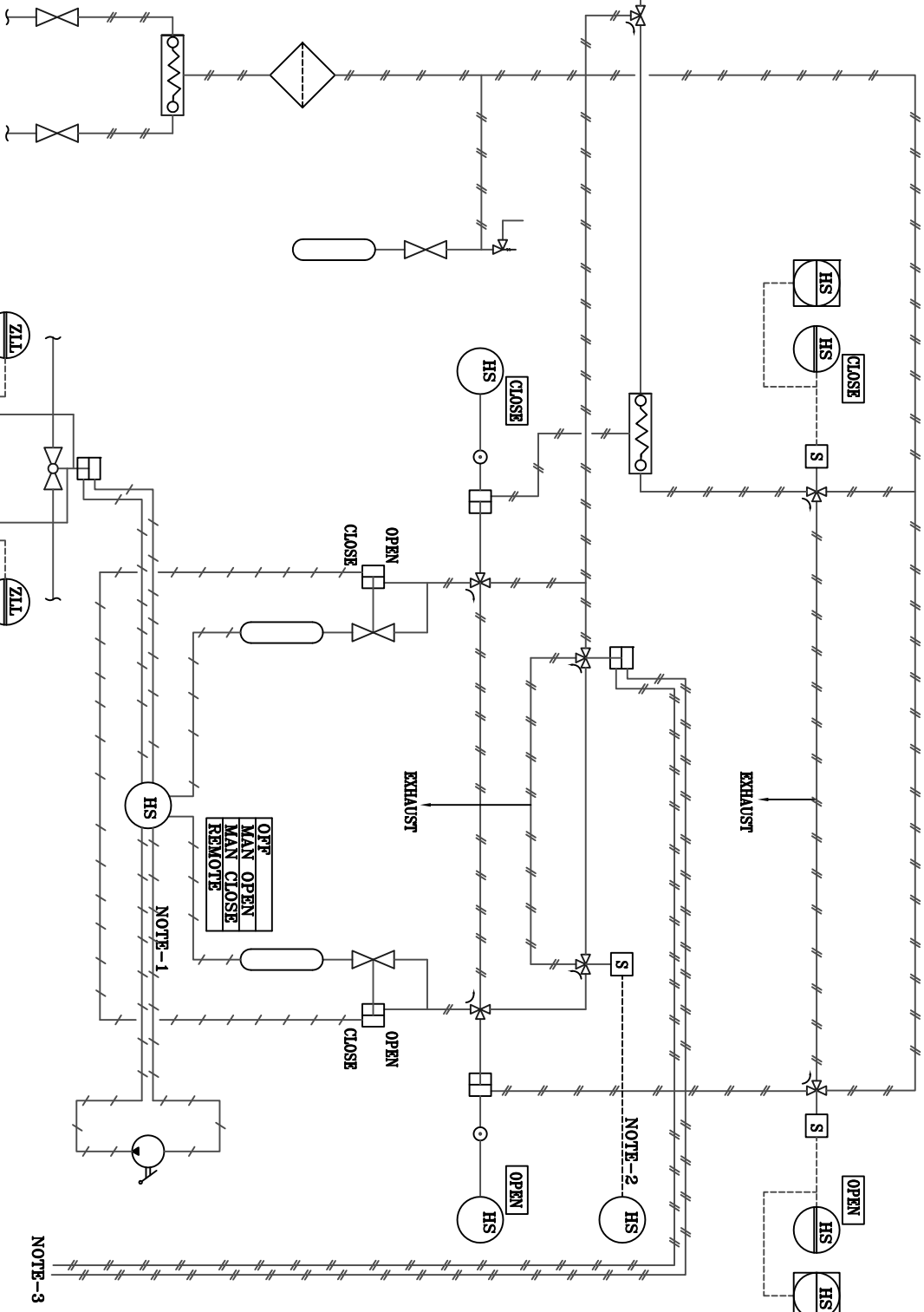
<b>MECON LIMITED NEW DELHI</b>	<b>INSTRUMENTATION SECTION</b>	<b>T.S. NO.: MEC/ TS / 05 / E5 / 002</b>	
<b>TITLE</b>	<b>GAS OVER OIL ACTUATORS</b>	<b>REV 1</b>	Page 15 of 15

### Gas Composition

Natural Gas composition- in % (Vol/Vol.)

- a) Methane- 92.83
- b) Ethane- 3.10
- c) Propane- 1.23
- d) i-Butane- 0.23
- e) n-Butane- 0.30
- f) i-Pentane- 0.10
- g) n-Pentane-0.08
- h) Hexane-0.14
- i) Nitrogen- 0.77
- j) Carbon dioxide- 1.22

Considerably wet gas & also contain water vapour.



LEGEND :-

- 1.) ~~—~~ ~~—~~ ~~—~~ PNEUMATIC SIGNAL
- 2.) ~~—~~ ~~—~~ ~~—~~ ELECTRICAL SIGNAL
- 3.) ~~—~~ ~~—~~ ~~—~~ HYDRAULIC SIGNAL

NOTES:

1. TO THE-IN FOR THE UPSTREAM/DOWNSTREAM ACTUATION GAS.
2. TO THE-IN FOR THE UPSTREAM/DOWNSTREAM PRESSURE TAP-OFF.
3. LOCAL / REMOTE SELECTOR SWITCH WITH POTENTIAL-FREE CONTACT.

[illegible]

## **PHILOSOPHY FOR AUTO-CLOSURE OF VALVES**

The valve shall be designed with Auto closure facility in case of pressure drops below specified value in order to prevent gas leakage due to damage in pipeline.

Three nos. Pressure switches shall be provided and the valve shall close in event of pressure drop indication by 2 out of 3 Pressure Switch.

On auto-closure, valve needs to be opened manually at site.

The set point of pressure for auto-closure shall be communicated during detailed engineering. However, it shall be field adjustable.

Facility for bypassing the auto closure (through manual valve) at site shall be provided. In that case, valve shall operate as a normal on-off remote operated valve.

The range of pressure switch shall be communicated during detailed engineering. However, it may cover entire pipeline operating pressure range.


Note : The above philosophy is applicable to valve actuators having auto closure facility and as indicated against respective MR item nos.



TYPICAL DATA SHEET FOR HYDRAULIC ACTUATOR			
GENERAL	1	SERVICE	WET NATURAL GAS
ACTUATOR	1	TYPE	HYDRAULIC ACTUATOR, MANUALLY OPERATED
	2	MIN. GAS PRESSURE FOR ACTUATOR SIZING	**
	3	SUPPLY PRESSURE: MIN/NOR/MAX.	*
	4	POWER GAS SUPPLY CONNECTION	*
	5	TUBING MATERIAL	SS 316
	6	TUBING SIZE: PNEUMATIC/HYDRAULIC	*/ * 1/2" O.D. MINIMUM.
	7	FILTER REGULATOR	REQUIRED
	8	VALVE POSITION INDICATOR	OPEN/CLOSE
	9	MANUAL OVERRIDE	REQUIRED
	10	FAILURE POSITION	FAIL IN LAST POSITION
	11	PAINTING	AS PER PAINTING SPECIFICATION
	12	LOCAL CONTROL PANEL	REQUIRED
	13	CONTROL PANEL MATERIAL	SS 316
	14	LOGIC/TUBING COMPONENTS	SS 316 (MINIMUM)
	15	TUBE FITTINGS	SS 316
	16	PANEL ENCLOSURE CLASS	IP-66
	17	GAS STORAGE & HYD. CYLINDER CAPACITY	
	18	ACCESSORIES	
	19	POSITION SWITCHES	REQUIRED FOR BOTH OPEN AND CLOSED POSITIONS
	20	SOLENOID VALVE	*
	21	ADJUSTABLE STOPPER FOR ACTUATOR	REQUIRED FOR BOTH OPENING & CLOSING
	22	STEM EXTENSION	*
VALVE POSITION SWITCH	1	SWITCH TYPE	PROXIMITY TYPE
	2		
	3	CONTACT RATING	*
	4	CABLE ENTRY (JUNCTION BOX)	1/2" NPT (F) (2 NOS.)
	5	SWITCH QUANTITY	TWO
	6	ENCLOSURE MATERIAL	SS 316
	7	ENCLOSURE CLASS	NEMA 4X (NOTE-1)
	8	CERTIFICATION	REQUIRED
	9	CERTIFICATION AGENCY	UL/FM/BASEEFA OR EQUAL
PROCESS DATA	1	FLUID	WET NATURAL GAS
	2	FLOW RATE MIN/ NOR. / MAX MMSCMD	*
	3	PRESSURE DROP @ NORMAL FLOW (KPBA)R(G)	*
	4	OPERATING TEMPERATURE °C	5 TO 50
	5	OPERATING PRESSURE MIN./NOR./MAX BAR(G)	*
	6	DESIGN TEMPERATURE °C	-29 TO +65 °C
	7	DESIGN PRESSURE Kg/cm2g	49
	8	DIFFERENTIAL PRESSURE Kg/cm2g	49
	9	DENSITY @ NOR. FLOW / MOLECULAR WEIGHT	*
	10	VISCOSITY CP	*
	11	SPECIFIC HEAT RATIO (CP/CV) SPECIFIC HEAT RATIO (CP/CV)	*

\* Vendor to specify

\*\* Actuator shall be sized considering max. Design Differential pressure across the valve.

