GUJARAT GAS

TECHNICAL SPECIFICATION

FOR

PE BALL VALVES

GUJARAT GAS

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1.0 SCOPE

This specification is for PE Ball valves and its component for use on PE- 100 pipe systems. PE Ball valves shall be manufactured, inspected and tested in accordance with the requirements of latest edition of ASME B16.40 and EN 1555-4 in conjunction with the requirements stipulated in this specification.

This specification is limited to valves with a nominal diameter up to and including 160 mm.

2.0 REFERENCE CODES & STANDARDS

Unless otherwise specified, the latest editions of the standards mentioned in this specification, Including all addenda and revisions, shall apply.

ASME B16.40 : Manually operated thermoplastic gas shut-offs and valves in gas distribution systems

EN 1555 – 4 : Plastics piping systems for the supply of gaseous fuels - Polyethylene PE) - Part 4: Valves

3.0 DEFINITION

For this specification the following definitions shall apply:

OWNER/ CLIENT	:	GUJARAT GAS LIMITED,
MANUFACTURER	:	Means the Manufacturer of PE Ball valves.
VENDOR	:	The person(s), firm, company, organization from whom Client / Contractor procures materials
TPIA	:	Third Party Inspection Agency authorized by GUJARAT Gas to be appointed by Vendor/ Contractor for inspection of material

4.0 SUBMITTALS BY MANUFACTURER

At the time of bidding, Bidder shall submit the following documents:

- Bidder shall submit valid EN 1555-4, ASME B16.40 license for manufacturing and testing for PE valves and should furnish a copy of the same along with the technical bid.
- Bidder shall submit documentary evidence (in English language only) for similar type of valves supplies to renowned gas industries, such as copy of purchase orders of past supply along with third party inspection release note, or certificate of at least one-year trouble free performance (of the material supplied vide the same PO).
- Detailed technical catalogues and approval certificates (in English language only) of DVGW, AGA, or equivalent for compliance to the requirements of ASME / EN standards or equivalent.
- General arrangement drawings showing all features and relative positions and sizes of purge set, operational cap, position indicator, and other external parts together with overall dimensions and bill of material.
- Supplier shall furnish overall dimensions, Overall weight, and material description of all parts, assembly and cross-sectional drawings. Sectional drawing showing major parts with reference numbers and material specification.
- Clause wise list of deviations from this specification, if any.

Within one week of placement of order, the Bidder shall submit one hard and one digital copy of, but not limited to, the following drawings, documents and specifications for OWNER's approval.

- Sectional and GA drawing showing all relevant details including bill of material.

- Detailed Quality Assurance Plan or Inspection & Test Plan showing the procedure being followed by them starting from the identification of raw materials to final tests, packing and dispatch.
- Any other relevant documents required by GGL.

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

Manufacturer shall submit to GGL one hard and one digital copy of all approved drawings, documents and specifications as listed in this specification.

5.0 MATERIAL

The compound from which the valve body and electro fusion socket is made of shall conform to EN 1555-4.

PE resin used for manufacture of thermoplastic valves shall be virgin, cadmium free pigmented compound. Antioxidant and UV stabilizer used in PE resin shall not exceed 0.3 and 0.5 percent respectively. Reprocessed material shall not be used.

6.0 GENERAL REQUIREMENTS

6.1 Appearance

When viewed without magnification, the internal and external surfaces of valves shall be smooth, clean and shall have no scoring, cavities or other surface defects to an extent that would prevent conformity to this standard.

No component of the valve shall show any signs of damage, scratches, pitting, bubbles, blisters, inclusions or cracks to an extent that would prevent conformity of the valves to the requirements of this standard.

6.2 Design

6.2.1 General

PE valves bodies and their PE spigot end or electrofusion socket shall have a pressure rating of at least that of the pipe to which they are assembled. The end connections of the valve provided for fusion to the PE system shall be of the spigot type unless otherwise agreed with GGL. PE spigot ends or electrofusion sockets shall have sufficient fusion compatibility to the pipe to which it is fused to meet the requirements of this standard.

Valves shall not be bolted and screwed and shall be so designed that they cannot be dismantled. Any mechanism that puts a loading on any seal shall be permanently locked. Line pressure shall not be relied upon as the sole source of seat loading.

Where any dissimilar metallic materials are used which may be in contact with moisture, the possibility of galvanic corrosion shall be avoided. The color of the valve body and spigots shall be yellow to BS 5252: 1976, 10E50, 10E53, 10E55 or equivalent.

6.2.2 Operating cap

The operating cap shall be integral with or connected to the stem in such a way that disconnection is impossible without special equipment.

The valve shall close by turning the operating cap clockwise. For a quarter-turn valve, the position of the shut-off disc shall be clearly indicated on the top side of the operating cap. Stops shall be provided at the fully open and closed positions.

7.0 OPERATING REQUIREMENTS

Valves shall be quarter turn and clockwise to close. They shall be of stem extended type. The maximum operating pressure of the valve shall be 5.0 bar (g).

Valve assembly shall be so designed as to protect the plastic material against excessive torsional or shearing loads when the valve or shutoff is operated, and from any other secondary stresses that might be exerted through the valve or its enclosure.

Adequate clearances for the operating tool shall be ensured by maintaining a clear area of 100 mm in diameter measured from the centerline of the top cap. The electro fusion coupler shall not infringe on this clear area or on the minimum spigot length.

