



GODAVARI GAS PVT. LIMITED

MATERIAL REQUISITION FOR VALVES

GGPL-BHI-BV-DOC-MR-001

| Rev | Date | Purpose | Prepared By | Checked By | Approved By |
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LIST OF ATTACHMENTS

| S.NO. | DOCUMENT TITLE | DOCUMENT NUMBER | Rev. |
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| 1.0 | Technical Specification for Ball Valves | ENG-STD-PI-DOC-TS-013 | 1 |
| 2.0 | Technical Specification for Globe Valves | ENG-STD-PI-DOC-TS-014 | 1 |
| 3.0 | Technical Data Sheet of Ball Valves, Globe Valves | LEPL/ GGPL/ DS/ MECH/ 001,002,004,005,006,007 | 0 |
| 4.0 | QAP for Ball Valves, Globe Valves | LEPL/BALL VALVE/001 LEPL/GLOBE VALVE/001 | 0 |

1.0 SCOPE OF SUPPLY (SOS)**1.1 General**

This requisition describes the scope of supply of Ball Valves & Globe Valves to be used in the Bhimadole Pipeline Network Connectivity Natural Gas Pipeline project.

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

1.2 Material Delivery Requirements

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

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

1.3 Ball Valves & Globe Valves:

The type and quantities of Ball Valves & Globe Valves are as detailed below:

| Sr.No | Description | Size/Bore | Thk/Rating | QTY |
|-----------|------------------------|-----------|------------|-----|
| | Standard/Specification | | | |
| 1 | Ball Valves | | | |
| a) | 3D1 | | | |
| | BW | 4" | 300# | 5 |
| | FE | 4" | 300# | 1 |
| | BW | 2" | 300# | 4 |
| | FE | 2" | 300# | 1 |
| b) | 1D1 | | | |
| | BW | 4" | 150# | 1 |
| | | | | |
| 2 | Globe Valves | | | |
| a) | 3D1 | | | |
| | BW | 2" | 300# | 2 |
| b) | 3D4 | | | |
| | FE | 2" | 300# | 1 |

2.0 GENERAL NOTES

2.1 Ball Valves & Globe Valves shall be used for Natural Gas service. Accordingly, Impact test and hardness tests as per specification shall be applicable.

2.2 All material shall be delivered at Company’s designated storage yard. The destination for delivery of items is near Amberpet, Andhrapradesh.

2.3 Bidder must submit duly filled up and signed data sheets, compliance statement, Check List and forms along with his offer.

In the absence of this information, Company reserves the right to reject bidder’s offer without any reference to Bidder in this regard.

3.0 REMARKS

3.1 Supplier’s Compliance

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

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

3.2 Compliance with Specification

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


3.3 Supplier’s Scope

Supplier’s scope of work supply includes the equipment with all internals & accessories shown on the data sheets, specifications and all unmentioned parts necessary for a satisfactory operation & testing except those which are indicated to be out of Supplier’s supply.

3.4 Inspection


Supplier shall submit with his bid a list of 3 well known international Third Party inspection Agencies as per enclosed vendor list he intends to use for inspection. This agency will issue all relevant certificates as per specification & codes.

Inspection shall also be performed by a designated Third Party Inspection agency and/or purchaser / Purchaser’s representative as set out & specified in the codes & particular documents forming this MR.

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4.0 SPECIAL INSTRUCTIONS TO BIDDERS


- 4.1 Bidder to note that no correspondence shall be entered into or entertained after the bid submission.
- 4.2 Bidder shall furnish quotation only in case he can supply material strictly as per this Material Requisition and specification/data sheets forming part of Material Requisition.
- 4.3 If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope & technical/ performance data required to be submitted with the offer, the offer shall be liable for rejection.
- 4.4 The submission of prices by the Bidder shall be construed to mean that he has confirmed compliance with all technical specifications of the corresponding item(s).
- 4.5 Bidder must submit all documents as listed in checklist along with his offer.
- 4.6 Supplier must note that stage wise inspection for complete fabrication, testing including the raw material inspection to be carried out.
- 4.7 Vendors for bought out items to be restricted to the approved vendor list attached with MR. Approval of additional vendor if required, for all critical bought out items shall be obtained by the supplier from the purchaser before placement of order. Credentials/ PTR of the additional vendor proposed to be submitted by supplier for review and approval of Purchaser/ Purchaser's representative

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ENGINEERING STANDARD


TECHNICAL SPECIFICATION FOR BALL VALVES

ENG-STD-PL-DOC-TS-013

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1.0 SCOPE


This specification provides minimum requirement for design, manufacturing, inspection, testing and supply of Carbon steel Ball Valves of ANSI class 150# to 300# and sizes ½” NB to 24”NB for service in non-sour gas pipelines.

Supply of Ball Valve is in scope of owner / client. This specification is for contractor's reference only.

2.0 REFERENCE DOCUMENTS

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

| | | |
|-----------------|---|---|
| API 6D | : | Specification for Pipeline Valves |
| API 6FA | : | Specification for Fire Test for Valves |
| ASME B 16.5 | : | Steel Pipe Flanges and Flanged Fittings. |
| ASME B 16.34 | : | Valves - Flanged, Threaded and Welding Ends. |
| ISO 17292: 2015 | : | Metal ball valves for petroleum, petrochemical and allied industries |
| ASME B 31.8 | : | Gas Transmission and Distribution Piping Systems |
| 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 |
| EN 10204 | : | Metallic products: Types of inspection documents |
| - | : | Data sheet for ball valves |
| API 598 | : | Valve Inspection and Testing |
| ASME 16.20 | : | Metallic gasket for pipe flanges – Ring joint or spiral wounds and jacketed. |
| ASME 16.21 | : | Non Metallic Gaskets for Pipe Flanges. |
| ASTM A370 | : | Standard Test Methods and Definitions for Mechanical Testing of Steel Products. |
| EN 10204 | : | Metallic Materials – Types of Inspection Documents |
| MSS-SP-6 | : | Standard Finishes for Contact Faces of Pipe Flanges and Connecting -end Flanges of Valves and Fittings. |
| MSS-SP-25 | : | Standard marking system for Valves, Fittings, Flanges and Union. |


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| MSS-SP-44 | : | Steel Pipeline Flanges. |
| MSS-SP-53 | : | Quality Std for Steel Casting & Forgings for Valves, Flanges & Fittings & Other Piping Components – Magnetic Particle Examination Method. |
| MSS-SP-55 | : | Quality Standard for Steel casting of valves, Flanges, Fittings & other Piping components (Visual Method) |
| MSS-SP-72 | : | Ball Valves with Flanged or Butt welding ends for General Service. |
| ISO 5208 | : | Industrial Valves – Pressure Testing of Valves |
| ISO 10497 | : | Testing of Valves – fire type testing requirements. |
| ISO 13623 | : | Petroleum & Natural Gas Industry – Pipeline Transportation System. Petroleum & Natural Gas Industry. Pipeline Transportation System – Pipeline Valves |
| ISO 14313 | : | NACE TM0177-2005, |
| SSPC-VIS-1 | : | Steel Structures Painting Council Visual Standard. In case of contradiction the most stringent shall apply. |
| NACE TM0177-2005 | : | Standard test method. Laboratory testing of metals for resistance to specific forms of environmental cracking in H ₂ S environments |
| BS 5351 | : | Steel Ball Valves for Petroleum, petrochemical and allied industries |
| BS EN 331 | : | Manually Operated Ball Valves and Closed Taper Plug Valves for Gas Installations |
| BS 6755-2 | : | Testing of Valves. Specification for fire type-testing requirement. |

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 service conditions as indicated in valve data sheet), which shall be subjected to approval by Purchaser.
- 3.2 Carbon steel used for the manufacture of valves shall be fully killed.
- 3.3 The carbon equivalent (CE) of valve end connections which are subject to further field welding by purchaser shall not exceed 0.43% (as calculated by the following formula) on check analysis for each heat of steel used:


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

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- 3.4 The steel used shall be suitable for field welding to pipes, flanges or fittings manufactured under ASTM A -234,A – 694, A – 420, A – 333, and API – 5L etc.
- 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, Charpy V-Notch test on each heat of base material shall be conducted as per API 6D, for all pressure containing parts such as body, end flanges and welding ends as well as bolting material for pressure containing parts. Charpy V-notch test shall be conducted at -29 °C. The Charpy V-notch test specimen shall be taken in the direction of principal grain flow and notched perpendicular to the original surface of plate or forging. The minimum average absorbed energy per set of three specimens shall be 35 J with an individual minimum per specimen of 28J at -29 °C. Test procedure shall conform to ASTM A 370 or ISO 148.
- 3.7 Valves shall be subjected to hardness test on base material for each heat for pressure containing parts. A full thickness cross section shall be taken for this purpose and the maximum hardness of the material of the valve components shall not exceed 248 HV₁₀ based on minimum four (4) measurements.
- 3.8 The ratio of effective YS/ UTS of the steel shall not exceed 0.85.

4.0 DESIGN AND CONSTRUCTION


- 4.1 Valve design shall be as per API 6D and other referred codes and shall be suitable for the process conditions indicated in the 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 B31.8. 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.
- 4.2 Corrosion Allowance for all valves to be used in sweet gas services shall be considered nil.
- 4.3 The manufacturer shall have valid license to use API monogram on valves manufactured as per API 6D.
- 4.4 Valve body design shall be fully welded for underground buried application. For above ground services body design can be either welded or bolted. Threaded body joints shall not be accepted.
- 4.5 Ball shall be of single piece, solid type construction.
- 4.6 All valves 4"NB and above shall be trunnion mounting type or as mentioned in the data sheet. Valves below 4" shall be floating/ TMBV type unless specifically mentioned in data sheet otherwise.
- 4.7 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 cannot be removed from seat ring and there is no extrusion during opening or closing operation at maximum differential pressure. The seat rings shall be designed so as to ensure sealing at low as well as high differential pressures. Seat design shall be as per valve data sheet.
- 4.8 All valves shall have two seating surfaces which in close position blocks the flow from both ends. The cavity between the seating surfaces is vented through a bleed connection provided on the body cavity, i.e., the valves shall be Double Block & Bleed (DBB).

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- 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 All valves of nominal valve size 150 mm (6") NB shall have provision for secondary sealant injection for Stem and 8" & above shall have provision for secondary sealant injection for Seat and Stem both, under full line pressure. All sealant injection connections shall be provided with an internal Non-return valve. Valve design shall have a provision to replace the sealant injection fitting under full line pressure.
- 4.11 All valves shall be provided with a vent and drain connection. Location and arrangement of vents and drains shall be as per Figure-1. Body vent and drain shall be provided with ball valve. Number and size shall be as per Figure-1.
- 4.12 Valve design shall ensure repair of stem seals/ packing under full line pressure.
- 4.14 a) Valve ends shall be either flanged or butt welded or one end flanged and one end butt welded as indicated in the Valve Data Sheet. Flanges of the flanged end cast/ forged body valves shall be integrally cast/ forged with the body of the 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) The length of butt welding ends shall be sufficient to allow welding and heat treatment without damage of the internal parts of the valves. Pup-Piece length shall be as per valve data sheet. Pipe for pup piece shall be seamless type only.
- c) Flanged end shall have dimensions as per ASME B 16.5, for valve sizes up to DN 600 mm (24") excluding DN 550 mm (22") MSS-SP-44 shall be referred. Flange face shall be either raised face or ring joint type as indicated in Valve Data Sheet. In case of RTJ flanges, the groove hardness shall be minimum 140 BHN. All flanged face shall have concentric serration with 125- 250 AARH finish.
- d) Butt welding end preparation shall conform to ASME B 16.25. In case of difference in thickness of valve body & mating pipelines, the bevel end of valve shall be as per ASME B 31.8. The end preparation shall take care of outside diameter of connecting pipe, wall thickness, material grade, SMYS & Special chemistry of welded material as indicated in the data sheet.
- 4.13 The temperature and pressure range of the valves shall be in accordance with the indicated values on the relevant piping specification and valve data sheet.
- 4.14 Wall thickness of parts used for the welding connection with the line pipe shall meet the following requirements:
- a) The maximum allowable stress in the material of butt-welds connection for butt welding shall be equal to 50% of the minimum yield strength guaranteed by the specification of steel used.
- b) The minimum wall thickness for butt welding connection must be greater than or equal to the largest valve of either the calculated minimum thickness of butt welding connections or the nominal thickness of pipe as indicated on data sheet.
- c) If the butt welding connections has a yield strength lower than the yield strength of the pipe to which it is intended to be welded, the wall thickness in each zone of the butt welding connection is at least equal to the specified pipe wall thickness time the ratio of minimum yield strength guaranteed by the specification of the steel of the pipe & minimum yield strength guaranteed by the specification of the steel of the butt welding connection.