MECON LIMITED  REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
		DOCUMENT NO.	Page 1 of 7
TITLE	PACKING, TRANSPORTATION & HANDLING OF VALVES	MEC/TS/05/21/061	REVISION : 0
			EDITION : 1

# **STANDARD TECHNICAL SPECIFICATION FOR PACKING, TRANSPORTATION AND HANDLING OF VALVES**


**SPECIFICATION NO.: MEC/TS/05/21/061**



**(OIL & GAS SBU)  
MECON LIMITED  
DELHI 110 092**


PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :
(ASHISH MATHUR) SDE	(HARSH KUMAR) MGR	(A. K. GUPTA) DGM	11.09.2018



MECON LIMITED  REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
		DOCUMENT NO.	Page 3 of 7
TITLE	PACKING, TRANSPORTATION & HANDLING OF VALVES	MEC/TS/05/21/061	REVISION : 0
			EDITION : 1

## **TABLE OF CONTENTS**

<b>1.0</b>	<b>SCOPE .....</b>	<b>4</b>
<b>2.0</b>	<b>PACKING .....</b>	<b>4</b>
<b>3.0</b>	<b>HANDLING.....</b>	<b>4</b>
<b>4.0</b>	<b>TRANSPORTATION.....</b>	<b>5</b>

MECON LIMITED  REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
		DOCUMENT NO.	Page 4 of 7
TITLE	PACKING, TRANSPORTATION & HANDLING OF VALVES	MEC/TS/05/21/061	REVISION : 0
			EDITION : 1

## 1.0 SCOPE

This specification covers the minimum requirements for Packing, Handling & transportation of valves and actuators. Though this specification covers the minimum requirement for packing, handling and transportation of valves, it is to be noted that any defect/ damage arising out of improper packing, handling & transportation shall be the responsibility of vendor. The delay due to rectification of such faults shall be to vendor's account. The date of delivery of material at site shall be considered as the day on which last such rectified material is delivered/ rectified at designated store.


## 2.0 PACKING

2.1 All valves shall be completely drained of test fluid and thoroughly dried after hydrotesting. The machined surfaces shall be coated with a light film of high viscosity rust inhibiting oil which will not become fluid and run off at temperatures below 80°C.


2.2 Flanged valves NPS 6" and smaller in Class 150 and Class 300 shall be fitted with UV resistant plastic covers. For other sizes, valve end flanges shall be fitted with plywood covers. The cover diameter shall be the same as the outside diameter of the flange and shall be at least 10 mm thick for valves up to NPS 24" and 12 mm thick for valves NPS 26" and larger. The cover shall be attached by machine bolts with a nut and washer fitted on the inside of the flange. There shall be minimum four (4) bolts on valves up to NPS 24" nominal size and eight (8) bolts on valves NPS 26 inch and larger. The bolts diameter shall not be less than ¼ the size of the flange bolt hole.

2.3 In addition to the above, all flange facings (ring joint, raised and flat) shall be covered with NBR (based) rubber Self-Adhesive protection (see fig below) that meets the following:

- ☐ Oil, ozone and weather resistant
- ☐ Minimum thickness of 1.5 mm
- ☐ Withstand temperatures up to 75°C
- ☐ Non deforming, loosening or detaching
- ☐ Proof against sand blasting
- ☐ No glue residue
- ☐ Chloride free

MECON LIMITED  REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
		DOCUMENT NO.	Page 5 of 7
TITLE	PACKING, TRANSPORTATION & HANDLING OF VALVES	MEC/TS/05/21/061	REVISION : 0
			EDITION : 1


- 2.4 Buttweld end valves shall be blanked on each end by high impact plastic bevel protectors, so that bevels are protected from possible mechanical damage during transportation.
- 2.5 The ends of threaded and socket weld end valves shall be protected with tight fitting plastic caps.
- 2.6 Packing shall be strong and sturdy such that it can withstand loading/unloading, pushing and crane lifting etc. All packaging shall be done in such a manner as to reduce volume and weight as much as possible without jeopardizing the safety of the material. All packing materials shall be new.
- 2.7 Stacking of multiple valves in single box is permitted upto 4" NB. However, in such case suitable partitions are to be made inside packing box.
- 2.8 Where height limitations restrict transportation of valve with actuator in assembled condition, actuator should be dismantled after successful testing at shop. However, the same need to be proposed by valve manufacturer during inspection of said valves and take the approval for Client/ PMC.
- 2.9 When valve, extended stem and actuators are transported in dismantled condition, the same shall be reassembled after fitment of valve at site. Valve vendor to deploy their representative within 3 days once the intimation is sent from site. Any delay beyond 3 days shall be to supplier's account.
- 2.10 Valve manufacturers to note that the safe transportation of assembled valve with actuator is in their scope of work. It is therefore required that the valve manufacturer should order actuator meeting the packing guidelines given in this specification. No claim shall be entertained on account of actuator manufacturer's non compliance of requirements specified in this specification, and the valve with actuator shall leave manufacturer's workshop after meeting the terms given in this specification.
- 2.11 Valves shall not be packed in poly wrap irrespective of the increase in shipping/ transport volume. Box of wood/ ply board etc. shall only be used to pack the valves with/ without actuator irrespective of the size/ rating of the valve.
- 2.12 The packing shall have suitable lifting arrangement to enable the lifting of valve with the packing. Suitable provisions/ supports shall be provided from support foot/ lifting lugs to enable to lift the valve with packing.

MECON LIMITED  REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
		DOCUMENT NO.	Page 6 of 7
TITLE	PACKING, TRANSPORTATION & HANDLING OF VALVES	MEC/TS/05/21/061	REVISION : 0
			EDITION : 1

- 2.13 Where it is required to transport valve and actuator separately, above clauses shall be individually applicable for valve and actuator.
- 2.14 Assembled Valves shall be properly secured inside packing in order to avoid any contact with packing material during transport.
- 2.15 For extended stem valves, it is permissible to dismantle stem extension and actuator and as such the valve may be transported in three parts, each part complying individually the requirements of this specification.
- 2.16 Actuators shall be packed in wooden box with proper cushioning of damage prone parts like sockets, tubing, panel boxes etc.
- 2.17 Actuator cylinders shall be mounted on base with the help of metallic U-clamps/ welding on reinforcement plate. Metallic U-clamps to be used with double bolts on either side of U clamp.
- 2.18 Actuator components layout shall be such that to minimize packing volume. Back-up tank shall be put in horizontal position only, wherever feasible.
- 2.19 The manufacturer shall exhibit the packing meeting to the requirement of this specification during inspection and take clearance.

### 3.0 HANDLING

- 3.1 Manufacturer to ensure that during lifting hooks for assembly are attached to body/ end piece casting/ forging only and not on the pup piece. Any pup piece having hook attachment mark may be rejected.
- 3.2 Assembled valves, at all times, shall be lifted through lifting lugs only and not from the pup pieces.
- 3.3 Support foot shall be provided on body only in bolted design. In no case, the support foot shall be fastened in body bolting.
- 3.4 Lifting Lugs shall be provided on body/ tail piece in bolted design. In no case, the lifting lugs shall be fastened in body bolting.
- 3.5 Valve vendor to work in close coordination with actuator vendor to ensure that the sling put in lifting lug of valve do not interfere with the actuator/ tubing during lifting at site. Any breakage during site lifting due to fouling of tubing/

MECON LIMITED  REGD. OFF: RANCHI 834002	STANDARD TECHNICAL SPECIFICATION		
	OIL & GAS SBU, DELHI		
		DOCUMENT NO.	Page 7 of 7
TITLE	PACKING, TRANSPORTATION & HANDLING OF VALVES	MEC/TS/05/21/061	REVISION : 0
			EDITION : 1

actuator components during site lifting shall be in supplier' account.

- 3.6 Extended Stem valves shall have placement of lifting lugs to ensure the lifting of valve in stem vertical condition only. Under no condition the valve is to be lifted in Stem horizontal/ inclined position.

#### 4.0 TRANSPORTATION

- 4.1 If the valve and actuator in assembled condition can be accommodated on low bed trailer, low bed trailer shall only be used for inland transportation. Dismantling of valve and actuator shall not be permitted under such case.
- 4.2 Valve shall be secured on trailer/ truck bed with ropes suitably attached with valve boxes. Type of rope selection shall depend upon weight of valve.
- 4.3 Tack welds on trailer/ truck bed shall not be used as a fastening method.
- 4.4 Bolting may be used to securely fasten the valve base on trailer if the provision is available. No. and diameter of bolts shall be suitably chosen as per weight of valve to ensure that bolts do not shear off during transportation.
- 4.5 For large size valves, Loading shall be done preferably by hanging the valve in position and moving the vehicle to valve sitting position.
- 4.6 Since unloading of valves is under valve manufacturer's scope, it is to be ensured that valve manufacturer's representative shall be available at designated store to facilitate the same. Valve manufacturer has to keep the track of vehicle movement accordingly. If due to project exigency/ time constraint the unloading has to be done during manufacturer's representative's absence, any damage during such unloading shall be attributable to manufacturer only.