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- d) The specified pipe wall thickness and grade with which the valve is intended to be used is specified in the data sheet.
- e) All valves under this specification shall be designed to withstand a field hydrostatic test pressure with non corrosive water. After installation during 24 hours when the ball is partially or fully open at a pressure level.
- $P = 1.5 \times D.P$
P = hydrostatic test pressure (bar)
D.P =Design Pressure.
- 4.15 Valve shall be provided with ball position indicator and stops of rugged construction at the fully open and fully closed positions.
- 4.16 Valves of nominal valve size, DN 150 mm (6”) and larger, shall be equipped with support foot and lifting lugs. Tapped holes and eyebolts shall not be used for lifting lugs. Height of support foot shall be kept minimum. The lifting lugs shall be stamped with safe working load.
- 4.17 In order to avoid stress induced crack and soft seat damage during direct field welding operation to valve body, all valves shall be supplied with welded pups at both ends which shall be considered as an integral part of the valves and also the ID of the pup shall match with pipe ID. The pup piece welding shall be carried out in controlled condition of temperature at manufacturer’s workshop. Field welding of pup piece shall not be allowed. Material & length of pup piece shall be as per Data sheet.
- 4.18 When indicated in Material Requisition, valves shall have locking devices to lock the valve either in full open (LO) or full close (LC) positions. Locking devices shall be permanently attached to the valve operator and shall not interfere with operation of the valve. Locking device shall be such that the valve shall operate when the differential pressure across the valve is $\leq 3\text{bar}$.
- 4.19 Valve design shall be such as to avoid bimetallic corrosion between carbon steel and high alloy steel components in the assembly. Accordingly, Suitable insulation shall be provided as required.
- 4.20 The valve stem shall be capable of withstanding the maximum operating torque required to operate the valve against the maximum differential pressure as per the appropriate class.
- 4.21 The combined stress shall not exceed the maximum allowable stresses specified in ASME Section VIII, Division 1. The design shall take into account a safety factor of 1.5 based on the maximum output torque of the operating mechanism. The valve Manufacturer shall guarantee that the breakaway torque after long periods of non- movement cannot exceed the normal short term breakaway torque by a factor more than 1.25, and that the safety factor specified above is not compromised.
- 4.22 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. The Length of stem extension shall be as indicated on the Valve Data Sheet. The length indicated corresponds to the distance between centerline of the valve opening and the centerline of the rim of the hand wheel on vertical shaft or centerline of the hand wheel on a horizontal shaft. In conformity with ISO 17292, valve shall be designed with an anti-blow-out stem so that the stem cannot be fully ejected by pressure inside the valve with the stem packing, gland retainer bolting removed.
- b) Manual override devices shall be provided on all valves

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- c) Vent, drain and sealant connections shall be terminated adjacent to the valve operator by means of suitable piping anchored to the valve body. Material shall be as per valve data sheet.
- d) The stem extension shall be self relieving.

4.24 Operating Devices

- a) In case of manual operation, valve sizes, 100 mm (NPS 4") and below shall be wrench/ hand wheel/ lever operated for Valves from 6"-10" shall be gear operated.

Valve design shall be such that damage due to malfunctioning of the operator or its control gear train or power cylinder and other 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 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's rated 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 the manual operation of all valves, the diameter of the hand wheel or the length of operating wrench shall be such that under the maximum differential pressure, the total force required to operate the valve does not exceed 350N. 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. The wrench length or hand wheel diameter shall be in accordance with API 6D requirements.


The manufacturer shall indicate the number of turns of the hand wheel (for gear operators), required for operating the valve from fully open to the fully closed 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 enclosure and shall be filled with suitable grease.
- f) The direction of closing to be marked on hand wheel.

- 4.25 Welding including repair welding of pressure controlling parts shall be as per welding procedure qualification specified in ASME Section IX.

- 4.26 The welders involved in welding shall be qualified in accordance with ASME Section IX.

- 4.27 Repair by welding is not permitted for forged body valves. However repair by welding as per ASME B 16.34 is permitted for cast body valves. Repair shall be carried out before any heat treatment of casting is done.

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- 4.28 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.
- 4.29 When specified on the Valve Datasheet, ball valves shall be “fire safe” in accordance with API 6FA, for which qualifying certificates, covering the range of items offered, shall be supplied by the Manufacturer.


5.0 INSPECTION AND TESTS

- 5.1 All inspection & testing shall be carried out as per QSL3 of API 6D as minimum and QAP provided elsewhere in the Bid.

The valve manufacturer must deliver a Certificate EN 10204 3.2 stating the quality, the mechanical properties (yield strength, tensile strength, and impact test at - 29 ° C), the chemical analysis of the process of manufacture and the marking (for ex: - heat number of material)

A new chemical analysis (up gradation) shall be done on specimen of valve in presence of TPIA.


- 5.2 All valves shall be visually inspected. The external and internal surfaces of the valves shall be free from any arc strikes, gouges and other detrimental defects.
- 5.3 Dimensional check on all valves shall be carried out as per the Purchaser approved drawings.
- 5.4 Chemical composition and mechanical properties shall be checked as per relevant material standards and this specification, for each heat of steel used.
- 5.5 Pressure containing parts of all valves such as body, bonnet, flange, welding ends and balls etc shall be subjected to impact test on each heat of base material as per API 6D.
- 5.6 Notch toughness properties Charpy V: The standard impact test temperature is - 29° C. The average value per series of 3 test specimen shall be equal to 35 J/cm². The minimum value per test specimen shall be equal to 28 J/cm²; this value may drop to 28 J/cm² per only test specimen per series. Number of Tests: 2 test sets (3 test specimens constitute one test set). For casting only 1 test set.
- 5.7 Non Destructive Examination
- 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. All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with MSS-SP-53.
- b) Body castings of all valves shall be 100% radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes body casting shall be subjected to 100% radiography.
- c) All forgings shall be 100% ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34. All forgings shall be subject to wet magnetic particle inspection on 100% of the internal surfaces. Method and acceptance shall comply with MSS-SP-53.

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- 5.8 Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME Sec-VIII Div.1, ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- 5.9 a) All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
- b) Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B 16.34.
- c) After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle method. Lamination defects in the bevel are not acceptable irrespective of the length. Rejectable defects must be removed. Weld repair of bevel surface is not permitted.
- 5.10 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 included in the hydrostatic shell test. No leakage is permissible during hydrostatic testing.

Following tests shall be performed as per Quality Assurance Plan:-

- High pressure pneumatic (N₂), shell and seat testing including extended stem at 1.1 x Design Pressure (300#)
 - Air seat test at 7 kg/cm²
 - Hyd. Shell Test at 1.5 times of rated design pressure
 - High pressure closure test
 - Double Block and Bleed Test
 - Testing shall be 100% checked and guide line shall be as per API 6D/ ASME B 16.34.
 - Antistatic Test shall be with 100% checking and guide line shall be BS EN 17292/ API6D.
 - Certificate / records of Fire safe Test shall be as per API 607/ API 6FA.
 - Visual inspection shall be 100% as per API 1104 / MSS-SP-55 and Dimension Inspection shall be 100% as per APPR.DRG./ B16.5/ B16.10/ B6.25/ API 6D.
- 5.11 A supplementary air seat test as per API 6D, Appendix C, Para C3.3 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.
- 5.12 Valves shall be subjected to Operational Torque Test as per Appendix C, Para C.6, API 6D under hydraulic pressure equal to maximum differential pressure corresponding to the valve rating. For manually operated valves, it shall be established that the force required to operate the valve does not exceed the requirements stated in this specification.
- 5.13 Subsequent to successful testing as specified above, one (1) valve out of the total ordered quantity shall be randomly selected by the Company Representative for cyclic testing as mentioned below:

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- a) The valve shall be subjected to at least min 10 Nos. Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.
- b) Subsequent to the above, the valve shall be subjected to hydrostatic test and supplementary air seat test.

Previously carried out prototype test of similar nature shall not be considered acceptable in place of this test.

- 5.15 Purchaser reserves the right to perform stage wise inspection and witness tests as indicated above at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to the Purchaser. Purchaser or Purchaser representative reserves the right to require additional testing at any time to confirm or further investigate a suspected fault. The cost incurred shall be borne to Manufacturer.

In no case shall any action of Purchaser or his inspector shall 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 TEST CERTIFICATES


Manufacturer shall submit the following certificates:

- a) Mill test certificates relevant to the chemical analysis and mechanical properties of the materials used for the valve construction as per the relevant standards / QAP.
- b) Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
- c) Test reports of radiograph and ultrasonic inspection, Visual, Dimensional.
- d) All other test reports and certificates as required by API 6D, this specification and data sheets.
- e) Fire safe test certificates as per API 6FA.

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.

7.0 PAINTING, MARKING AND SHIPMENT

- 7.1 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, the external surfaces of buried portion of the valve shall be painted with three coats of suitable Polyurethane (PU) epoxy resin with a minimum dry film thickness of 1000 microns for UG Valve, 300 microns (epoxy point) for AG Valve.

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- 7.2 All valves shall be marked as per API 6D. The units of marking shall be metric except nominal which shall be in inches.
- 7.3 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.
- 7.4 All sealant lines and other cavities of the valve shall be filled with sealant before shipment.
- 7.5 Packaging and shipping instructions shall be as per API 6D and procurement documentation. All valves shall be transported with ball in the fully open condition.
- 7.6 On packages, following shall be marked legibly with suitable marking ink:
- a) Order Number
 - b) Manufacturer's Name and/or make
 - c) Valve size and rating
 - d) Tag Number
 - e) Serial Number
- F) API monogram;
- G) API class designation;
- H) Maximum Operating Pressure;
- I) Part number, year of manufacture and/or order number;

8.0 SPARES AND ACCESSORIES

- 8.1 Manufacturer shall furnish list of recommended spares and accessories for valves required during start-up and commissioning.
- 8.2 Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of valves.
- 8.3 Manufacturer shall quote for spares and accessories as per Material Requisition.

9.0 DOCUMENTATION

- 9.1 At the time of bidding, Manufacturer shall submit the following documents:
- a) Filled in Data Sheet
 - b) 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 dimension.

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- c) 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 with the requirements of this specification.
- d) 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.
- e) 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.
- f) Clause wise list of deviations from this specification, if any.
- g) Descriptive technical catalogues of the manufacturer.
- h) Installation, Operational and Maintenance Manual.
- i) Copy of valid API 6D Certificate.
- j) Details of support foot including dimensions and distance from valve centerline to bottom of support foot.

9.2 Within three weeks of placement of order, the Manufacturer shall submit four copies of, but not limited to, the following drawings, documents and specifications for Purchaser's approval:


- a) Detailed sectional drawings showing all parts with reference numbers and material specifications.
- 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.
- c) Welding, heat treatment and testing procedures.
- d) Details of corrosion resistant paint to be applied on the valves.

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

9.3 CD containing all docs shall be submitted within 30 days from the approval date, Manufacturer shall submit to Purchaser one reproducible and six copies of the approved drawings, documents and specifications.

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

- a) Test certificates
- b) Manual for installation, erection, maintenance and operation instructions including a list of recommended spares for the valves.

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9.5 All documents shall be in English language only.

10.0 GUARANTEE


10.1 Manufacturer shall guarantee that the material and machining of valves and fittings comply with the requirements in this specification and in the purchase order.

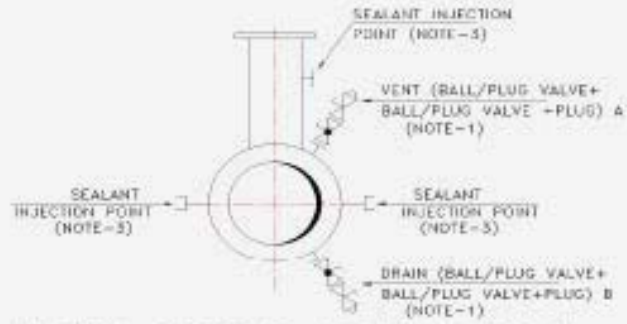
10.2 Manufacturer is bound to replace or repair all valve parts which should result defective due to inadequate engineering or to the quality of materials and machining.