# **DATA SHEETS**

## DATA SHEET FOR BALL VALVES

### MR Item nos.: A.1

- 1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_
- 2.0 Valve Size DN (inch) : DN 750 (30") ANSI Rating : 300# Design Standard : **API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/21/002, Rev-1, Ed-1**
- 4.0 Connecting Pipeline Design Pressure, kg/cm2 (g): 49 Design Temperature, °C : **-29°C to +65°C**

### 5.0 Connecting Pipe Specification :

5.1 Material	DN 750 (30")
5.2 Outer Diameter, mm	API 5L Gr. X-70
5.3 Thickness, mm	PSL 2
	762
	15.9

### 6.0 Valve Construction Design

- 6.1 Configuration : Reduced Bore ☐ Full Bore ☒
- 6.2 End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒
- 6.3 Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒
- 6.4 Ball Mounting : **Trunnion Mounted**
- 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. WCC / A 234 Gr. WPC	
7.2 Ball	(A 216 Gr.WCC/A 234 Gr.WPC) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVILON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG
- 9.0 Location : Above Ground ☐ Buried ☒
- 10.0 Stem Extension Requirement : Yes ☒ No ☐ Length of stem extension shall be 2750+ or -250mm which shall be finalized during drawing approval stage.
- 11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒
- 12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

### 14.0 Valve Testing Requirement

	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test	79	As per API 6D
14.2 Air Test	57	As per API 6D
	5.6-7	As per API 6D

- 15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**


### 16.0 Valve Painting Specification

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 For under ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 micron. Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

#### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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".
- Minimum thickness of valve body / adaptor shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.
REVISIONS									
SECTION PROCESS & PIPING					CLIENT : Oil India Limited		<div> <b>MECON LIMITED</b></div>		
	NAME	DATE	CHKD	DATE	PROJECT: BAGHJAN – MADHUBAN				
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18	PIPELINE PROJECT				
DRWN									
APPROVED					AK Gupta,DGM		DATA SHEET NO.: MEC/23U1/05/28/M001/DS/0V/01		REV 0
					DATA SHEET FOR BALL VALVES (NB ≥ 2")				

# **DATA SHEET FOR BALL VALVES**

## **MR Item nos.: A.2**

- 1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_
- 2.0 Valve Size DN (inch) : DN 750 (30") ANSI Rating : 300# Design Standard : **API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/21/002, Rev-1, Ed-1**
- 4.0 Connecting Pipeline Design Pressure, kg/cm2 (g) 49 Design Temperature, °C : **-29°C to +65°C**

## **5.0 Connecting Pipe Specification :**

5.1 Material	DN 750 (30")
5.2 Outer Diameter, mm	API 5L Gr. X-70
5.3 Thickness, mm	PSL 2
	762
	15.9

## **6.0 Valve Construction Design**

- 6.1. Configuration : Reduced Bore ☐ Full Bore ☒
- 6.2. End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒
- 6.3. Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒
- 6.4. Ball Mounting : **Trunnion Mounted**
- 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. WCC / A 234 Gr. WPC	
7.2 Ball	(A 216 Gr. WCC/A 234 Gr. WPC) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVILON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG
- 9.0 Location : Above Ground ☐ Buried ☒
- 10.0 Stem Extension Requirement : Yes ☒ No ☐ Length of stem extension shall be 2750+ or -250mm which shall be finalized during drawing approval stage.
- 11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒
- 12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002 and HOV datasheet
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

## **14.0 Valve Testing Requirement**

	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
14.1 Hydrostatic Test Seat	57	As per API 6D
14.2 Air Test	5.6-7	As per API 6D

- 15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**


## **16.0 Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 For under ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 micron Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

## **Notes:**

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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".
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD		
REVISIONS <th colspan="3">REFERENCES</th>						REFERENCES		
SECTION PROCESS & PIPING					CLIENT : Oil India Limited		DRG. NO.	
					PROJECT: BAGHJAN – MADHUBAN			
					PIPELINE PROJECT			
DSGN					A.Mathur			
20-11-18					Harsh Kumar		20-11-18	
DRWN							MECON LIMITED	

# **DATA SHEET FOR BALL VALVES**

## **MR Item nos.: A.3**

- 1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_
- 2.0 Valve Size DN (inch) : DN 750 (30") ANSI Rating : 300# Design Standard : **API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/21/002, Rev-1, Ed-1**
- 4.0 Connecting Pipeline Design Pressure, kg/cm2 (g): 49 Design Temperature, °C : **-29°C to +65°C**

## **5.0 Connecting Pipe Specification :**

5.1 Material	DN 750 (30")
5.2 Outer Diameter, mm	API 5L Gr. X-70
5.3 Thickness, mm	PSL 2
	762
	15.9

## **6.0 Valve Construction Design**

- 6.1. Configuration : Reduced Bore ☐ Full Bore ☒
- 6.2. End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒
- 6.3. Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒
- 6.4 Ball Mounting : **Trunnion Mounted**
- 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. WCC / A 234 Gr. WPC	
7.2 Ball	(A 216 Gr.WCC/A 234 Gr.WPC) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVILON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG
- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ No ☒
- 11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒
- 12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002 and HOV datasheet
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

## **14.0 Valve Testing Requirement**

	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	<b>79</b>	<b>As per API 6D</b>
Seat	<b>57</b>	<b>As per API 6D</b>
14.2 Air Test	<b>5.6-7</b>	<b>As per API 6D</b>

- 15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**


## **16.0 Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.

- 17.0 Lock Open/ Lock Close/Normally Close Requirement :N.A.

### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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**".
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.
REVISIONS									
SECTION PROCESS & PIPING					CLIENT : Oil India Limited		<div></div> <div>MECON LIMITED</div>		
					PROJECT: BAGHJAN – MADHUBAN				
					PIPELINE PROJECT				
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18					
DRWN									
APPROVED  AK Gupta,DGM					DATA SHEET FOR BALL VALVES (NB ≥ 2")		DATA SHEET NO.:		REV
							MEC/23U1/05/28/M/001/DS/BV/03		0

# **DATA SHEET FOR BALL VALVES**

**MR Item nos.: A.4**

1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_

2.0 Valve Size DN (inch) : DN 600 (24") ANSI Rating : 300# Design Standard : **API 6D**

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

4.0 Connecting Pipeline Design Pressure, kg/cm2 (g): 49 Design Temperature, °C : **-29°C to +65°C**

5.0 **Connecting Pipe Specification :**

5.1 Material	DN 600 (24") API 5L Gr. X-52 PSL 2
5.2 Outer Diameter, mm	610
5.3 Thickness, mm	14.3

6.0 **Valve Construction Design**

6.1 Configuration : Reduced Bore ☐ Full Bore ☒

6.2 End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒

6.3 Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒

6.4 Ball Mounting : **Trunnion Mounted**

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 / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr. WCB/A 234 Gr. WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVLON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG

9.0 Location : Above Ground ☒ Buried ☐

10.0 Stem Extension Requirement : Yes ☐ No ☒

11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒

12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002 with Auto-Closure facility

13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

14.0 Valve Testing Requirement		
	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
14.1 Hydrostatic Test Seat	57	As per API 6D
14.2 Air Test	5.6-7	As per API 6D


15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

## **Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

## Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS							
SECTION PROCESS & PIPING						CLIENT : Oil India Limited	
NAME DATE CHKD DATE						PROJECT: BAGHJAN – MADHUBAN	
DSGN A.Mathur 20-11-18 Harsh Kumar 20-11-18						PIPELINE PROJECT	
DRWN						 <b>MECON LIMITED</b>	
APPROVED AK Gupta,DGM						<b>DATA SHEET FOR BALL VALVES (NB ≥ 2")</b> DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/BV/04 REV 0	

## DATA SHEET FOR BALL VALVES

**MR Item nos.: A.5, A.10**

1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_

2.0 Valve Size DN (inch) : DN 600 (24"), DN 300 (12") ANSI Rating : 300# Design Standard : **API 6D**

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

4.0 Connecting Pipeline Design Pressure, kg/cm<sup>2</sup> (g): 49 Design Temperature, °C : **-29°C to +65°C**

5.0 **Connecting Pipe Specification :** N.A.