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

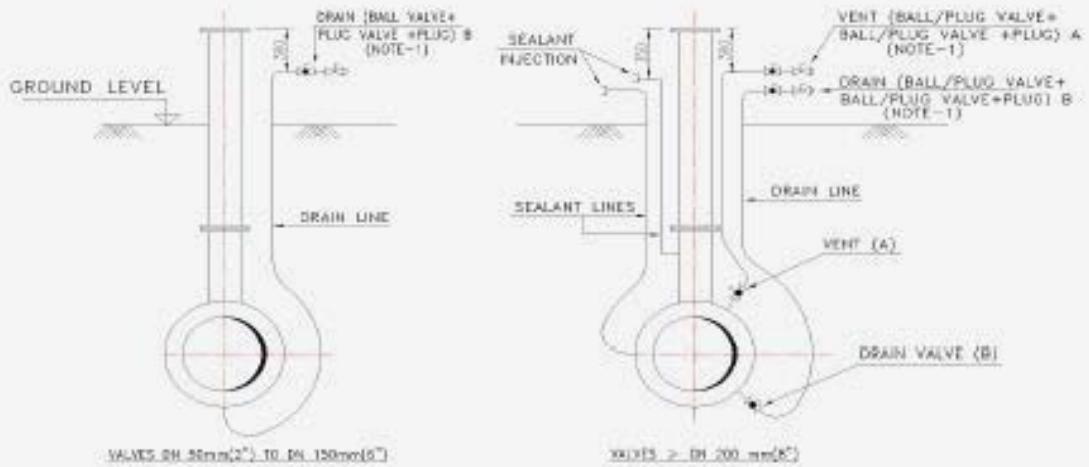
10.4 Any defect occurring during the period of Guarantee shall be attended to by making all necessary modifications and repair of defective parts free of charge to the Purchaser as per the relevant clause of the bid document.

10.5 All expenses shall be to Manufacturer's account.

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ABOVE GROUND INSTALLATION



UNDERGROUND INSTALLATION

| SIZES OF VENT & DRAIN CONNECTIONS | | |
|-----------------------------------|-----------|-----------------|
| NOM. VALVE SIZE | A. DN(mm) | B. DN(mm) |
| 50 TO 150 | - | 15 |
| 200 TO 800 | 15 | 25 |
| 750 & ABOVE | 15 | 50 (SEE 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

ENGINEERING STANDARD

TECHNICAL SPECIFICATION FOR GLOBE VALVES


ENG-STD-PL-DOC-TS-014

| Rev | Date | Purpose | Prepared By | Checked By | Approved By |
|-----|----------|-------------|-------------|------------|-------------|
| 0 | 31.10.16 | First Issue | SC | SK | KG |



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1.0 GENERAL


- 1.1 This specification provides minimum requirement for design, manufacturing, Inspection, Testing and supply of Carbon steel Globe Valves of sizes ½" NB to 12"NB (300mm) for service in non-sour gas pipelines.
- 1.2 Vendor shall quote in strict accordance with the valve Data / Specification sheets, technical specification and enclosures to this specification. Deviations to the Specification / Data sheets, if any, shall be indicated as per clause 2.0. Vendor shall supply valves along with auxiliaries, if any, such as gear operator, bypasses, drains, etc., specified in the valve specification sheets and this specification.
- 1.3 All codes and standards for manufacturing, testing, inspection etc., shall be of latest editions. Also refer data sheet (attached elsewhere in the bid document) for globe valves.

1.4 Materials

- 1.4.1 Material for major components of the valves shall be as indicated in Valve Data Sheet. In addition, the material shall also meet the requirements specified herein. Other components shall be as Manufacturer's standard (suitable for service conditions as indicated in valve data sheet), which shall be subjected to approval by Purchaser.
- 1.4.2 Carbon steel used for the manufacture of valves shall be fully killed. Carbon equivalent (CE) of valve end connections which are subject to further field welding, as calculated by the following formula, shall not exceed 0.43% on check analysis for each heat of steel used.

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

- 1.4.3 Charpy V-Notch test on each heat of base material shall be for all pressure containing parts such as body, end flanges and welding ends as well as bolting material. Unless specified otherwise, the Charpy impact test shall be conducted at -29°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.
- 1.4.4 The minimum average absorbed energy per set of three specimens shall be 35 J with an individual minimum per specimen of 28J at -29°C. No specimen shall exhibit less than 85 percent shear area.
- 1.4.5 Impact test for all material shall be carried out as per QAP.
- 1.4.6 The ratio of effective YS/ UTS of the steel shall not exceed 0.85.
- 1.4.7 Valves shall be subjected to hardness test on base material for each heat for pressure containing parts. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four (4) measurements. Grain size shall be 8 or finer as per ASTM E112.

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2.0 DOCUMENTATION

2.1 Vendor shall submit with the offer the following:

2.1.1 Manufacturer's complete descriptive and illustrative Catalogue/ Literature.

2.1.2 Detailed dimensioned general arrangement and cross-sectional drawings with Parts/ material lists, weight etc., for valves to manufacturer's standard.

2.1.3 Drawings for valves with accessories like gear operator, extension bonnet, extended stems with stands bypass, etc., giving major salient dimensions.

2.1.4 One copy of the valve technical specification and data sheets signed as "ACCEPTED" by the manufacturer with all deviations marked clearly.

2.1.4 If the valve is regretted or has no deviation, the manufacturer shall write clearly on valve specification sheets as "REGRET" or "NO DEVIATION".

2.1.5 If there is any deviation in the specification, the same shall be listed clause wise. Even clauses which are acceptable shall be categorically confirmed as "ACCEPTED".

2.1.6 On failure to submit document as specified in clauses 2.1.1 to 2.1.5 above, the offer is likely to be rejected.

2.2 Vendor shall submit for approval the drawings mentioned in item no 2.1.2 & 2.1.3 and Detailed Testing procedures, welding procedure specification and NDT Procedure within three weeks of placement of order.

2.2.1 Test reports shall be supplied for all mandatory tests as per the applicable code. Test reports shall also be furnished for any supplementary tests as specified in clause 3.11 to 3.16.


2.2.2 Material test certificates (Physical property, chemical composition, welding and heat treatment report) of the pressure containing parts shall be furnished for the valves supplied. Material test certificates for the other parts shall also be furnished for verification during inspection.

2.2.3 Manufacture of valves shall commence only after approval of the above documents. Once the approval has been given by Owner/ Owner's Representative, any changes in design, material and method of manufacture shall be notified to Owner/ Owner's Representative whose approval in writing of all changes shall be obtained before the valve is manufactured.

3.0 DESIGN AND CONSTRUCTION

3.1 Valves shall be designed, manufactured, tested, inspected and marked as per the manufacturing standards design codes and standards (Latest editions) indicated in the respective valve specification sheets. Any conflict between the technical specification, specification sheets and referred standard codes shall be brought to the notice of the purchaser for clarifications and more stringent shall apply. No deviation to specification/ standard shall be permitted through vendor drawings approval. Approval of drawings shall be valid only for design features.


3.2 Bonnet extension wherever specification the valve sheet to BS: 6364 shall be for "Non Cold Box Application" unless otherwise specified in the requisition.

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- 3.3 Lifting Lug shall be integral part of the valve.
- 3.4 All flanged valves shall have flanges integral (except forged valves) with the valve body. Flange finish shall be as per valve data sheet.
- 3.5 For all weld end valves with bevel end as per ANSI B16. 25.
- 3.6 If an overlay weld-deposit is used for the body seat ring and seating surface, the seat ring base material shall be at least equal to the corrosion resistance of the material of the shell.
- 3.7 Valve body/ bonnet shall be forged/ cast as specified. Forging is acceptable in place of casting but not vice-versa.
- 3.8 Material of construction of yoke shall be minimum equivalent to body/ bonnet material.
- 3.9 Stem shall be forged or machined from forged / rolled bar. No casting is permitted.
- 3.10 Stellite / hard facing by deposition shall be minimum 1.6 mm. Renewable seat ring may be seal welded.
- 3.11 As a pre-qualification low temperature carbon steel, (LTCS), 3 ½ Ni steel (CRYO) & austenitic stainless (CRYO) valves shall be subjected to cryogenic test as per BS 6364 and test shall be witnessed and certified by purchaser inspection agency. The vendor has to submit test certificate for prototype valves along with the offer. Prototype test carried on a particular size, rating and design will qualify valves of sizes equal to and below the particular size of the same rating and design.
- 3.12 Wherever impact test of SS studs/ nuts is called for in the data sheet, the impact value shall be 27J at the intended service temperature specified in the data sheets.
- 3.13 For all austenitic stainless steel valves Inter Granular Corrosion (IGC) test shall have to be conducted as per following:
- ASTM A 262 practice "B" with acceptance criteria of "60 Mills/ Year (Max.)" – For all materials forged, rolled, wrought and casting.
- OR
- ASTM A 262 practice "E" with acceptance criteria of "No cracks as observed form 20x magnification" – For all materials other than castings. "Microscopic structure to be observed form 250x magnification" in addition.
- 3.14 Spiral wound bonnet gasket is to be provided with inner/ outer ring except when encapsulated gaskets type body- bonnet joints are employed.
- 3.15 Vendor to provide the list of spares for commissioning and 2 years of operation & maintenances.

4.0 OPERATION

- 4.1 Generally the valves are hand wheel or lever operated up to 4". Gear operation shall be provided as under:

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| Class | Size Requiring- Gear Operator |
|-------|-------------------------------|
|-------|-------------------------------|


| | |
|------|---------------|
| 300# | 6" and Larger |
|------|---------------|

For sizes lower than these ranges, hand wheel shall be provided.

- 4.2 Gear operator shall be totally enclosed bevel gear in grease case with grease nipples/ plugs with position indicators for open / close position.
- 4.3 Where gear operator is not called for as per clause 4.1 but vendor recommends a gear operator, he shall highlight such case/s and quote separate prices for the valve and gear operator.
- 4.4 Gear operator shall be so designed to operate effectively with the differential pressure across the closed vale equal to the cold non-shock pressure rating.
- 4.5 Hand wheel diameter shall not exceed 750 mm and lever length shall not exceed 500 mm. on both sides. Effort to operate shall not exceed 35 kgs at hand wheel periphery. However failing to meet the above requirements vendor shall offer gear operated valve and quote as per clause 4.3.
- 4.6 Gear used in the gear operated valve shall be of non-sparking type.

5.0 INSPECTION AND TESTING

- 5.1 Every valve shall be subjected to all the mandatory tests and checks called in the respective codes/ QAP.
- 5.2 Every valve, its components and auxiliaries be subjected to all the mandatory tests and checks called in the respective codes, data sheets etc. by the manufacturer.
- 5.3 Though the extent of inspection by purchaser or his authorized representative shall be as under, however exact extent with hold points shall be decided by Owner's Representative and recorded in the form of inspection plan. Inspection shall be confirming to EN 10204 3.2 certification. Vendor shall submit QAP for Owner / Owner's Representative's approval before starting the production of valves.
- 5.4 In case of motor operated or actuator operated valves, functional/operational checks as per the requirements of the specifications shall be made on each valve.
- 5.5 Pressure containing parts of all valves such as body, bonnet, flange, welding ends and balls etc. shall be subjected to impact test on each heat of base material as per the QAP attached in bid document.
- 5.6 Manufacturer shall give reasonable access and facilities required for inspection to the Purchaser. 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 shall 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.
- 5.7 All 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

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ASME VIII, Division 1 Appendix 12 and ASME VIII div 2, respectively.

- 5.8 All finished valve ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
- 5.9 Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined.
- 5.10 After final machining, all bevel surfaces shall be inspected by dye penetrate or wet -magnetic particle methods. Laminations shall not be acceptable.
- 5.11 Weld repair of bevel surface is not permitted.
- 5.12 One (1) valve out of the total ordered quantity shall be randomly selected by the Company Representative for cyclic testing as mentioned below:
- a) The valve shall be subjected to at least 500 Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.
 - b) Subsequent to the above, the valve shall be subjected to hydrostatic test and Supplementary air seat test in accordance with QAP.

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 Purchaser. Previously carried out prototype test of similar nature shall not be considered in place of this test.


- 5.13 All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B16.34.
- 5.14 All forgings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B16.34.
- 5.15 All valves, with body made by forgings, shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B16.34.
- 5.16 Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B31.8 and API 1104.
- 5.17 All other tests shall be carried out as per the QAP.

6.0 RADIOGRAPHY OF CAST VALVES

- 6.1 Valve casting shall undergo radiographic examination as specified hereunder:

| Material | Rating | Size Range | Radiography |
|----------|--------|------------|-------------|
| All | 300# | All Sizes | 100% |

- 6.2 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

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be radio-graphed for types of valve not covered in ANSI B-16.34, vendor shall enclose details of areas to be radiographed in line with ANSI B-16.34.

- 6.3 Random radiography wherever specified in individual data sheets, the sampling shall be per size of the quantity ordered for each foundry.
- 6.4 Radiography wherever specified in the data sheets or as per clause 6.1 shall be done by X-Ray/ Gamma-Ray to get the required sensitivity.
- 6.5 Over and above the stipulation laid down in clauses 6.1, 6.2, 6.3 & 6.4, all valve castings shall only be procured among the foundries after obtaining approval from Owner / Owner's Representative.

7.0 QUALITY ASSURANCE PLAN (QAP)

7.1 Procurement of Bought Out Materials

All critical materials such as casting, forging, pressure holding parts, electrical and instrument accessories, etc. shall be purchased by the Vendor from Owner / Owner's Representative's approved suppliers meeting Qualification Criteria stipulated if any.

Vendor shall submit a list of bought out materials and sub-vendors for these bought out materials for owner/ Owner's Representative approval within 2 weeks from Telefax/ Letter of Intent. Vendor has to submit the Quality Assurance Plan (QAP) at the time of bidding.

7.2 Calibration Records

Vendor shall use only calibrated measuring and test instruments and maintain calibration records. Vendor shall furnish records of calibration of measuring and test instruments including re calibration records to concerned purchaser inspection engineer.

7.3 Quality Records

Vendor shall maintain quality records as per approved procedures. Inspection, Reports & Test Record. Copies shall be furnished to purchaser inspection engineer.


7.4 Final Documentation

Final drawings/ documents consisting of technical data manual/ mechanical catalogue is a compilation of "as built" certified, drawings and data, manufacturing and test records, installation, operating and maintenance instructions. For drawings where Purchaser's approval is required, the final certified drawings shall be included. Final documents shall be legible photocopies in A4, A3 or A2 size only. The purchase requisition shall also form a part of the final documentation. TPIA shall issue 3.2 certificates as per EN 10204.

7.5 Test Certificates

Manufacturer shall submit the following certificates:

- i) Mill test certificates relevant to the chemical analysis and mechanical properties the materials used for the valve construction and Heat treatment chart(if applicable) as per the relevant

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standards & QAP.

- ii) Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
- iii) All relevant test reports like radiograph Inspection, ultrasonic inspection, MPT/ DPT Inspection, Visual & Dimensional Inspection records as per approved QAP.
- iv) All other test reports and certificates as required by BS 1873, this specification and data sheets.
- v) Manufacturer / TPIA 3.2 (as per BS EN 10204) confirmation certificate.

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 MARKING

- 8.1 Valve markings, symbols, abbreviations etc. shall be in accordance with MSS SP- 25 or the standard referred in specification sheet as applicable. Vendors name, valve rating, material designation, nominal size, direction of flow (if any) etc. shall be integral on the body.
- 8.2 Each valve shall have a corrosion resistant tag giving size, valve tag / code no, securely attached on the valve body.
- 8.3 Paint or Ink for marking shall not contain any harmful metal or metal salts such as zinc, lead or copper which causes corrosive attack on heating.
- 8.4 All valves shall be coated / painted as per painting specification/ relevant specification mentioned anywhere in the bid.
- 8.5 All alloy steel high temp valves shall be painted with heat resistant silicone paint suitable for intended temperature.


9.0 DESPATCH

- 9.1 Valves shall be dry, clean and free from moisture, dirt and loose foreign materials of any kind.
- 9.2 Valves shall be protected from rust, corrosion and any mechanical damage during transportation, shipment and storage.
- 9.3 Rust preventive on machined surfaces to be welded shall be easily removable with a petroleum solvent or not harmful to welding.

- 9.4 Each end of valves shall be protected with the following materials:

| | |
|----------------|--------------------------------|
| Flange face | : Wood, Metal or Plastic cover |
| Beveled end | : Wood, Metal or Plastic cover |
| SW & Scrd. End | : Plastic cap |


- 9.5 End protectors to be used on flange faces shall be attached by at least three bolts or wiring through bolt holes and shall not be smaller than the outside diameter of the flange. However plastic caps for SW & SCRD. End valves shall be press fit type.

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- 9.6 End protectors to be used on beveled end shall be securely and tightly attached.
- 9.7 For special service valves additional requirement of dispatch shall be prescribed in data sheet.
- 9.8 All spares required for start-up and commissioning shall be supplied along with the valve.

10.0 GUARANTEE

- 10.1 Manufacturer shall guarantee that the material and machining of valves and fittings comply with the requirements in this specification and in the purchase order.
- 10.2 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.
- 10.3 If valve defect or malfunctioning cannot be eliminated, Manufacturer shall replace the valve without delay.
- 10.4 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.
- 10.5 All expenses shall be to Manufacturer's account.

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Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR BALL
VALVE 2" AND ABOVE
SIZE (150#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 001

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| | | | | | |
|-------------------------|---|---------------------------|--------------------------|---|---------------------------|
| Tag No. | : | As per PO | ANSI Rating | : | 150# |
| Owner Specification No. | : | ENG-STD-PL- DOC-TS-013 | Valve Bore | : | Full Bore |
| Design Std | : | API 6D | Face Finish F/E & B/W | : | 125-250 AARH |
| Size | : | As per P&ID | End Connection | : | ASME B 16.5/ ASME B 16.25 |

VALVE DESIGN CONDITION

| | | | | | |
|---------------------|---|---------------------------|----------------------|---|-------------|
| Corrosion Allowance | : | 1.5 mm | Temperature in °C | : | -10 to 65 |
| Service | : | Natural Gas (Non-sour) | Installation | : | A/G and U/G |
| Design Factor | : | 0.4 | Connecting Pipe | : | As per PO |

SERVICE CONDITIONS

| | |
|-----------------|-------------|
| Service | Natural Gas |
| Design Pressure | 19 Bar-g |
| Design temp. | -10 to 65 |

STEM EXTENSION

| | |
|----------------|-------------------------|
| Stem Extension | For U/G mainline Valves |
| Stem Height | Refer Note 8 |

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Lyons Engineering Pvt. Ltd.

DATA SHEET FOR BALL VALVE 2" AND ABOVE SIZE (150#)

Doc No. LEPL/ GGPL/ DS/ MECH/ 001

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VALVE CONSTRUCTION

| | | | |
|----------------|----------------------|----------------------|------------------|
| Size | 2" size | 2" to 12" size | 2"to 12" size |
| Type | A/G and U/G | A/G | U/G |
| Body | Fully Welded/ Bolted | Fully Welded/ Bolted | Fully Welded |
| Seat | Floating Type | Trunnion Mounted | Trunnion Mounted |
| End Connection | Flanged/ Welded | Flanged/ Welded | Welded |

VALVE MATERIAL SPECIFICATION (Equivalent or superior)

| Description | Material Specified | Material Offered** |
|----------------------------------|--|--------------------|
| Body | ASTM A 216 Gr. WCB | |
| Ball | (ASTM A 216 Gr. WCB/ A 234 Gr. WPB/ A395 Gr. LF2 + 75 MICRON ENP) / AISI 410 | |
| Body seat Ring | (AISI 4140 + 75mm ENP)/ AISI 410 | |
| Seat Seal (Secondary) | VITON / PTFE | |
| Stem (No Casting – Single Piece) | (AISI 4140 + 75 microns ENP)/ AISI 410 | |
| Stem Seal | VITON / PTFE | |
| Stud Bolts | ASTM A 193 Gr. B7/ ASTM A 194 Gr. 2H | |
| Nuts | ASTM A 193 Gr. B7/ ASTM A 194 Gr. 2H | |
| Pup piece | Refer Note 6 (API 5L/ ASTM A106 Gr. B Charpy) | |

** - To be filled by vendor

TESTING REQUIREMENTS

| | | | | | |
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| | | |
|-------------------------|---|--|
| Charpy Impact | : | Body & side pieces, Ball & seat, Stem as per the MOC or API 6D values whichever is stringent |
| Hydrostatic Test | : | Body: 1.5 x rated Pressure; Seat: 1.1 x Rated Pressure. |
| Pneumatic test with N2 | : | 19 Bar(g) for 5 min |
| Low pressure Seat (Air) | : | 7 Bar(g) |
| Hardness test | : | 248HV 10 Max. |
| NDE test | : | Refer Note 16 |

NOTES:

1. This Valve data sheet shall be read in conjunction with Job specification of Ball valve & Hydraulic actuators.
2. Valve shall confirm to QSL3 as per API 6D.
3. Ball and Stem shall be Nickel Plated (ENP) min. thickness 75 μ , to reach a suitable hardness or equivalent proven design.
4. All Valves Shall be Provided with antistatic feature and antistatic test as per ISO EN 17292 / API 6D shall be performed.
5. All valves shall be provided with anti blowout proof arrangement as per ISO EN 17292 / API 6D.
6. Pup piece shall be conforming to the connecting line pipe specification and seamless in construction up to 12".
7. Valve design shall be fire safe as per API 6FA.
8. Stem height will be furnished / decided during detail engineering for Underground valves.
9. All Inspection and tests shall be carried out as per relevant approved QAP. Unless otherwise specified, all tests shall be witnessed by the purchase / control authority.
10. All valves 4" and above shall be Trunnion Mounted.
11. Vent and Drain Connection shall have arrangement of 1 ball Valve + 1 Needle Valve + Depressurizing plug. MOC of Valve, plug and Tube shall be SS 316.

| | | | | | |
|------|----------|-------------|--------------|-------------|--------------|
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12. The Stem sealant connection shall be equipped with a check valve integrated in the body + Needle valve + Sealant Fitting. MOC shall be SS 316.

13. Vent, Drain and Sealant Connection with valve body shall be seal welded.

14. The Final Coat of Painting shall have RAL 9010 for valve.

15. TPIA shall issue EN 10204 3.2 certification for valve.

16. Non Destructive Examination

- Body castings of all valves shall be 100% radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
- All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34.
- Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
- Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.
- After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Reject able defects must be removed. Weld repair of bevel surface is not permitted.

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Lyons Engineering Pvt. Ltd

**DATA SHEET FOR
BALL VALVE
2" AND ABOVE SIZE
(300#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 002

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| | | | | | |
|-------------------------|---|---------------------------|--------------------------|---|---------------------------|
| Tag No. | : | As per PO | ANSI Rating | : | 300# |
| Owner Specification No. | : | ENG-STD-PL- DOC-TS-013 | Valve Bore | : | Full Bore |
| Design Std | : | API 6D | Face Finish F/E & B/W | : | 125-250 AARH |
| Size | : | As per P&ID | End Connection | : | ASME B 16.5/ ASME B 16.25 |

VALVE DESIGN CONDITION

| | | | | | |
|---------------------|---|---------------------------|----------------------|---|----------------|
| Corrosion Allowance | : | 1.5 mm | Temperature in °C | : | (-)29 to (+)65 |
| Service | : | Natural Gas (Non-sour) | Installation | : | A/G or U/G |
| Design Factor | : | 0.4 | Connecting Pipe | : | As per PO |

SERVICE CONDITIONS

| | |
|-----------------|----------------|
| Service | Natural Gas |
| Design Pressure | 49 Bar-g |
| Design temp. | (-)20 to (+)65 |

STEM EXTENSION

| | |
|----------------|-------------------------|
| Stem Extension | For U/G mainline Valves |
| Stem Height | Refer Note 8 |

| | | | | | |
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BALL VALVE
2" AND ABOVE SIZE
(300#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 002

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VALVE CONSTRUCTION

| | | | |
|----------------|----------------------|----------------------|------------------|
| Size | 2" size | 2" to 12" size | 2" to 12" size |
| Type | A/G and U/G | A/G | U/G |
| Body | Fully Welded/ Bolted | Fully Welded/ Bolted | Fully Welded |
| Seat | Floating Type | Trunnion Mounted | Trunnion Mounted |
| End Connection | Flanged/ Welded | Flanged/ Welded | Welded |