5.1 Material \_\_\_\_\_

5.2 Outer Diameter, mm \_\_\_\_\_

5.3 Thickness, mm \_\_\_\_\_

6.0 **Valve Construction Design**

6.1 Configuration : Reduced Bore ☐ Full Bore ☒

6.2 End Connections : Flanged as per ASME B16.5 ☒ Butt Welded as per ASME B16.25 ☐

6.3 Flanges (wherever applicable) : a) RF ☒ RT ☐ NA ☐  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☒ NA ☐

6.4 Ball Mounting : **Trunnion Mounted**

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)

Valve Material Specification		
Part	Specified Material	Material Offered (Equivalent or superior)
7.1 Body	A 216 Gr. WCB / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr. WCB/A 234 Gr. WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVLON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG

9.0 Location : Above Ground ☒ Buried ☐

10.0 Stem Extension Requirement : Yes ☐ No ☒

11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒

12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002

13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607 (Auto-Closure facility for 24" Valve only)

Valve Testing Requirement		
	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	<b>79</b>	<b>As per API 6D</b>
14.2 Air Test Seat	<b>57</b>	<b>As per API 6D</b>
	<b>5.6-7</b>	<b>As per API 6D</b>

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

### Valve Painting Specification

- 16.0 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

#### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS							
SECTION PROCESS & PIPING						CLIENT : Oil India Limited	
NAME DATE CHKD DATE						PROJECT: BAGHJAN – MADHUBAN	
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18		PIPELINE PROJECT	
DRWN							
DATA SHEET FOR BALL VALVES (NB ≥ 2")						MECON LIMITED	
APPROVED AK Gupta, DGM						DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/BV/05	
						REV 0	

# **DATA SHEET FOR BALL VALVES**

**MR Item nos.: A.6, A.7**

1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_

2.0 Valve Size DN (inch) : DN 600 (24"), DN 400 (16") ANSI Rating : 300# Design Standard : **API 6D**

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

4.0 Connecting Pipeline Design Pressure, kg/cm<sup>2</sup> (g): 49 Design Temperature, °C : **-29°C to +65°C**

5.0 **Connecting Pipe Specification :** N.A.

5.1 Material \_\_\_\_\_

5.2 Outer Diameter, mm \_\_\_\_\_

5.3 Thickness, mm \_\_\_\_\_

6.0 **Valve Construction Design**

6.1 Configuration : Reduced Bore ☒ Full Bore ☐

6.2 End Connections : Flanged as per ASME B16.5 ☒ Butt Welded as per ASME B16.25 ☐

6.3 Flanges (wherever applicable) : a) RF ☒ RT ☐ NA ☐  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☒ NA ☐

6.4 Ball Mounting : **Trunnion Mounted**

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	<b>A 216 Gr. WCB / A 234 Gr. WPB</b>	
7.2 Ball	<b>(A 216 Gr. WCB/A 234 Gr. WPB) +75 µENP coating/ AISI410</b>	
7.3 Body Seat Rings (No Casting)	<b>AISI 4140 + 75 micron ENP coating/AISI 410</b>	
7.4 Seat Seal	<b>VITON/DEVLON</b>	
7.5 Stem (No casting)	<b>AISI 4140 + 75 micron ENP coating/AISI 410</b>	
7.6 Stem Seals	<b>VITON/PTFE</b>	
7.7 Stud Bolts/ Nuts	<b>ASTM A 193 Gr. B7/ A194 Gr. 2H</b>	

8.0 Corrosion Allowance : **5 mm** Service : **NATURAL GAS / RLNG**

9.0 Location : Above Ground ☒ Buried ☐

10.0 Stem Extension Requirement : Yes ☐ No ☒

11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒

12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002 and HOV Datasheet

13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

## **14.0 Valve Testing Requirement**

		Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test	Body	<b>79</b>	<b>As per API 6D</b>
	Seat	<b>57</b>	<b>As per API 6D</b>
14.2 Air Test		<b>5.6-7</b>	<b>As per API 6D</b>


15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

## **16.0 Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS							
SECTION PROCESS & PIPING						CLIENT : Oil India Limited	
NAME DATE CHKD DATE						PROJECT: BAGHJAN – MADHUBAN	
DSGN A.Mathur 20-11-18 Harsh Kumar 20-11-18						PIPELINE PROJECT	
DRWN						 <b>MECON LIMITED</b>	
APPROVED AK Gupta,DGM						<b>DATA SHEET FOR BALL VALVES</b> <b>(NB ≥ 2")</b>	
						DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/BV/06	
						REV 0	

# **DATA SHEET FOR BALL VALVES**

## **MR Item nos.: A.8**

- 1.0 Valve Manufacturer : Actuator Manufacturer : N.A.
- 2.0 Valve Size DN (inch) : DN 300 (12") ANSI Rating : 300# Design Standard : **API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/21/002, Rev-1, Ed-1**
- 4.0 Connecting Pipeline Design Pressure, kg/cm<sup>2</sup> (g):49 Design Temperature, °C : **-29°C to +65°C**

## **5.0 Connecting Pipe Specification :**

5.1 Material	DN 300 (12")
5.2 Outer Diameter, mm	API 5L Gr. B
5.3 Thickness, mm	PSL 2
	323.9
	12.7

## **6.0 Valve Construction Design**

- 6.1 Configuration : Reduced Bore ☐ Full Bore ☒
- 6.2 End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒
- 6.3 Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒
- 6.4 Ball Mounting : **Trunnion Mounted**
- 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 / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVLON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ No ☒
- 11.0 Gear Operator Requirement : Yes ☒ (For 6" & above) No ☐
- 12.0 Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

## **14.0 Valve Testing Requirement**

		Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test	Body	79	As per API 6D
	Seat	57	As per API 6D
14.2 Air Test		5.6-7	As per API 6D


- 15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

## **16.0 Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD		
REVISIONS							REFERENCES	
SECTION PROCESS & PIPING					CLIENT : Oil India Limited			DRG. NO.
					PROJECT: BAGHJAN – MADHUBAN			
					PIPELINE PROJECT			
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18			MECON LIMITED	
DRWN								
APPROVED					AK Gupta,DGM		DATA SHEET FOR BALL VALVES (NB ≥ 2")	
							DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/BV/07	
							REV 0	



# **DATA SHEET FOR BALL VALVES**

**MR Item nos.: A.9, A.13,A.16**

- 1.0 Valve Manufacturer : Actuator Manufacturer : N.A.
- 2.0 Valve Size DN (inch) : DN 300 (12"), DN 250 (10"), DN 100 (4") ANSI Rating : 300# Design Standard : **API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/21/002, Rev-1, Ed-1**
- 4.0 Connecting Pipeline Design Pressure, kg/cm2 (g): 49 Design Temperature, °C : **-29°C to +65°C**
- 5.0 **Connecting Pipe Specification :** N.A.
- 5.1 Material
- 5.2 Outer Diameter, mm
- 5.3 Thickness, mm
- 6.0 **Valve Construction Design**
- 6.1 Configuration : Reduced Bore ☒ Full Bore ☐ Butt Welded as per ASME B16.25
- 6.2 End Connections : Flanged as per ASME B16.5 ☒ RT ☐ NA ☐
- 6.3 Flanges (wherever applicable) : a) RF ☒ b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☒ NA ☐
- 6.4 Ball Mounting : **Trunnion Mounted for 12" and 10" Valves ; Floating Ball for 4" Valves**
- 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 / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVILON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG
- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ No ☒
- 11.0 Gear Operator Requirement : Yes ☒ (For 12" & 10" Valves) No ☒ (Lever Operated for 4" Valves)
- 12.0 Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

## **14.0 Valve Testing Requirement**

	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	<b>79</b>	<b>As per API 6D</b>
Seat	<b>57</b>	<b>As per API 6D</b>
14.2 Air Test	<b>5.6-7</b>	<b>As per API 6D</b>

- 15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

## **16.0 Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1 ,Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS						CLIENT : Oil India Limited	
SECTION PROCESS & PIPING						PROJECT: BAGHJAN – MADHUBAN	
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18		PIPELINE PROJECT	
DRWN							
APPROVED						MECON LIMITED	
AK Gupta,DGM							
DATA SHEET FOR BALL VALVES (NB ≥ 2")						DATA SHEET NO.: MEC/Z3U1/05/28/M/001/DS/BV/08	REV 0

# **DATA SHEET FOR BALL VALVES**

**MR Item nos.: A.11**

- 1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : N.A.
- 2.0 Valve Size DN (inch) : DN 250 (10") ANSI Rating : 300# Design Standard : **API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/21/002, Rev-1, Ed-1**
- 4.0 Connecting Pipeline Design Pressure, kg/cm<sup>2</sup>:49 Design Temperature, °C : **-29°C to +65°C**

**5.0 Connecting Pipe Specification :**

5.1 Material	DN 250 (10")
5.2 Outer Diameter, mm	API 5L Gr. B PSL 2
5.3 Thickness, mm	273
	12.7

**6.0 Valve Construction Design**

- 6.1 Configuration : Reduced Bore ☒ Full Bore ☐
- 6.2 End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒
- 6.3 Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒
- 6.4 Ball Mounting : **Trunnion Mounted**
- 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 / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVILON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : **5 mm** Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☐ Buried ☒
- 10.0 Stem Extension Requirement : Yes ☒ No ☐ Length of stem extension shall be 2750+ or -250mm which shall be finalized during drawing approval stage.
- 11.0 Gear Operator Requirement : Yes ☒ (For 6" & above) No ☐
- 12.0 Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