VALVE MATERIAL SPECIFICATION (Equivalent or superior)

| Description | Material Specified | Material Offered** |
|----------------------------------|--|--------------------|
| Body | ASTM A 216 Gr. WCC/ A 234 Gr for Valves above 2" size | |
| Ball | ASTM A 216 Gr. WCC/ A 234 Gr / A395 +75 microns ENP]/ AISI 410 | |
| Body seat Ring | (AISI 4140 +75 micron ENP)/ AISI 410 | |
| Seat Seal (Secondary) | VITON / RPTFE/ As per manufacturer | |
| Stem (No Casting – Single Piece) | (AISI 4140 +75 micron ENP)/ AISI 410 | |
| Stem Seal | VITON / RPTFE / As per manufacturer recommendation | |
| Stud Bolts | ASTM A 193 Gr. B7/ A194 Gr. 2H | |
| Nuts | ASTM A 193 Gr. B7/ A194 Gr. 2H | |
| Pup piece | Refer Note 6 (API 5L/ ASTM A 106 Gr. B (Charpy)) | |

** - To be filled by vendor

TESTING REQUIREMENTS

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BALL VALVE
2" AND ABOVE SIZE
(300#)**

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| | | |
|-------------------------|---|--|
| Charpy Impact | : | Body & side pieces, Ball & seat, Stem as per the MOC or API 6D values whichever is stringent |
| Hydrostatic Test | : | Body: 1.5 x rated Pressure; Seat: 1.1 x Rated Pressure. |
| Pneumatic test with N2 | : | 49 Bar(g) for 5 min |
| Low pressure Seat (Air) | : | 7 Bar(g) |
| Hardness test | : | 248HV 10 Max. |
| NDE test | : | Refer Note 16 |

NOTES:

1. This Valve data sheet shall be read in conjunction with Job specification of Ball valve & Hydraulic actuators.
2. Valve shall confirm to QSL3 as per API 6D.
3. Ball and Stem shall be Nickel Plated (ENP) min. thickness 75 μ , to reach a suitable hardness or equivalent proven design.
4. All Valves Shall be Provided with antistatic feature and antistatic test as per ISO EN 17292 / API 6D shall be performed.
5. All valves shall be provided with anti blowout proof arrangement as per ISO EN 17292 / API 6D.
6. Pup piece shall be conforming to the connecting line pipe specification and seamless in construction up to 12".
7. Valve design shall be fire safe as per API 6FA.
8. Stem height will be furnished / decided during detail engineering for Underground valves.
9. All Inspection and tests shall be carried out as per relevant approved QAP. Unless otherwise specified, all tests shall be witnessed by the purchase / control authority.
10. All valves 4" and above shall be Trunnion Mounted.
11. Vent and Drain Connection shall have arrangement of 1 ball Valve + 1 Needle Valve + Depressurizing plug. MOC of Valve, plug and Tube shall be SS 316.
12. The Stem sealant connection shall be equipped with a check valve integrated in the body + Needle valve + Sealant Fitting. MOC shall be SS 316.

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**DATA SHEET FOR
BALL VALVE
2” AND ABOVE SIZE
(300#)**

**Doc No. LEPL/ GGPL/ DS/
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13. Vent, Drain and Sealant Connection with valve body shall be seal welded.

14. The Final Coat of Painting shall have RAL 9010 for valve.

15. TPIA shall issue EN 10204 3.2 certification for valve.

16. Non Destructive Examination

- Body castings of all valves shall be 100% radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
- All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34.
- Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
- Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.
- After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Reject able defects must be removed. Weld repair of bevel surface is not permitted.

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Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR SOCKET
WELDED BALL VALVE (SIZE
BELOW 2"- 800#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 004

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DATA SHEET FOR BALL VALVES (BELOW 2" 800#)

| Sr. No. | Description | Specification | | | |
|-------------------------------------|--|--|--------------|-------------|--------------|
| GENERAL | | | | | |
| 1 | Valve Size | Below 2" | | | |
| 2 | ANSI Rating | ANSI 800# | | | |
| 3 | Design Standard | BS EN ISO 17292 | | | |
| 4 | Corrosion allowance | 1.5MM | | | |
| 5 | Design Factor | 0.4 | | | |
| SERVICE CONDITIONS | | | | | |
| 6 | Service | Natural Gas | | | |
| 7 | Design Pressure | 138 Bar-g | | | |
| 8 | Design Temperature | -29°C to 65°C | | | |
| VALVE CONSTRUCTION DESIGN | | | | | |
| 11 | Location | Above Ground/Under Ground | | | |
| 12 | Valve Type(Floating/Trunion | Floating | | | |
| 13 | Bore(Full/Reduced) | Full Bore | | | |
| 14 | End Connections | Socket welded/ Threaded (as per ASME B 16.11, ASME B 1.20.1) | | | |
| 15 | Locking arrangement | Locking facility in full open position | | | |
| 16 | Shutoff Class | VI | | | |
| 17 | Three Piece construction/ Bolted | Required | | | |
| 18 | Bi- Directional | Required | | | |
| 19 | Double Block and Bleed | Not Required | | | |
| 20 | Blow out proof stem | Required | | | |
| 21 | Anti-static device | Required | | | |
| 22 | Lever operation | Required | | | |
| 23 | Open and close Ball position indicator | Required | | | |
| VALVE MATERIAL SPECIFICATION | | | | | |
| | Part | Specified Material | | | |
| 24 | Body | ASTM A 105 | | | |
| 25 | Ball (SOLID) | 13% Cr. Steel | | | |
| 26 | Seat | RPTFE/ DELRIN | | | |
| 27 | Stem | 13% Cr. Steel (NO CASTING) | | | |
| 28 | Stem seals | GRAFOIL | | | |
| 29 | Stud bolts / Nuts | ASTM A 193 Gr B7/ A194 Gr. 7 | | | |
| 30 | Gland | 13% Cr. Steel | | | |
| 31 | Gland Packing | GRAFOIL | | | |
| VALVE TESTING REQUIREMENT | | | | | |
| 32 | Fire Resistant Design Requirement | As per API 6FA/API 607 / BS : 6755 (Part - II) BS | | | |
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**DATA SHEET FOR SOCKET
WELDED BALL VALVE (SIZE
BELOW 2"- 800#)**

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| | | EN ISO 10497/API-RP-6FA | |
|---|---------------------------------|---|-----------------------|
| 33 | Hydrostatic Test | Body | 1.5 X Design Pressure |
| | | Seat | 1.1 X Design Pressure |
| 34 | Air Seat Test | 7 Bar-g | |
| 35 | Anti Static Testing Requirement | Direct current <12V and resistance on dry valves shall not exceed 10 Ohms | |
| 36 | Charpy Impact Test | Body & side pieces, Ball & seat, Stem as per the MOC standard | |
| 37 | Hardness test | As per Material of construction standard | |
| 38 | NDE Test | Refer Note 9 | |
| 39 | Marking & Painting Spec. | SSPC-SP/MSS SP-25 and BS 5351 | |
| NOTE:- | | | |
| 1. Inspection and Testing shall be as per this Data Sheet, BS EN ISO 17292, and API 598 | | | |
| 2. Short pattern valves are not acceptable. | | | |
| 3. Valves shall be lever operated | | | |
| 4. Test Certificates shall be reviewed by client/TPIA as per approved QAP, GA drawing, Inspection & Test certificates including NDE. | | | |
| 5. Bidder shall clearly mention deviation, if any. | | | |
| 6. 100% of valve shall undergo hydro test of seat, soft seat shall be replaced after hydro test. After that all valves shall be air tested. | | | |
| 7. 100% valves castings shall be subjected to radiography test. | | | |
| 8. This Data Sheet shall be read in conjuncture with the Technical Notes for Valves. | | | |

Note 9: Non Destructive Examination

- Body castings of all valves shall be 100% radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
- All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34.
- Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
- Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.

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WELDED BALL VALVE (SIZE
BELOW 2"- 800#)**

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- After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Reject able defects must be removed. Weld repair of bevel surface is not permitted.

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|------|----------|-------------|--------------|-------------|--------------|
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| | | | | | |
|-------------------------|---|---------------------------|-----------------------------|---|-------------------------------|
| Tag No. | : | As per PO | ANSI Rating | : | 150# |
| Owner Specification No. | : | ENG-STD-PL- DOC-TS-014 | Valve Bore | : | Reduced Opening Port |
| Design Std | : | API 602/BS 1873 | Face Finish (Flange End) | : | 125-250 AARH |
| Size | : | As per P&ID | End Connection | : | ASME B 16.5 (Flanged)/ Welded |

VALVE DESIGN CONDITION

| | | | | | |
|---------------------|---|---------------------------|-------------------|---|--------------------|
| Corrosion Allowance | : | 1.5 mm | Temperature in °C | : | (-)10 to (+)65 |
| Service | : | Natural Gas (Non-sour) | Installation | : | A/G or U/G |
| Design Factor | : | 0.4 | Connecting Pipe | : | As per P&ID and PO |

SERVICE CONDITIONS

| | |
|-----------------|----------------|
| Service | Natural Gas |
| Design Pressure | 19 Bar-g |
| Design temp. | (-)10 to (+)65 |

VALVE MATERIAL SPECIFICATION (Equivalent or superior)

| Description | Material Specified | Material Offered** |
|------------------------|---|--------------------|
| Body | ASTM A 105/ ASTM A216 Gr. WCB (Charpy) | |
| Bonnet (Welded) | ASTM A 105/ ASTM A216 Gr. WCB (Charpy) | |
| Disc (Loose Plug Type) | HF + Stellite | |

| | | | | | |
|------|----------|-------------|--------------|-------------|--------------|
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Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR F/E
GLOBE VALVE
FOR SIZE 2” to 12”
(150#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 005

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| | | |
|--|---|--|
| Body Seat Rings | HF + Stellite | |
| Stem Packing (Renewable with valve open on stream) | Corrosion inhibited die formed flexible graphite with braided anti-extrusion ring | |
| Hand Wheel (Rising) | Malleable Iron/ Cast Steel/ Duct Iron/ Fabricated Steel | |
| Stud Bolts | ASTM A 193 Gr.B7/ A194 Gr.7 | |
| Nuts | ASTM A 193 Gr.B7/ A194 Gr.7 | |
| Body Seal | Grafoil | |
| Stem Seal | Grafoil | |
| Body Seat | RPTFE/ DELRIN | |

** - To be filled by vendor


TESTING REQUIREMENTS

| | | |
|--|---|--|
| Charpy Impact | : | Body & side pieces, Ball & seat, Stem as per the MOC or API 6D values whichever is stringent |
| Hydrostatic Test | : | Shell: 1.5 x rated Pressure; Seat: 1.1 x Rated Pressure. |
| High Pressure Pneumatic test (with N2) | : | 1.1 x rated pressure for both shell & seat |
| Back Seat Test | : | 1.1 x Rated Pressure |
| Low pressure Seat (Air) | : | 7 Bar(g) |
| NDE Test | : | Note 9 |

NOTES:

1. This Valve data sheet shall be read in conjunction with Job specification of Globe valve.
2. Stem height will be furnished / decided during detail engineering for Underground valves.

| | | | | | |
|------|----------|-------------|--------------|-------------|--------------|
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|--|--|--|

3. All Inspection and tests shall be carried out as per relevant approved QAP. Unless otherwise specified, all tests shall be witnessed by the purchase / control authority.
4. Valve shall be OS & Y type.
5. The Final Coat of Painting shall have Oxford Blue-RAL 5005 for valve.
6. TPIA shall issue EN 10204 3.2 certification for valve.
7. Painting of the valves shall be as per Manufacturer’s Standard & shall be suitable for corrosive industrial environment.
8. Each valve shall be tested as per BS EN 12266 (Part-1 & 2).
9. Non Destructive Examination
 - Body castings of all valves shall be 100% radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
 - All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34.
 - Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B31.8 and API 1104 as applicable.
 - All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
 - Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.
 - After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Reject able defects must be removed. Weld repair of bevel surface is not permitted.

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Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR F/E
GLOBE VALVE
FOR SIZE 2" to 12"
(300#)**

**Doc No. LEPL/ GGPL/ DS/
MECH/ 006**

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| | | | | | |
|-------------------------|---|---------------------------|-----------------------------|---|-------------------------------|
| Tag No. | : | As per PO | ANSI Rating | : | 300# |
| Owner Specification No. | : | ENG-STD-PL- DOC-TS-014 | Valve Bore | : | Reduced Opening Port |
| Design Std | : | API 602/BS 1873 | Face Finish (Flange End) | : | 125-250 AARH |
| Size | : | As per P&ID | End Connection | : | ASME B 16.5 (Flanged)/ Welded |

VALVE DESIGN CONDITION

| | | | | | |
|---------------------|---|---------------------------|----------------------|---|--------------------|
| Corrosion Allowance | : | 1.5 mm | Temperature in °C | : | (-)29 to (+)65 |
| Service | : | Natural Gas (Non-sour) | Installation | : | A/G or U/G |
| Design Factor | : | 0.4 | Connecting Pipe | : | As per P&ID and PO |

SERVICE CONDITIONS

| | |
|-----------------|-------------------|
| Service | Natural Gas |
| Design Pressure | 49 Bar-g for 300# |
| Design temp. | (-)29 to (+)65 |

VALVE MATERIAL SPECIFICATION (Equivalent or superior)

| Description | Material Specified | Material Offered** |
|-----------------|--|--------------------|
| Body | ASTM A 216 Gr. WCB/ /ASTM A 350 Gr. LF2 | |
| Bonnet (Welded) | ASTM A 216 Gr.WCB /ASTM A 350 Gr. LF2 | |
| Connecting Pipe | ASTM A 106 Gr. B (Charpy) | |

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**DATA SHEET FOR F/E
GLOBE VALVE
FOR SIZE 2” to 12”
(300#)**

**Doc No. LEPL/ GGPL/ DS/
MECH/ 006**

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| | | |
|--|---|--|
| Disc (Loose Plug Type) | HF + Stellite | |
| Body Seat Rings | HF + Stellite | |
| Stem Packing (Renewable with valve open on stream) | Corrosion inhibited die formed flexible graphite with braided anti-extrusion ring | |
| Hand Wheel (Rising) | Malleable Iron/ Cast Steel/ Duct Iron/ Fabricated Steel | |
| Stud Bolts | ASTM A 193 Gr. B7 | |
| Nuts | ASTM A 193 Gr. B7 | |

** - To be filled by vendor

TESTING REQUIREMENTS

| | | |
|--|---|--|
| Charpy Impact | : | Body & side pieces, Ball & seat, Stem as per the MOC or API 6D values whichever is stringent |
| Hydrostatic Test | : | Shell: 1.5 x rated Pressure; Seat: 1.1 x Rated Pressure. |
| High Pressure Pneumatic test (with N2) | : | 1.1 x rated pressure for both shell & seat |
| Back Seat Test | : | 1.1 x Rated Pressure |
| Low pressure Seat (Air) | : | 7 Bar(g) |
| NDE Test | : | Note 9 |

NOTES:

1. This Valve data sheet shall be read in conjunction with Job specification of Globe valve.
2. Stem height will be furnished / decided during detail engineering for Underground valves.
3. All Inspection and tests shall be carried out as per relevant approved QAP. Unless otherwise specified, all tests shall be witnessed by the purchase / control authority.
4. Valve shall be OS & Y type.

| | | | | | |
|------|----------|-------------|--------------|-------------|--------------|
| 0 | 18.10.16 | First Issue | SC | SK | SB |
| Rev. | Date | Purpose | Prepared By: | Checked By: | Approved By: |



Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR F/E
GLOBE VALVE
FOR SIZE 2” to 12”
(300#)**

**Doc No. LEPL/ GGPL/ DS/
MECH/ 006**

Page 3 of 3

5. The Final Coat of Painting shall have Oxford Blue-RAL 5005 for valve.
6. TPIA shall issue EN 10204 3.2 certification for valve.
7. Painting of the valves shall be as per Manufacturer’s Standard & shall be suitable for corrosive industrial environment.
8. Each valve shall be tested as per BS EN 12266 (Part-1 & 2).
9. Non Destructive Examination
 - Body castings of all valves shall be 100% radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
 - All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34.
 - Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B31.8 and API 1104 as applicable.
 - All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
 - Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.
 - After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Reject able defects must be removed. Weld repair of bevel surface is not permitted.

| | | | | | |
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| 0 | 18.10.16 | First Issue | SC | SK | SB |
| Rev. | Date | Purpose | Prepared By: | Checked By: | Approved By: |



Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR
SOCKET WELDED
GLOBE VALVE
(Below 2" Size-800#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 07

Page 1 of 2

DATA SHEET FOR GLOBE VALVES

| Sr. No. | Description | Specification | |
|-------------------------------------|--------------------------------|--|-------------------------------|
| GENERAL | | | |
| 1 | Valve Size | Below 2" | |
| 2 | ANSI Rating | ANSI 800# | |
| 3 | Design Standard | BS 15761 | |
| 4 | Corrosion allowance | 1.5MM | |
| 5 | Design Factor | 0.4 | |
| SERVICE CONDITIONS | | | |
| 6 | Service | Natural Gas | |
| 7 | Design Pressure | 138 Bar-g | |
| 8 | Design Temperature | -29°C to 65°C | |
| VALVE CONSTRUCTION DESIGN | | | |
| 11 | Location | Above Ground/Under Ground | |
| 12 | End Connections | Socket Welded (As per ASME B 16.11) | |
| 13 | Body/ Bonnet connection | Bolted | |
| VALVE MATERIAL SPECIFICATION | | | |
| | Part | Specified Material | |
| 14 | Body | ASTM A 216 Gr. WPB/ A350 LF2 | |
| 15 | Bonnet | ASTM A 216 Gr. WPB/ A350 LF2 | |
| 16 | Stem (ANTI BLOW OUT) | AISI 4140 +75 microns ENP | |
| 17 | Gland Packing | GRAPHOIL | |
| 18 | Plug | ASTM A 216 Gr. WPB/ A350 LF2 | |
| 19 | Seat and back seat arrangement | Renewable | |
| 20 | Screw type | OS & Y | |
| 21 | Position indicator | Open and close indicator required | |
| 22 | Hand Wheel | Carbon steel coated with PVC grip | |
| VALVE TESTING REQUIREMENT | | | |
| 23 | Closure Test | High pressure | 1.1 X Design Pressure (Water) |
| | | Low pressure | 7 Bar-g (Air) |
| 24 | Backseat test | High pressure | 1.1 X Design Pressure (Water) |
| | | Low pressure | 7 Bar-g (Air) |
| 25 | Shell test | 1.5 X Design Pressure | |
| 26 | Charpy Impact test | Body & side pieces, Ball & seat, Stem as per the MOC or API 6D values whichever is stringent | |
| 27 | NDE Test | Note 6 | |
| 28 | Marking & Painting Spec. | SSPC-SP/MSS SP-25 & BS 5352 | |
| NOTE:- | | | |

| | | | | | |
|------|----------|-------------|--------------|-------------|--------------|
| 0 | 18.10.16 | First Issue | SC | SK | SB |
| Rev. | Date | Purpose | Prepared By: | Checked By: | Approved By: |



Lyons Engineering Pvt. Ltd.

**DATA SHEET FOR
SOCKET WELDED
GLOBE VALVE
(Below 2” Size-800#)**

Doc No. LEPL/ GGPL/ DS/
MECH/ 07

Page 2 of 2

| |
|--|
| 1. Inspection and Testing shall be as per this Data Sheet API 598/BS 6755 Part-1. |
| 2. Test Certificates shall be reviewed by client/TPIA as per approved QAP, GA drawing, Inspection & Test certificates including NDE. |
| 3. Bidder shall clearly mention deviation, if any. |
| 4. In case valve is supplied in accordance with API 602/BS 1873, Min. body valve thickness shall be as per ASME B16.34 |
| 5. This Data Sheet shall be read in conjuncture with the Technical Notes for Valves. |

Note 6: Non Destructive Examination

- Body castings of all valves shall be radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. For all sizes, body casting shall be subjected to 100% radiography.
- All forgings shall be ultrasonically examined in accordance with the procedure and acceptance standard of Annexure E of ASME B 16.34.
- Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.3 or ASME B31.8 as applicable and API 1104.
- All finished weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.
- Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.
- After final machining, all bevel surfaces shall be inspected by dye penetrate or wet - magnetic particle methods. All defects longer than 6.35 mm shall be rejected. Reject able defects must be removed. Weld repair of bevel surface is not permitted.

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|------|----------|-------------|--------------|-------------|--------------|
| 0 | 18.10.16 | First Issue | SC | SK | SB |
| Rev. | Date | Purpose | Prepared By: | Checked By: | Approved By: |



QUALITY ASSURANCE PLAN
FOR BALL VALVE

QAP NO: LEPL/BALL
VALVE/001

REV: 00 DT:

| PROJECT : | | ITEM DETAIL : | | | | QAP NO: LEPL/BALL VALVE/001 | | |
|---------------------|------------------------------|---|-------------------|---|--|-----------------------------|------------------|------------|
| CLIENT : | | QAP NO: | | | | REV: 00 DT: | | |
| CONSULTANT : | | REV NO. & DATE: | | | | | | |
| MANUFACTURER NAME : | | REF DOC: | | | | | | |
| TPIA/ INSPECTION: | | PO NO: | | | | | | |
| CONTRACTOR : | | PO NO : | | DT: | | | | |
| SR. NO | COMPONENTS & OPERATIONS | TYPES OF CHECK | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | INSPECTION | |
| | | | | | | | MANUFA CTURER | TPI/CLIENT |
| 1 | RAW MATERIAL | | | | | | | |
| | 1. BODY & SIDE PEICE | 1. CHEMICAL TEST | PER HEAT | ASTM A 350 LF 2 / TENDER SPEC. | ASTM A 350 LF 2 / TENDER SPEC. | FOUNDARY T.C REPORT 3.1 | P | R |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO/HARDNESS) | PER HEAT | ASTM A 350 LF 2 / TENDER SPEC. | ASTM A 350 LF 2 / TENDER SPEC. | MTC / LAB TEST REPORT 3.2 | P | W |
| | | 3. VISUAL | 100% | AS REQUIRED BY ASTM PRODUCT SPECIFICATION | AS REQUIRED BY ASTM PRODUCT SPECIFICATION | INSPECTION REPORT 3.2 | P | W |
| | | 4. IMPACT TEST AT -20° C | PER HEAT | ASTM A 370 /A 961 /A 350 LF2 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P | W |
| | | AT -46° C | PER HEAT | ASTM A 370 /A 961 /A 350 LF2 | AVG. 27 J & IND 16 J / TENDER SPEC. | | | |
| | | 5. RT | 100% | ASME B 16.34 APPENDIX - 1 | API 6D | INSPECTION REPORT 3.1 | P | R |
| | | 6. MPT | 100% SURFACE AREA | ASME B 16.34 APPENDIX II/ SECTION V , ARTICLE 7 | ASME B 16.34 APPENDIX II/ ASME SECTION VIII DIV 1 , APPENDIX 6 | INSPECTION REPORT 3.2 | P | W |
| | | 7. UT | 100% | ASME B 16.34 APPENDIX IV/ SECTION V , ARTICLE 5 | ASME B 16.34 APPENDIX IV/ ASME SECTION VIII DIV. 1 - UF 55 | INSPECTION REPORT 3.2 | P | W |
| | 1. BALL & SEAT RING FOR TMBV | 1. CHEMICAL TEST | PER HEAT | ASTM A 351 GR. CF8M / A350LF2+ 75 Menp | ASTM A 351 GR. CF8M / A350LF2+ 75 Menp | SUPPLIER T.C. REPORT 3.1 | P | R |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO/HARDNESS) | PER HEAT | ASTM A 351 GR. CF8M / A350LF2+ 75 Menp | ASTM A 351 GR. CF8M / A350LF2+ 75 Menp | SUPPLIER T.C. REPORT 3.2 | P | W |
| | | 3. VISUAL | 100% | AS REQUIRED BY ASTM PRODUCT SPECIFICATION | AS REQUIRED BY ASTM PRODUCT SPECIFICATION | INSPECTION REPORT 3.2 | P | W |
| | | 4. RT FOR CASTING | 100% | ASME B 16.34 ANNEX B | ASME B 16.34 ANNEX B | INSPECTION REPORT 3.1 | P | R |
| | | 5. UT | 100% | ASME B 16.34 APPENDIX IV/ SECTION V , ARTICLE 5 | ASME B 16.34 APPENDIX IV/ ASME SECTION VIII DIV. 1 - UF 55 | INSPECTION REPORT 3.2 | P | W |
| | | 6. IMPACT TEST AT -20° C , | PER HEAT | ASTM A 370 /A 961 /A 350 LF2 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P | W |
| | | AT -46° C , | PER HEAT | ASTM A 370 /A 961 /A 350 LF2 | AVG. 27 J & IND 16 J / TENDER SPEC. | | | |
| | 3.STEM | 1. CHEMICAL TEST | PER HEAT | ASTM A 350 LF 2 / TENDER SPEC. | ASTM A 350 LF 2 / TENDER SPEC. | FOUNDARY T.C REPORT 3.1 | P | R |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO/HARDNESS) | PER HEAT | ASTM A 350 LF 2 / TENDER SPEC. | ASTM A 350 LF 2 / TENDER SPEC. | MTC / LAB TEST REPORT 3.2 | P | W |
| | | 3. IMPACT TEST A T -20° C , | PER HEAT | ASTM A 370 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P | W |
| | | 4. DPT | 100% SURFACE AREA | ASME B 16.34 APPENDIX II/ ASME SECTION V DIV 1 , APPENDIX 6 | ASME B 16.34 APPENDIX II/ ASME SECTION VIII DIV 1 , APPENDIX 8 | INSPECTION REPORT 3.2 | P | W |
| | 4 PUP PIECE | 1. CHEMICAL TEST | PER PIPE | C | ASTM A 333 GR. 6 / TENDER SPEC. | SUPPLIER T.C. REPORT 3.1 | P | R |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO) | PER PIPE | ASTM A 333 GR. 6 / TENDER SPEC. | ASTM A 333 GR. 6 / TENDER SPEC. | LAB TC AS PER 3.1 | P | W# |
| | | 3. VISUAL | 100% | ASTM A 333 GR. 6 / TENDER SPEC. | ASTM A 333 GR. 6 / TENDER SPEC. | INSPECTION REPORT 3.2 | P | W# |
| | | 4. IMPACT TEST AT -20° C , | PER PIPE | ASTM A 370 /ASTM A 333 GR.6 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P | W# |
| | | AT -46° C , | PER PIPE | ASTM A 370 /ASTM A 333 GR.6 | AVG. 18 J & IND 14 J / TENDER SPEC. | | | |
| 2 | INPROCESS INSPECTION. | | | | | | | |
| | 1. BODY & SIDE PIECE | 1. TRANSFER OF HEAT NO. | 100% | API 6D | API 6D | INSPECTION REPORT 3.2 | P | W |
| | | 2. DIMENSIONS | 100% | APPR.VENDOR DRG. | APPR.VENDOR DRG. | INSPECTION REPORT 3.1 | P | R |