**14.0 Valve Testing Requirement**

	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
Seat	57	As per API 6D
14.2 Air Test	5.6-7	As per API 6D

- 15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**


**16.0 Valve Painting Specification**

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 micron  
Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

- 17.0 Lock Open/ Lock Close/Normally Close Requirement : **As indicated in MR/Schedule of Rates (SOR)**

**Notes:**

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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"**.
- Minimum thickness of valve body / adaptor shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS						REFERENCES	
SECTION	PROCESS & PIPING	CLIENT : Oil India Limited				 <b>MECON LIMITED</b>	
	NAME	DATE	CHKD	DATE	PROJECT: BAGHJAN – MADHUBAN		
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18	PIPELINE PROJECT		
DRWN							
APPROVED						DATA SHEET NO.:	REV
AK Gupta,DGM						MEC/23U1/05/28/M/001/DS/BV/09	0
<b>DATA SHEET FOR BALL VALVES</b>							
<b>(NB ≥ 2")</b>							

## DATA SHEET FOR BALL VALVES

MR Item nos.: A.12, A.15

- 1.0 Valve Manufacturer : Actuator Manufacturer : N.A.
- 2.0 Valve Size DN (inch) : DN 250 (10"), DN 100 (4") ANSI Rating : 300# Design Standard : API 6D
- 3.0 MECON's Technical Specification No. : MEC/TS/05/21/002, Rev-1, Ed-1
- 4.0 Connecting Pipeline Design Pressure, kg/cm2 (g): 49 Design Temperature, °C : -29°C to +65°C

### 5.0 Connecting Pipe Specification :

	DN 250 (10")	DN 100 (4")
5.1 Material	API 5L Gr.B PSL 2	API 5L Gr.B PSL 2
5.2 Outer Diameter, mm	273	114.3
5.3 Thickness, mm	12.7	8.56

### 6.0 Valve Construction Design

- 6.1 Configuration : Reduced Bore ☒ Full Bore ☐
- 6.2 End Connections : Flanged as per ASME B16.5 ☐ RT ☐ Butt Welded as per ASME B16.25 ☒
- 6.3 Flanges (wherever applicable) : a) RF ☐ b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒
- 6.4 Ball Mounting : Trunnion Mounted for 10" Valves ; Floating Ball for 4" Valves
- 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 / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVLON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

- 8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG
- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ No ☒
- 11.0 Gear Operator Requirement : Yes ☒ (For 10") No ☒ Lever operated for 4" valve
- 12.0 Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

### 14.0 Valve Testing Requirement

	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
Seat	57	As per API 6D
14.2 Air Test	5.6-7	As per API 6D

- 15.0 Anti-Static Testing Requirement : As per Standard API 6D (Latest Ed.)

### 16.0 Valve Painting Specification

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

#### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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".
- Minimum thickness of valve body / adaptor shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS						CLIENT : Oil India Limited	
SECTION PROCESS & PIPING						PROJECT: BAGHJAN – MADHUBAN	
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18		PIPELINE PROJECT	
DRWN						MECON LIMITED	
APPROVED						DATA SHEET FOR BALL VALVES (NB ≥ 2")	
AK Gupta,DGM						DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/BV/10	REV 0

## DATA SHEET FOR BALL VALVES

**MR Item nos.: A.14**

1.0 Valve Manufacturer : \_\_\_\_\_ Actuator Manufacturer : \_\_\_\_\_

2.0 Valve Size DN (inch) : DN 250 (10") ANSI Rating : 300# Design Standard : API 6D

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

4.0 Connecting Pipeline Design Pressure, kg/cm2 (g): 49 Design Temperature, °C : -29°C to +65°C

5.0 **Connecting Pipe Specification :**

DN 250 (10")
API 5L Gr. B
PSL 2
273
12.7

5.1 Material

5.2 Outer Diameter, mm

5.3 Thickness, mm

6.0 **Valve Construction Design**

6.1 Configuration : Reduced Bore ☒ Full Bore ☐

6.2 End Connections : Flanged as per ASME B16.5 ☐ Butt Welded as per ASME B16.25 ☒

6.3 Flanges (wherever applicable) : a) RF ☐ RT ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒

6.4 Ball Mounting : **Trunnion Mounted**

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)

Valve Material Specification		
Part	Specified Material	Material Offered (Equivalent or superior)
7.1 Body	A 216 Gr. WCB / A 234 Gr. WPB	
7.2 Ball	(A 216 Gr. WCB/A 234 Gr. WPB) +75 µENP coating/ AISI410	
7.3 Body Seat Rings (No Casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.4 Seat Seal	VITON/DEVLON	
7.5 Stem (No casting)	AISI 4140 + 75 micron ENP coating/AISI 410	
7.6 Stem Seals	VITON/PTFE	
7.7 Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG

9.0 Location : Above Ground ☒ Buried ☐

10.0 Stem Extension Requirement : Yes ☐ No ☒

11.0 Gear Operator Requirement : Yes ☐ (For 6" & above) No ☒

12.0 Actuator Requirement : Yes ☒ No ☐ As per attached Gas Over Oil Actuator specification No. MEC/TS/05/E5/002

13.0 Fire Resistant Design Requirement : Type test as per API 6FA/API607

Valve Testing Requirement		
	Test Pressure (min.), kg/cm <sup>2</sup> (g)	Minimum Duration, minutes
14.1 Hydrostatic Test	79	As per API 6D
	57	As per API 6D
14.2 Air Test	5.6-7	As per API 6D


15.0 Anti-Static Testing Requirement : As per Standard API 6D (Latest Ed.)

### Valve Painting Specification

- 16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 16.2 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.
- 17.0 Lock Open/ Lock Close/Normally Close Requirement : N.A.

### Notes:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002, Rev 1, Ed. 1
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
- Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
- 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.
- Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
- 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.
- Valves shall be inspected and approved by Purchaser before despatch.
- Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves
- 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".
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.
REVISIONS							<b>MECON LIMITED</b>
SECTION PROCESS & PIPING							
DSGN	A.Mathur	20-11-18	Harsh Kumar	20-11-18	CLIENT : Oil India Limited PROJECT: BAGHJAN – MADHUBAN PIPELINE PROJECT		
DRWN							
<b>DATA SHEET FOR BALL VALVES</b> <b>(NB ≥ 2")</b>						DATA SHEET NO.: MEC/23U/05/28/M/001/DS/BV/11	REV 0

# **DATA SHEET FOR PLUG VALVE**

**MR Item nos. : B.1**

- 1.0 Valve Manufacturer : \_\_\_\_\_
- 2.0 Valve Size (NB) (inch) : 10" ANSI Rating : 300# **Design Standard : API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/62/003, Rev-2** **Design Temperature, °C : -29°C to 65°C**
- 4.0 Connecting Pipeline Design Pressure, Kg/cm2(g) : 49
- 5.0 **Connecting Pipe Specification**
- |                              |                    |
|------------------------------|--------------------|
| 5.1 Material                 | 10"                |
| 5.2 Diameter (OD), mm (inch) | API 5L, Gr. B PSL2 |
| 5.3 Thickness, mm            | 273 mm             |
|                              | 12.7 mm            |
- 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** ☐
- 6.3. Flanges (wherever applicable) : 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 216 Gr. WCB/A 234 Gr. WPB/A105	
7.2 Plug	(A 216 Gr. WCB/A 234 Gr. WPB/A105)+75 µENP coating/AISI410	
7.3 Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4 Stem (No Casting)	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5 Stem Seal	PTFE/Graphite	
7.6 Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☐ Buried ☒
- 10.0 Stem Extension Requirement : Yes ☒ No ☐ Length of stem extension shall be 2750+ or -250mm which shall be finalized during drawing approval stage.
- 11.0 Gear Operator Requirement : Yes ☒ No ☐
- 12.0 Gas Powered Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ BS EN: 10497**

## **14.0 Valve Testing Requirement**

	Test Pressure (min.), kg/cm2(g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
Seat	57	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-055 909.
- 15.2 For under ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 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:**

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
- 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.
- Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
- Attached generic QAP shall be submitted for approval after making necessary changes considering 3.2 certification aspect.
- Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - **N.A.**
- 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.
- 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**".
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.	
REVISIONS							CLIENT : Oil India Limited			
SECTION		OIL & GAS			PROJECT:  BAGHJAN – MADHUBAN PIPELINE PROJECT				MECON LIMITED	
	NAME	DATE	CHKD	DATE						
DSGN	A.Mathur	20.11.2018	Harsh	20.11.2018						
DRWN										
APPROVED							AK Gupta DGM	DATA SHEET FOR PLUG VALVES (NB ≥ 2")		
							SCALE : DATA SHEET NO. : MEC/23U1/05/28/M/001/DS/PV/01		REV 0	