QUALITY ASSURANCE PLAN
FOR BALL VALVE

QAP NO: LEPL/BALL
VALVE/001

REV: 00 DT:

| | |
|---------------------|-----------------|
| PROJECT : | ITEM DETAIL : |
| CLIENT : | QAP NO: |
| CONSULTANT : | REV NO. & DATE: |
| MANUFACTURER NAME : | REF DOC: |
| TPIA/ INSPECTION: | PO NO: |

| SR. NO | COMPONENTS & OPERATIONS | TYPES OF CHECK | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | INSPECTION | |
|----------|--|--|------------------------|---------------------------|--|-------------------------------------|------------------|------------|
| | | | | | | | MANUFA CTURER | TPI/CLIENT |
| | 2. BALL | 1. DIMENSIONS | 100% | APPR.VENDOR DRG. | APPR.VENDOR DRG. | INSPECTION REPORT 3.1 | P | R |
| | 3.. STEM | 1. DIMENSIONS | 100% | APPR.VENDOR DRG. | APPR.VENDOR DRG. | INSPECTION REPORT 3.1 | P | R |
| | 4. PUP PIECE WELDING | 1. REVIEW OF WPS & PQR | AS APPLICABLE FOR EACH | ASME Section IX | AS PER APPROVED DRG/APPLICABLE WELD. | WPS &PQR | P | R |
| | | 2. RT OF PUP PIECE BUTT JOINTS | 100% | ASME Section V,Article 2 | ASME Section VIII Div. 1, UWS1 (linear indications); ASME Section VIII Div.1, Appendix 4 (round indications) | INSPECTION REPORT 3.1 | P | R |
| | | 3. DP OF BUTT WELD JOINT | 100% | ASME Section V,Article 6 | ASME Section VIII Div. 1, Appendix 8 | INSPECTION REPORT 3.2 | P | W |
| | | 4. UT OF FIELD BEVEL END 100 MM | 100% | ASME Section V, Article 4 | NO LAMINATION ON BEVEL EDGES | INSPECTION REPORT 3.2 | P | W |
| | 5. BODY & SIDE PIECE WELDING (FOR WELDED BODY VALVE) | AFTER HOT PASS AND FINAL CAP WELD DPT | 100% | ASME Section V,Article 6 | ASME Section VIII Div. 1, Appendix 8 | INSPECTION REPORT 3.2 | P | W |
| | | UT OF BODY BUTT JOINTS | 100% | ASME Section V, Article 4 | ASME Section VIII Div. 1, Appendix 12 | INSPECTION REPORT 3.2 | P | W |
| 3 | BOUGHT OUT ITEM | | | | | | | |
| | 1. FASTNERS | 1. CHEMICAL TEST | PER LOT | A 320 L7 & A 194 GR. 7 | A 320 L7 & A 194 GR. 7 | SUPPLIER T.C./INSPECTION REPORT 3.1 | P | R |
| | | 2. MECHANICAL TEST | PER LOT | A 320 L7 & A 194 GR. 7 | A 320 L7 & A 194 GR. 7 | SUPPLIER T.C./INSPECTION REPORT 3.1 | P | W# |
| | | 3. DIMENSIONS | 10% | APPR.VENDOR DRG | APPR.VENDOR DRG | INSPECTION REPORT 3.1 | P | R |
| | | 4.IMPACT TEST AT -101° C | PER LOT/PER SIZE | ASTM A 370 | AVG 27J & IND 20J / Tender Spec. | SUPPLIER T.C./INSP. REPORT 3.2 P | P | W |
| | | 5. HEAT TREATMENT | 100% | A 320 L7 & A 194 GR. 7 | A 320 L7 & A 194 GR. 7 | INSPECTION REPORT 3.1 | P | R |
| 4 | PERFORMANCE TEST | | | | | | | |
| | 1.PERFORMANCE TEST | 1. HYD. SHELL TEST AT 74 KG/CM ² | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | 2. HIGH-PRESSURE CLOSURE TEST (Double Block & Bleed Test) | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | AIR SEAT TEST AT 7 KG/CM ² | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | HIGH PRE.PNEUMATIC(N2) SHELL & SEAT TEST AT 49 KG/CM ² | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | PERFORMANCE TEST(OPENNING & CLOSING)-MIN. 10 CYCLE | 100% | API 6D / TENDER DOC. | API 6D / TENDER DOC. | INSPECTION REPORT 3.2 | P | 100% W |
| | | FUNCTIONAL TEST WITH ACTUATOR, IF ANY (OPENNING & CLOSING)-MIN. 10 CYCLE | 100% | API 6D / TENDER DOC. | API 6D / TENDER DOC. | INSPECTION REPORT 3.2 | P | 100% W |
| | | ANTISTATIC TEST | 100% | BS EN 17292/ API 6D | BS EN 17292 | INSPECTION REPORT 3.2 | P | 5% W |
| | | FIRE SAFE TEST | TYPE TEST | API 607 / API 6FA | API 607 / API 6FA | FIRE SAFE TEST CERTIFICATE | P | R |
| | | TORQUE TEST | 100% | API 6D | API 6D | INSPECTION REPORT 3.2 | P | W |



QUALITY ASSURANCE PLAN
FOR BALL VALVE

QAP NO: LEPL/BALL
VALVE/001

REV: 00 DT:

| PROJECT : | | ITEM DETAIL : | | | | | | | |
|---------------------|-------------------------|--|--------------------|--|--|--|------------------|----------------|--|
| CLIENT : | | QAP NO: | | | | | | | |
| CONSULTANT : | | REV NO. & DATE: | | | | | | | |
| MANUFACTURER NAME : | | REF DOC: | | | | | | | |
| TPIA/ INSPECTION: | | PO NO: | | | | | | | |
| CONTRACTOR : | | | | PO NO : | | DT: | | | |
| SR. NO | COMPONENTS & OPERATIONS | TYPES OF CHECK | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | INSPECTION | | |
| | | | | | | | MANUFA CTURER | TPI/CLIENT | |
| 4 | PAINTING | | | | | | | | |
| | 1. PAINTING | 1. SURFACE PREPARATION | 100% | TENDER SPEC. | TENDER SPEC. | INSPECTION REPORT | P | 100% W | |
| | | 2. PRIMER COAT | MEASUREMENT OF WFT | TENDER SPEC. | TENDER SPEC. | PAINT INSPECTION REPORT/ 3.2 CERTIFICATION | P | 100% R | |
| | | 3. FINAL COAT | MEASUREMENT OF DFT | TENDER SPEC. | TENDER SPEC. | PAINT INSPECTION REPORT/ 3.2 CERTIFICATION | P | 10% W , 100% R | |
| | | 4. VISUAL | 100% | TENDER SPEC. | TENDER SPEC. | INSPECTION REPORT | P | 10% W , 100% R | |
| 5 | FINAL INSPECTION | | | | | | | | |
| | FINAL INSPECTION | 1. VISUAL\ TAGGING \ MARKING | 100% | APPR.VENDOR DRG | APPR.VENDOR DRG | INSPECTION REPORT 3.2 | P | 100% W | |
| | | 2. DIMENSIONS | 100% | APPR. DRG./ ASME B16.10 / ASME B16.5/ B16.25 / API 6D | APPR. DRG./ ASME B16.10 / ASME B16.5/ B16.25 / API 6D | INSPECTION REPORT 3.2 | P | 100% W | |
| 6 | FINAL DOCUMENTS | | | | | | | | |
| | FINAL DOCUMENTS | 1. QAP / PO / MTC / IR / COMPLIANCE CERTIFICATES | 100% | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | COMPLIANCE CERTIFICATE | P | R | |
| | | 2. INSPECTION RELEASE NOTE | 100% | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | COMPLIANCE CERTIFICATE | H | P | |

Legend: P-Perform, R-Review, W-Witness, H-Hold TPIA-Third Party Inspection Agency

NOTE:

1. DRAIN & VENT VALVES,PIPES AND AUXILLARY CONNECTIONS AS PER APPROVED GAD OF VALVES TO BE REVIEWED BY TPIA.

2. WPS / PQR FOR PUP PIECE AND BODY/SIDE PIECE WELDING TO BE REVIEWED BY TPIA

3. TPIA SHALL ISSUE 3.2 CERTIFICATE AS PER EN 10204 FOR BALL VALVE AND ACTUATOR.

4. W# :- THE CERTIFICATION SHALL BE AS PER EN 10204 3.1 WITH TPIA WITNESS.(FOR PUP PIECE- MECHNICAL TEST & IMPACT TEST)

5.FOR ALL FORGING MATERIALS THE SPECIMEN SHALL BE TAKEN FROM THE INTEGRAL PART OF THE FORGING.

6.FOR HEAT TRETMENT TEMP. CHART SHALL BE SIGNED BY TPIA,ALSO POWER FAILURE LOG SHALL BE MAINTAINED.

7.MATERIAL & TYPE SHALL BE AS PER TENDER SPECS/DATA SHEET

8.IF ANY ACTUATOR WITH VALVE, ADDITIONAL DOCUMENT TO BE SUBMITTED FOR ACTUATOR LIKE QAP, DATASHEET, WIRING DIAGRAM, OPERATION DIAGRAM, TEST PROCEDURE FOR CLIENT/PMC APPROVEL.

9.THIS QAP SHALL BE READ IN CONIUNCTION WITH BALL VALVE DATA SHEET.

10. AVERAGE GRAIN SIZE SHALL BE 8 OR FINER AS PER ASTM E 112.

11.SAMPLE FROM ANY ONE LOT/HEAT SHALL BE TESTED BY CLIENT UNDER THEIR WITNESS THIRD PARTY LAB AT DISCRETION

12. ALL MEASURING INSTRUMENT / EQUIPMENT SHALL HAVE VALID CALIBRATION CERTIFICIE & SAME SHALL BE REVIEWED BY TPIA.

| | | | |
|--------------|-------------|------------------------|--------|
| | | REVIEWED & ACCEPTED BY | |
| PREPARED BY: | APPROVED BY | CONSULTANT | CLIENT |



QUALITY ASSURANCE PLAN
FOR GLOBE VALVE

QAP NO: LEPL/GLOBE
VALVE/001

REV: 00 DT:

| | |
|---------------------|-----------------|
| PROJECT : | ITEM DETAIL : |
| CLIENT : | QAP NO: |
| CONSULTANT : | REV NO. & DATE: |
| MANUFACTURER NAME : | REF DOC: |
| TPIA/ INSPECTION: | PO NO: |

| CONTRACTOR : | | PO NO : | DT: | | | | |
|--------------|-------------------------|------------------|---------------------|------------------|------------------|------------------|------------|
| SR. NO | COMPONENTS & OPERATIONS | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | INSPECTION | |
| | | | | | | MANUFA CTURER | TPI/CLIENT |

| SR. NO | COMPONENTS & OPERATIONS | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | MANUFA CTURER | TPI/CLIENT |
|----------|------------------------------|---|---------------------|---|--|-------------------------------------|------------|
| 1 | RAW MATERIAL | | | | | | |
| | 1. BODY & SIDE PEICE | 1. CHEMICAL TEST | PER HEAT | A 352 Gr. LCC / A 350LF2 / Tender Doc. | A 352 Gr. LCC / A 350LF2 / Tender Doc. | FOUNDARY T.C REPORT 3.1 | P R |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO/HARDNESS) | PER HEAT | A 352 Gr. LCC / A 350LF2 / Tender Doc. | A 352 Gr. LCC / A 350LF2 / Tender Doc. | FOUNDARY T.C REPORT 3.2 | P W |
| | | 3. VISUAL | 100% | MSS-SP/AS REQUIRED BY ASTM PRODUCT SPECIFICATION | MSS-SP/AS REQUIRED BY ASTM PRODUCT SPECIFICATION | INSPECTION REPORT 3.2 | P W |
| | | 4. IMPACT TEST AT -20° C | PER HEAT | ASTM A 370 /A 961 /A 350 LF2 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P W |
| | | AT -46° C | PER HEAT | ASTM A 370 /A 961 /A 350 LF2 | AS PER MATERIAL SPEC. | | |
| | | 5. RT OF CASTINGS | 100% | ASME B 16.34 APPENDIX - 1/ ASME SEVTION V/ | ASME B 16.34 APPENDIX - 1/ ASME SEVTION V/ ARTICLE-2 | INSPECTION REPORT 3.1 | P R |
| | | 6. MPT | 100% SURFACE AREA | ASME B 16.34 APPENDIX II/ SECTION V, ARTICLE 7 | ASME B 16.34 APPENDIX II/ ASME SECTION VIII DIV 1 , APPENDIX 6 | INSPECTION REPORT 3.2 | P W |
| | | 7. UT | 100% | ASME B 16.34 APPENDIX IV/ SECTION V , ARTICLE 5 | ASME B 16.34 APPENDIX IV/ ASME SECTION VIII DIV. 1 - UF 55 | INSPECTION REPORT 3.2 | P W |
| | 2. DISC & SEAT RING | 1. CHEMICAL TEST | PER HEAT | SS 316 + HF* | SS 316 + HF* | SUPPLIER T.C. REPORT 3.1 | P R |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO/HARDNESS) | PER HEAT | SS 316 + HF* | SS 316 + HF* | SUPPLIER T.C. REPORT 3.2 | P W |
| | | 3. VISUAL | 100% | MSS-SP- 55 | MSS-SP- 55 | INSPECTION REPORT 3.2 | P W |
| | | 4. DPT | 100% SURFACE AREA | ASME B16.34 APPENDIX III /ASME Section V,Article 6 | ASME B16.34 APPENDIX III / ASME Section VIII Div. 1,Appendix 8 | INSPECTION REPORT 3.2 | P W |
| | | 5. IMPACT TEST AT -20° C , | PER HEAT | ASTM A 370 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P W |
| | 3. STEM | 1. CHEMICAL TEST | PER HEAT | SS 316 (NO CASTING) | SS 316 (NO CASTING) | LAB T.C REPORT 3.1 | P W |
| | | 2. MECHANICAL TEST (YS,UTS,YS/UTS, MICRO/HARDNESS) | PER HEAT | SS 316 (NO CASTING) | SS 316 (NO CASTING) | LAB T.C REPORT 3.1 | P W |
| | | 3. IMPACT TEST A T -20° C , | PER HEAT | ASTM A 370 | AVG. 35 J & IND 28 J / TENDER SPEC. | INSPECTION REPORT 3.2 | P W |
| | | 4. DPT | 100% SURFACE AREA | ASME B 16.34 APPENDIX II/ ASME SECTION V DIV 1 , APPENDIX 6 | ASME B 16.34 APPENDIX II/ ASME SECTION VIII DIV 1 , APPENDIX 8 | INSPECTION REPORT 3.2 | P W |
| 2 | INPROCESS INSPECTION. | | | | | | |
| | 1. BODY & BONNET | 1. TRANSFER OF HEAT NO. | 100% | API 6D | API 6D | INSPECTION REPORT 3.2 | P W |
| | | 2. DIMENSIONS | 100% | APPR.VENDOR DRG. | APPR.VENDOR DRG. | INSPECTION REPORT 3.1 | P R |
| | 2. DISC & SEAT RING | 1. DIMENSIONS | 100% | APPR.VENDOR DRG. | APPR.VENDOR DRG. | INSPECTION REPORT 3.1 | P R |
| | 3. STEM | 1. DIMENSIONS | 100% | APPR.VENDOR DRG. | APPR.VENDOR DRG. | INSPECTION REPORT 3.1 | P R |
| | 4. HARD FACING | 1.HARDNESS & DP | 100% | AS PER APPR. WPS/PQR | AS PER APPR. WPS/PQR | INSPECTION REPORT 3.2 | P W |
| 3 | BOUGHT OUT ITEM | | | | | | |
| | 1. FASTNERS | 1. CHEMICAL TEST | PER LOT | A 320 L7 & A 194 GR. 7 | A 320 L7 & A 194 GR. 7 | SUPPLIER T.C./INSPECTION REPORT 3.1 | P R |
| | | 2. MECHANICAL TEST | PER LOT | A 320 L7 & A 194 GR. 7 | A 320 L7 & A 194 GR. 7 | SUPPLIER T.C./INSPECTION REPORT 3.1 | P W# |
| | | 3. DIMENSIONS | 10% | APPR.VENDOR DRG | APPR.VENDOR DRG | INSPECTION REPORT 3.1 | P R |



QUALITY ASSURANCE PLAN
FOR GLOBE VALVE

QAP NO: LEPL/GLOBE
VALVE/001

REV: 00 DT:

| PROJECT : | | ITEM DETAIL : | | | | | | |
|---------------------|-------------------------|--|--------------------|---|--|--|------------------|----------------|
| CLIENT : | | QAP NO: | | | | | | |
| CONSULTANT : | | REV NO. & DATE: | | | | | | |
| MANUFACTURER NAME : | | REF DOC: | | | | | | |
| TPIA/ INSPECTION: | | PO NO: | | | | | | |
| CONTRACTOR : | | | | | | | | |
| SR. NO | COMPONENTS & OPERATIONS | TYPES OF CHECK | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | INSPECTION | |
| | | | | | | | MANUFA CTURER | TPI/CLIENT |
| | | 4.IMPACT TEST AT -101° C | PER LOT/PER SIZE | ASTM A 370 | AVG 27J & IND 20J / Tender Spec. | SUPPLIER T.C./INSP. REPORT 3.2 P | P | W |
| | | 5. HEAT TREATMENT | 100% | A 320 L7 & A 194 GR. 7 | A 320 L7 & A 194 GR. 7 | INSPECTION REPORT 3.1 | P | R |
| 4 | PERFORMANCE TEST | | | | | | | |
| | 1.PERFORMANCE TEST | 1. HYD. SHELL TEST AT 74 KG/CM ² | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | 2. BACK SEAT TEST | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | 3.AIR SEAT TEST AT 7 KG/CM ² | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | 4.HIGH PRE.PNEUMATIC(N2) SHELL & SEAT TEST AT 49 KG/CM ² | 100% | API 6D / ASME B16.34 | API 6D / ASME B16.34 | INSPECTION REPORT 3.2 | P | 100% W |
| | | 5.PERFORMANCE TEST(OPENNING & CLOSING)-MIN. 10 CYCLE | 100% | API 6D / TENDER DOC. | API 6D / TENDER DOC. | INSPECTION REPORT 3.2 | P | 100% W |
| | | 6.FUNCTIONAL TEST WITH ACTUATOR, IF ANY (OPENNING & CLOSING)-MIN. 10 CYCLE | 100% | API 6D / TENDER DOC. | API 6D / TENDER DOC. | INSPECTION REPORT 3.2 | P | 100% W |
| | | 7.TORQUE TEST | 100% | API 6D | API 6D | INSPECTION REPORT 3.2 | P | W |
| 4 | PAINTING | | | | | | | |
| | 1. PAINTING | 1. SURFACE PREPARATION | 100% | TENDER SPEC. | TENDER SPEC. | INSPECTION REPORT | P | 100% W |
| | | 2. PRIMER COAT | MEASUREMENT OF WFT | TENDER SPEC. | TENDER SPEC. | PAINT INSPECTION REPORT/ 3.2 CERTIFICATION | P | 100% R |
| | | 3. FINAL COAT | MEASUREMENT OF DFT | TENDER SPEC. | TENDER SPEC. | PAINT INSPECTION REPORT/ 3.2 CERTIFICATION | P | 10% W , 100% R |
| | | 4. VISUAL | 100% | TENDER SPEC. | TENDER SPEC. | INSPECTION REPORT | P | 10% W , 100% R |
| 5 | FINAL INSPECTION | | | | | | | |
| | FINAL INSPECTION | 1. VISUAL\ TAGGING \ MARKING | 100% | APPR.VENDOR DRG | APPR.VENDOR DRG | INSPECTION REPORT 3.2 | P | 100% W |
| | | 2. DIMENSIONS | 100% | APPR. DRG./ ASME B16.10 / ASME B16.5/ B16.25 / API 6D | APPR. DRG./ ASME B16.10 / ASME B16.5/ B16.25/ API 6D | INSPECTION REPORT 3.2 | P | 100% W |
| 6 | FINAL DOCUMENTS | | | | | | | |
| | FINAL DOCUMENTS | 1. QAP / PO / MTC / IR / COMPLIANCE CERTIFICATES | 100% | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | COMPLIANCE CERTIFICATE | P | R |
| | | 2. INSPECTION RELEASE NOTE | 100% | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | AS PER TECHNICAL SPEC./ AS PER APPVD. DGW. & QAP | COMPLIANCE CERTIFICATE | H | P |

Legend: P-Perform, R-Review, W-Witness, H-Hold TPIA-Third Party Inspection Agency

NOTE:

1. MATERIAL & TYPE SHALL BE AS PER TENDER SPECS/DATA SHEET

2. TPIA SHALL ISSUE 3.2 CERTIFICATE AS PER EN 10204

3. HF*- HARD -FACED WITH STELLITE

4. W# - THE CERTIFICATION SHALL BE AS PER EN 10204 3.1 WITH TPIA WITNESS.(FOR PUP PIECE- MECHANICAL TEST & IMPACT TEST)

5.FOR ALL FORGING MATERIALS THE SPECIMEN SHALL BE TAKEN FROM THE INTEGRAL PART OF THE FORGING.

6.FOR HEAT TREATMENT TEMP. CHART SHALL BE SIGNED BY TPIA,ALSO POWER FAILURE LOG SHALL BE MAINTAINED.

7.SAMPLE FROM ANY ONE LOT/HEAT SHALL BE TESTED BY CLIENT UNDER THEIR WITNESS THIRD PARTY LAB AT DISCRETION



QUALITY ASSURANCE PLAN
FOR GLOBE VALVE

QAP NO: LEPL/GLOBE
VALVE/001

REV: 00 DT:

| | |
|---------------------|-----------------|
| PROJECT : | ITEM DETAIL : |
| CLIENT : | QAP NO: |
| CONSULTANT : | REV NO. & DATE: |
| MANUFACTURER NAME : | REF DOC: |
| TPIA/ INSPECTION: | PO NO: |
| CONTRACTOR : | PO NO : DT: |

| SR. NO | COMPONENTS & OPERATIONS | TYPES OF CHECK | QUANTAM OF CHECK | REFERENCE DOCUMENTS | ACCEPTANCE NORMS | FORMET OF RECORD | INSPECTION | |
|--------|-------------------------|----------------|------------------|---------------------|------------------|------------------|------------------|------------|
| | | | | | | | MANUFA CTURER | TPI/CLIENT |

8. AVERAGE GRAIN SIZE SHALL BE 8 OR FINER AS PER ASTM E 112.
9. ALL MEASURING INSTRUMENT / EQUIPMENT SHALL HAVE VALID CALIBRATION CERTIFICIE & SAME SHALL BE REVIEWED BY TPIA.

| PREPARED BY: | | APPROVED BY | | REVIEWED & ACCEPTED BY | |
|--------------|--|-------------|--|------------------------|--------|
| | | | | CONSULTANT | CLIENT |