# **DATA SHEET FOR PLUG VALVE**

**MR Item nos. : B.2**

- 1.0 Valve Manufacturer : \_\_\_\_\_
- 2.0 Valve Size (NB) (inch) : 10" ANSI Rating : 300# **Design Standard : API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/62/003, Rev-2** **Design Temperature, °C : -29°C to 65°C**
- 4.0 Connecting Pipeline Design Pressure, Kg/cm2(g) : 49
- 5.0 **Connecting Pipe Specification**
- |                              |                    |
|------------------------------|--------------------|
| 5.1 Material                 | 10"                |
| 5.2 Diameter (OD), mm (inch) | API 5L, Gr. B PSL2 |
| 5.3 Thickness, mm            | 273 mm             |
|                              | 12.7 mm            |
- 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** ☐
- 6.3. Flanges (wherever applicable) : a) RF ☐ FF ☐ RTJ ☐ NA ☒  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☐ NA ☒

## **Valve Material Specification**

Part	Material	Material Offered (Equivalent or Superior)
7.1 Body	A 216 Gr. WCB/A 234 Gr. WPB/A105	
7.2 Plug	(A 216 Gr. WCB/A 234 Gr. WPB/A105)+75 µENP coating/AISI410	
7.3 Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4 Stem (No Casting)	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5 Stem Seal	PTFE/Graphite	
7.6 Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ NO ☒
- 11.0 Gear Operator Requirement : Yes ☒ No ☐
- 12.0 Gas Powered Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ BS EN: 10497**

## **Valve Testing Requirement**


	Test Pressure (min.), kg/cm2(g)	Minimum Duration, minutes
14.1 Hydrostatic Test	79	As per API 6D
	57	As per API 6D
14.2 Air Test	5.6 - 7	As per API 6D

## **Valve Painting Specification**

- 15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 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:**

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
- 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.
- Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
- Attached generic QAP shall be submitted for approval after making necessary changes considering 3.2 certification aspect.
- Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - **N.A.**
- 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.
- 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**".
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.		
REVISIONS							CLIENT : Oil India Limited				
SECTION OIL & GAS									MECON LIMITED		
	NAME	DATE	CHKD	DATE	PROJECT: BAGHJAN – MADHUBAN PIPELINE PROJECT						
DSGN	A.Mathur	20.11.2018	Harsh	20.11.2018							
DRWN											
APPROVED					AK Gupta DGM	DATA SHEET FOR PLUG VALVES (NB ≥ 2")				SCALE : DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/PV/02	REV 0

# **DATA SHEET FOR PLUG VALVE**

**MR Item nos. : B.3**

- 1.0 Valve Manufacturer : \_\_\_\_\_
- 2.0 Valve Size (NB) (inch) : 10" ANSI Rating : 300# **Design Standard : API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/62/003, Rev-2** **Design Temperature, °C : -29°C to 65°C**
- 4.0 Connecting Pipeline Design Pressure, Kg/cm2(g) : 49
- 5.0 **Connecting Pipe Specification** N.A.
- 5.1 Material \_\_\_\_\_
- 5.2 Diameter (OD), mm (inch) \_\_\_\_\_
- 5.3 Thickness, mm \_\_\_\_\_
- 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** ☐
- 6.3. Flanges (wherever applicable) : 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 216 Gr. WCB/A 234 Gr. WPB/A105	
7.2 Plug	(A 216 Gr. WCB/A 234 Gr. WPB/A105)+75 µENP coating/AISI410	
7.3 Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4 Stem (No Casting)	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5 Stem Seal	PTFE/Graphite	
7.6 Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ NO ☒
- 11.0 Gear Operator Requirement : Yes ☒ No ☐
- 12.0 Gas Powered Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ BS EN: 10497**

## **14.0 Valve Testing Requirement**


	Test Pressure (min.), kg/cm2(g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
Seal	57	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-055 909.
- 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:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
- 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.
- Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
- Attached generic QAP shall be submitted for approval after making necessary changes considering 3.2 certification aspect.
- Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - **N.A.**
- 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.
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.	
REVISIONS							CLIENT : Oil India Limited			
SECTION		OIL & GAS			PROJECT:  BAGHJAN – MADHUBAN PIPELINE PROJECT				MECON LIMITED	
	NAME	DATE	CHKD	DATE						
DSGN	A.Mathur	20.11.2018	Harsh	20.11.2018						
DRWN										
APPROVED					AK Gupta DGM		DATA SHEET FOR PLUG VALVES (NB ≥ 2")			
							SCALE :		REV	
							DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/PV/03		0	

# **DATA SHEET FOR PLUG VALVE**

**MR Item nos. : B.4**

- 1.0 Valve Manufacturer : \_\_\_\_\_
- 2.0 Valve Size (NB) (inch) : 4" ANSI Rating : 300# **Design Standard : API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/62/003, Rev-2** **Design Temperature, °C : -29°C to 65°C**
- 4.0 Connecting Pipeline Design Pressure, Kg/cm2(g) : 49
- 5.0 **Connecting Pipe Specification**
- |                              |                    |
|------------------------------|--------------------|
| 5.1 Material                 | 4"                 |
| 5.2 Diameter (OD), mm (inch) | API 5L, Gr. B PSL2 |
| 5.3 Thickness, mm            | 114.3              |
|                              | 6.02 mm            |
- 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** ☐
- 6.3. Flanges (wherever applicable) : 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 216 Gr. WCB/A 234 Gr. WPB/A105	
7.2 Plug	(A 216 Gr. WCB/A 234 Gr. WPB/A105)+75 µENP coating/AISI410	
7.3 Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4 Stem (No Casting)	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5 Stem Seal	PTFE/Graphite	
7.6 Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ NO ☒
- 11.0 Gear Operator Requirement : Yes ☐ No ☒ LEVER OPERATED
- 12.0 Gas Powered Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ BS EN: 10497**

## **14.0 Valve Testing Requirement**


	Test Pressure (min.), kg/cm2(g)	Minimum Duration, minutes
14.1 Hydrostatic Test	79	As per API 6D
	57	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-055 909.
- 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:**

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
- 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.
- Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
- Attached generic QAP shall be submitted for approval after making necessary changes considering 3.2 certification aspect.
- Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - **N.A.**
- 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.
- 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"**.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.				
REVISIONS							CLIENT : Oil India Limited						
SECTION		OIL & GAS		PROJECT: BAGHJAN – MADHUBAN PIPELINE PROJECT									
	NAME	DATE	CHKD								DATE		
DSGN	A.Mathur	20.11.2018	Harsh								20.11.2018		
DRWN													
APPROVED				AK Gupta DGM		DATA SHEET FOR PLUG VALVES (NB ≥ 2")				SCALE : DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/PV/04		REV 0	
									MECON LIMITED				



# **DATA SHEET FOR PLUG VALVE**

**MR Item nos. : B.5**

- 1.0 Valve Manufacturer : \_\_\_\_\_
- 2.0 Valve Size (NB) (inch) : 4" ANSI Rating : 300# **Design Standard : API 6D**
- 3.0 MECON's Technical Specification No. : **MEC/TS/05/62/003, Rev-2** **Design Temperature, °C : -29°C to 65°C**
- 4.0 Connecting Pipeline Design Pressure, Kg/cm2(g) : 49
- 5.0 **Connecting Pipe Specification** N.A.
- 5.1 Material \_\_\_\_\_
- 5.2 Diameter (OD), mm (inch) \_\_\_\_\_
- 5.3 Thickness, mm \_\_\_\_\_
- 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** ☐
- 6.3. Flanges (wherever applicable) : a) RF ☒ FF ☐ RTJ ☐ NA ☐  
b) Serrated ☐ Smooth (125 to 200 microinches AARH) ☒ NA ☐

## **Valve Material Specification**

Part	Material	Material Offered (Equivalent or Superior)
7.1 Body	A 216 Gr. WCB/A 234 Gr. WPB/A105	
7.2 Plug	(A 216 Gr. WCB/A 234 Gr. WPB/A105)+75 µENP coating/AISI410	
7.3 Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4 Stem (No Casting)	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5 Stem Seal	PTFE/Graphite	
7.6 Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : 5 mm Service : NATURAL GAS / RLNG

- 9.0 Location : Above Ground ☒ Buried ☐
- 10.0 Stem Extension Requirement : Yes ☐ NO ☒
- 11.0 Gear Operator Requirement : Yes ☐ No ☒ LEVER OPERATED
- 12.0 Gas Powered Actuator Requirement : Yes ☐ No ☒
- 13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ BS EN: 10497**

## **Valve Testing Requirement**


	Test Pressure (min.), kg/cm2(g)	Minimum Duration, minutes
14.1 Hydrostatic Test Body	79	As per API 6D
Seal	57	As per API 6D
14.2 Air Test	5.6 - 7	As per API 6D

## **Valve Painting Specification**

- 15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
- 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:

- This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
- Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
- Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
- 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.
- Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
- Attached generic QAP shall be submitted for approval after making necessary changes considering 3.2 certification aspect.
- Material for body shall have a guaranteed minimum yield strength of 35000 psi. In case the same cannot be guaranteed, valves shall be provided with a 500 mm pup piece (integrally welded to the valve on each side) with strength equivalent to that of the connecting pipe. - **N.A.**
- 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.
- 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**".
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS		BY	APPRD	REFERENCES		DRG. NO.		
REVISIONS											
SECTION OIL & GAS					CLIENT : Oil India Limited			<div></div> <div>MECON LIMITED</div>			
	NAME	DATE	CHKD	DATE	PROJECT: BAGHJAN – MADHUBAN PIPELINE PROJECT						
DSGN	A.Mathur	20.11.2018	Harsh	20.11.2018							
DRWN											
APPROVED					AK Gupta DGM	DATA SHEET FOR PLUG VALVES (NB ≥ 2")			SCALE : DATA SHEET NO.: MEC/23U1/05/28/M/001/DS/PV/05		REV 0



**MECON LIMITED**

## DATA SHEET FOR GLOBE VALVES

MR Item nos. : C.1

1. Valve Manufacturer : \_\_\_\_\_
2. Size : 4" Rating : ANSI 300# Design Standard : BS EN ISO 17292:2004
3. Purchaser's Specification : Refer Technical notes for Gate & Globe Valves
4. Design Pressure : 49 kg/cm<sup>2</sup>(g) Design Temperature : -29°C to + 65°C
5. Corrosion Allowance : 5 mm Service : Natural Gas / RLNG
6. End Connections : Flanged both ends as per ASME B 16.5 ☒  
 Butt Weld both ends as A-16.25 ☐  
 Flanged one end butt weld other end ☐  
 Socket weld both ends as per ASME B16.11 ☐
7. Flanges (where applicable) : a) RF ☒ FF ☐ RTJ ☐  
 b) Serrated ☐ Smooth (125 to 200 AARH) ☒
8. Connecting Pipe Specification : \_\_\_\_\_
9. Valve Material Specification :

	Part	Material	Material Offered (Equivalent or Superior)
9.1	Body	ASTM A 216 Gr.WCB	
9.2	Bonnet (Bolted)	ASTM A 216 Gr.WCB	
9.3	Stem (Rising)	13% Cr. Steel (No Casting)	
9.4	Disc(Loose Plug/Ball Type)	(ASTM A 216 Gr. WCB + 13% Cr Steel Facing) / 13% Cr Steel (Stellited)	
9.5	Body Seat Ring	ASTM A 216 Gr. WCB+13% Cr Steel Facing (Stellited)	
9.6	Stem Packing (Renewable with valve open on stream)	Corrosion inhibited die formed flexible graphite with braided anti extrusion rings	
9.7	Hand Wheel (Rising)	Malleable Iron/ Cast Steel/ Fab. Steel	
9.8	Bonnet Bolts	A 193 Gr. B7	
9.9	Bonnet Nuts	A194 Gr. 2H	
9.10	Bonnet Gasket	Spiral Wound SS 316 + Grafoil	

10. Hydrostatic Test Pressure  
 a) Body : 79 kg/cm<sup>2</sup>(g)  
 b) Seat : 57 kg/cm<sup>2</sup>(g)
11. Pneumatic Test Pressure with : 5.6 - 7 kg/cm<sup>2</sup> (g).  
 Air
12. Painting Specifications:  
 i) Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.  
 ii) 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).

### Notes:

- Valve specification sheet shall be read in conjunction with technical notes for Gate and Globe valves.
- Valve shall be designed for intrinsically fire safe.
- Testing shall be as per BS EN 12266-1, approved QAP, this specification and other relevant standards.
- Bidder shall clearly write all/ any deviation against each part/ material of valve in the space provided for .  
 Wherever bidder agrees with MECON's data sheet, bidder shall clearly indicate "agreed".
- Charpy "V" notch test on each heat of base material shall be conducted for all pressure containing parts such as body, end flange, welding ends as well as the bolting material as per ASTM 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.
- Hardness test shall be carried out on each heat of base material for all pressure containing parts of the valve. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four measurements representing the entire thickness.
- Stem packing shall be renewable with valve open on stream .
- Painting procedure of the valves shall be as per Manufacturer's Standard.
- Material Test Certificates and Hydro Test Reports shall be furnished prior to dispatch.
- Minimum thickness of valve body / adapter shall not be less than that specified in ASME B16.34 plus corrosion allowance specified in this datasheet .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFERENCES	DRG. NO.													
SECTION PROCESS & PIPING <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>NAME</th> <th>DATE</th> <th>CHKD</th> <th>DATE</th> </tr> <tr> <td>DSGN A.Mathur</td> <td>20.11.2018</td> <td>Harsh Kumar</td> <td>20.11.2018</td> </tr> <tr> <td>DRWN</td> <td></td> <td></td> <td></td> </tr> </table>						NAME	DATE	CHKD	DATE	DSGN A.Mathur	20.11.2018	Harsh Kumar	20.11.2018	DRWN				CLIENT : Oil India Limited  PROJECT: BAGHJAN – MADHUBAN PIPELINE PROJECT		 MECON LIMITED
NAME	DATE	CHKD	DATE																	
DSGN A.Mathur	20.11.2018	Harsh Kumar	20.11.2018																	
DRWN																				
APPROVED <div style="text-align: right;">AK Gupta DGM</div>						DATA SHEET FOR GLOBE VALVES ≥ 2" DATA SHEET NO.: MEC/23U1/05/21/M/001/DS/GV/01														
						SCALE :	REV 0													

**SPARES LIST (START-UP & COMMISSIONING)  
- ASSORTED VALVES**



OIL & GAS SBU, DELHI

Page 1 of 1

**LIST OF COMMISSIONING SPARES AND ACCESSORIES FOR START-UP & COMMISSIONING FOR BALL VALVES , PLUG VALVES, GLOBE VALVES and ACTUATORS**

Sl. No.	Item No.	Description	Quantity
1.		Sealant Gun for BALL VALVES , PLUG VALVES	One No.
2.		Sealant for BALL VALVES , PLUG VALVES	One lot
3.			
4.			
5.			

**NOTES:**

1. Bidder to include the start-up and commissioning spares for valves in the quoted price for Ball Valves, Plug Valves, Globe Valves and Actuators.
2. Vendor shall provide sufficient amount of sealant to cater one filling of all the ordered valves.
3. Each successful bidder shall supply above mentioned commissioning spares as detailed in the TS.

**To be filled, signed and stamped by Bidder.**

**Bidder's Seal**

**Signature of Bidder**

<b>Client :</b> OIL INDIA LTD.	<b>Project :</b> BAGHJAN – MADHUBAN PIPELINE PROJECT	<b>Document No. :</b> MEC/23U1/05/28/M/001/S002/CS	<b>Rev. No.</b> 0	<b>Date :</b> 20.11.18
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**SPARES LIST (2 YEARS NORMAL OPERATION)  
- ASSORTED VALVES**



OIL & GAS SBU, DELHI

Page 1 of 1

**LIST OF SPARES AND ACCESSORIES FOR TWO YEARS OF NORMAL OPERATION FOR VALVE**

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

**NOTE:**

Bidder shall quote separately spares for two years normal operation for valves as per price schedule proforma.


To be filled, signed and stamped by Bidder.

Bidder's Seal

Signature of Bidder

Client : OIL INDIA LTD.	Project : BAGHJAN – MADHUBAN PIPELINE PROJECT	Document No. : MEC/23U1/05/28/M/001/S002C/OS	Rev. No. 0	Date : 22.11.18
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**QAPs**

	CONTRACTOR		<b>QUALITY ASSURANCE PLAN FOR STRUCTURAL AND MECHANICAL EQUIPMENT</b>					PROJECT : BAGHJAN –MADHUBAN PIPELINE PROJECT											
	ORDER NO. & DATE																		
	SUB-CONTRACTOR																		
	ORDER NO. & DATE																		
<b>INSTRUCTIONS FOR FILLING UP :</b>  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.							<b>CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES &amp; DOCUMENTS :</b>  <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%; vertical-align: top;"> <i>Code    Description</i>            1. Visual            2. Dimensional            3. Fitment &amp; 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 &amp; Weld Procedure Test            12. Approval of Test and Repair Procedure            13. Heat Treatment            14. Pressure Test            15. Leakage Test            16. Balancing            17. Vibration Test         </td> <td style="width:33%; vertical-align: top;"> <i>Code    Description</i>            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         </td> <td style="width:33%; vertical-align: top;"> <i>Code    Description</i>            34. Internal Inspection Report by Contractor            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 Double Block &amp; Bleed Test            47. Functional Test            48. Pneumatic Double Block &amp; Bleed Test            49. Cyclic Test         </td> </tr> </table> <i>Code    DOCUMENTS:</i> 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 amendments, if any D9. Calibration Certificate of all measuring instruments and gauges D10. X-Ray Reports										<i>Code    Description</i> 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	<i>Code    Description</i> 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	<i>Code    Description</i> 34. Internal Inspection Report by Contractor 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 Double Block & Bleed Test 47. Functional Test 48. Pneumatic Double Block & Bleed Test 49. Cyclic Test
<i>Code    Description</i> 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	<i>Code    Description</i> 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	<i>Code    Description</i> 34. Internal Inspection Report by Contractor 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 Double Block & Bleed Test 47. Functional Test 48. Pneumatic Double Block & Bleed Test 49. Cyclic Test																	

**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										
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. (MR Item 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							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
1.0	BALL VALVES 24",12",16", 12",10" 4" #300 PLUG Valves 10", 4" #300 GLOBE Valves 4" #300	A.1 to A.16 B.1 to B.5 C.1	As Per MR	\*	\*	\*	As per attached sheet 2 to 10										
For MECON (Stamp & Signature)												For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)			QAP NO. MEC/23U1/05/28/M/001/S002/QAP		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						
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	



QAP No. : MEC/23U1/05/28/M/001/S002/QAP

FORM NO. 11.20(4.4)F-09 REV-0

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)	<u>Material</u> 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	Obturator	<u>Material</u> 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	

QAP No. : MEC/23U1/05/28/M/001/S002/QAP

FORM NO. 11.20(4.4)F-09 REV-0

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	
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	R	
					-	-	-	46	46	46	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. (as applicable)	H	H	W	
					-	-	-	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	
					-	-	-	48	48	48	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. (as applicable)	H	H	W	
					-	-	-	49	49	49	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S.	H	H	W	
1.10	Complete documentation check and compilation							■	■	■	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 despatch clearance				-	-	-	■	■	■	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				Not Applicable											
For MECON (Stamp & Signature)					For CONTRACTOR/ SUB-CONTRACTOR					QAP NO.: MEC/23U1/05/28/M/001/S002/QAP					REV 0	

	CONTRACTOR		<b>QUALITY ASSURANCE PLAN FOR INSTRUMENTATION EQUIPMENT</b>						PROJECT :					
	ORDER NO. & DATE								PACKAGE NO. :					
	SUB-CONTRACTOR								PACKAGE NAME :					
	ORDER NO. & DATE								ITEM NAME : GAS OVER OIL ACTUATOR					

<b>INSTRUCTIONS FOR FILLING UP :</b>  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.	<b>CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES &amp; DOCUMENTS :</b>  <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;"><i>Code Description</i></td> <td style="width:33%;"><i>Code Description</i></td> <td style="width:33%;"><i>Code Description</i></td> <td style="width:33%;"><i>Code DOCUMENTS</i></td> </tr> <tr> <td>1. Visual</td> <td>18. Amplitude Test</td> <td>34. Internal Inspection Report by Contractor</td> <td>D1. Approved GA drawings</td> </tr> <tr> <td>2. Dimensional</td> <td>19. Sponge Test</td> <td></td> <td>D2. Information and other reference dig/ stamped dgs released for mfg.</td> </tr> <tr> <td>3. Fitment &amp; Alignment</td> <td>20. Dust/ Water Ingress Test</td> <td>35. Hardness Test</td> <td>D3. Relevant catalogues</td> </tr> <tr> <td>4. Physical Test (Sample)</td> <td>21. Friction Factor Test</td> <td>36. Spark Test for Lining</td> <td>D4. Bill of mat/ Item no./ Identification</td> </tr> <tr> <td>5. Chemical Test (Sample)</td> <td>22. Adhesion Test</td> <td>37. Calibration</td> <td>D5. Matchmarks details</td> </tr> <tr> <td>6. Ultrasonic Test</td> <td>23. Performance Test/ Characteristic Curve</td> <td>38. Safety Device Test</td> <td>D6. Line/ Layout diagram</td> </tr> <tr> <td>7. Magnetic Particle Test (MPI)</td> <td>24. No Load/ Free Running Test</td> <td>39. Ease of Maintenance</td> <td>D7. Approved erection procedures</td> </tr> <tr> <td>8. Radiography Test</td> <td>25. Load/ Overload Test</td> <td>40. Fire Test (Type Test)</td> <td>D8. Unpriced sub P.O. with specification and amendments, if any</td> </tr> <tr> <td>9. Dye Penetration Test</td> <td>26. Measurement of Speeds</td> <td>41. Charpy V-Notch Test</td> <td>D9. Calibration Certificate of all measuring instruments</td> </tr> <tr> <td>10. Metallographic Exam.</td> <td>27. Acoustical Test</td> <td>42. Operational Torque Test</td> <td></td> </tr> <tr> <td>11. Welder's Qualification &amp; Weld Procedure Test</td> <td>28. Geometrical Accuracy</td> <td>43. ENP (Electroless Nickel Plating)</td> <td></td> </tr> <tr> <td>12. Approval of Test and Repair Procedure</td> <td>29. Repeatability and Positioning Accuracy</td> <td>44. Execution</td> <td></td> </tr> <tr> <td>13. Heat Treatment</td> <td>30. Proving Test</td> <td>45. Painting</td> <td></td> </tr> <tr> <td>14. Pressure Test</td> <td>31. Surface Preparation</td> <td>46. Anti-Static Test</td> <td></td> </tr> <tr> <td>15. Leakage Test a) Piston Seal b) Pneumatic / Hydraulic Connection</td> <td></td> <td>47. Functional Test : a) Electrical and pneumatic functional test. b) Insulation Test of Electrical components. c) Check of operating time control. d) Check of limiting device operation. e) No load test (DP=0) &amp; load (DP max) Operations with the minimum required feeding pressure. f) Manual Override functional test.</td> <td></td> </tr> <tr> <td></td> <td>32. Manufacturer's Test Certificates for bought-out items</td> <td>48. Pneumatic Double Block &amp; Bleed Test</td> <td>and gauges D10. X-Ray Reports</td> </tr> <tr> <td></td> <td>33. IBR/ Other Statutory agencies compliance certificate</td> <td></td> <td></td> </tr> </table>	<i>Code Description</i>	<i>Code Description</i>	<i>Code Description</i>	<i>Code DOCUMENTS</i>	1. Visual	18. Amplitude Test	34. Internal Inspection Report by Contractor	D1. Approved GA drawings	2. Dimensional	19. Sponge Test		D2. Information and other reference dig/ stamped dgs released for mfg.	3. Fitment & Alignment	20. Dust/ Water Ingress Test	35. Hardness Test	D3. Relevant catalogues	4. Physical Test (Sample)	21. Friction Factor Test	36. Spark Test for Lining	D4. Bill of mat/ Item no./ Identification	5. Chemical Test (Sample)	22. Adhesion Test	37. Calibration	D5. Matchmarks details	6. Ultrasonic Test	23. Performance Test/ Characteristic Curve	38. Safety Device Test	D6. Line/ Layout diagram	7. Magnetic Particle Test (MPI)	24. No Load/ Free Running Test	39. Ease of Maintenance	D7. Approved erection procedures	8. Radiography Test	25. Load/ Overload Test	40. Fire Test (Type Test)	D8. Unpriced sub P.O. with specification and amendments, if any	9. Dye Penetration Test	26. Measurement of Speeds	41. Charpy V-Notch Test	D9. Calibration Certificate of all measuring instruments	10. Metallographic Exam.	27. Acoustical Test	42. Operational Torque Test		11. Welder's Qualification & Weld Procedure Test	28. Geometrical Accuracy	43. ENP (Electroless Nickel Plating)		12. Approval of Test and Repair Procedure	29. Repeatability and Positioning Accuracy	44. Execution		13. Heat Treatment	30. Proving Test	45. Painting		14. Pressure Test	31. Surface Preparation	46. Anti-Static Test		15. Leakage Test a) Piston Seal b) Pneumatic / Hydraulic Connection		47. Functional Test : a) Electrical and pneumatic functional test. b) Insulation Test of Electrical components. c) Check of operating time control. d) Check of limiting device operation. e) No load test (DP=0) & load (DP max) Operations with the minimum required feeding pressure. f) Manual Override functional test.			32. Manufacturer's Test Certificates for bought-out items	48. Pneumatic Double Block & Bleed Test	and gauges D10. X-Ray Reports		33. IBR/ Other Statutory agencies compliance certificate		
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EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Noms and Documents	REMARKS/ SAMPLING PLAN					
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (As per MR)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage I 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					
	GAS OVER OIL ACTUATOR		As per PO	-			5,6/7/8/9*,14,15(a),42,23	P	15(a),42,23	W#	-	1,2,3,15(b),3,44	P	47	W	4,47	R	1,2,3,5,6,7,8,9,14,15(a),15(b),23	D2,D3,D4,D6, MECON TS	100%
								5	R		32,33	R	31,32,33	R	31,32,33	R	31,32,33,42,44,47			

\*Tests as applicable shall be carried out on storage tank, Gas over Oil tanks & actuator housing.  
 #Tests shall be witnessed for storage tank, Gas over Oil tanks & actuator housing.  
 NOTE :- 3.2 Inspection Report shall be provided.

For MECON (Stamp & Signature)	For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)	QAP NO. MEC/05/ES/STD /QAP/GOV  SHEET 1 OF 1	REV 0
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