The valves, including internals, shall not be adversely affected by the heat generated during the jointing process. The design and construction of valves shall be such that no maintenance is required.

Valves shall be suitable for installation and operation below ground. All parts of the valve, including those parts, which are not normally subjected to line pressure, shall be sealed against the ingress of water, dirt, soil, etc.

The valve shall carry an operating member which can be turned by 50 mm square socket 40 mm deep or of appropriate size depending on the requirement. This operating member shall not be damaged by the metal socket during normal valve operation and shall bear clear indication of the position of the valve port.

Stops shall be provided at the fully open and fully closed positions either on the body of the valve or on the associated part such as a mounting cradle or box.

Valves shall be capable of operation and sealing against gas flowing from either direction.

8.0 INSPECTION / DOCUMENTS

8.1 Inspection shall be carried out as per EN 1555-4 and GGL technical specification.

8.2 Bidder should get the inspection carried out from GGL appointed TPIA.

- Inspection to be carried out as per ASME B16.40: 2008 and GGL Purchase Order specification.
- Review / checking the material test certificate and visual inspection for the whole lot.
- Dimensional measurement, pressure & leakage test witnessing for at least 10% at random, of the whole lot.

8.3 Bidder shall furnish all the material test certificates, internal test / inspection reports as per GGL Technical speciation, at the time of final inspection of each supply lot of material.

8.4 All the measuring instruments shall be calibrated and tested at the time of inspection. The Bidder shall furnish relevant certificate at the time of inspection & testing

8.5 GGL reserves the rights to select a sample of valves randomly from each manufacturing batch & have these independently tested for dimension tolerances/ leakage testing. Should the results of these tests fall outside the limits specified in GGL technical specification, then GGL reserves the rights to reject all production supplied from the batch.

Inspection shall be carried out as per Owner Technical Specification.

Owner Representative shall carry out stage wise inspection during manufacturing / final inspection.

Manufacturer /Vendor shall furnish all the material test certificates, proof of approval / licence from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. and specified code for 100% material, at the time of final inspection of each supply lot of material. All the codes / documents shall be made available for reference of TPIA at the time of inspection.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Manufacturer /Vendor shall hire TPIA from approved TPIA list of GUJARAT Gas for production witnessing and testing as per approved QAP of GUJARAT Gas.

Even after third party inspection, Owner reserves the right to select a sample of PE ball valves randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

9.0 QUALITY ASSURANCE

Bidder shall prepare and submit quality assurance plan within a week after receipt of order for approval in line with this specification.

The supplier will provide details of their quality assurance procedures during the assembly of the units and for final inspection following testing.

Gujarat Gas reserves the right to visit the Supplier's facilities without prior notice, and inspect test records and witness assembly and testing in progress.

10.0 DOCUMENTATION

Prior to shipment, Manufacturer shall submit to TPIA one reproducible of the following:

- Raw material test certificate with traceability
- Test certificates / results for all the tests that are carried out in accordance with this specification and ASME B16.40 as per Manufacturer's quality control procedure.
- Inspection release note issued by TPIA and summary reports of inspection carried out by TPIA against approved QAP.
- Specific installation instructions, if any.
- Operation, maintenance, recommendations and instruction manual in detail.
- Any other relevant documents required by GGL.

The certificates shall be valid only when approved / certified by TPIA. Only those valves, which have been certified by TPIA, shall be dispatched from Manufacturer's works.

All documents shall be in English language only.

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11.0 WARRANTY

PE Ball valves shall be guaranteed against performance and workmanship for a period of eighteen months from the date of delivery or twelve months from the date of commissioning, whichever is earlier. GGL also reserves the right to charge the supplier all costs incurred by GGL for rectifying or replacing defective units within the warranty period.

Manufacturer is bound to replace or repaired all valve parts, which are resulted defective due to inadequate engineering or to the quality of materials or any other reasons.

12.0 MARKING

12.1 General

- All valves supplied in accordance with this specification shall be suitably and individually marked.
- Unless otherwise stated in latest edition of EN 1555–4, Table 5, the marking elements shall be printed or formed directly on the valve in such a way that after storage, weathering, handling and installation legibility is maintained during use of the valve.
- Marking shall not initiate cracks or other types of defects which adversely influence the performance of the valve.
- If printing is used, the colour of the printed information shall differ from the basic color of the valve.
- The size of the marking shall be such that it is legible without magnification.
- There shall be no marking on the minimum spigot length.
- The minimum required marking shall conform to latest edition of EN 1555 – 4, Table 5.

12.2 Additional marking

Valves conforming to this specification, which are third party certified by a certification body, shall be marked unless otherwise specified by GGL.

13.0 PACKAGING

The valves shall be packaged in bulk or individually protected where necessary in order to prevent deterioration.

Whenever possible, they shall be placed in individual bags, in cardboard boxes or cartons. It is recommended to protect the spigot end by external caps.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, type and dimensions of the part, number of units in the box, and any special storage conditions and storage time limits.

14.0 ENCLOSURE:

I. Annexure- 1: Data sheet of PE-Ball Valve
II. Annexure-2: Quality Assurance Plan

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ANNEXURE-1: DATASHEET

Sr. No.	Parameters	Description
1	Sizes(Diameter)	63 mm, 90 mm, 125 mm & 160 mm
2	Model	For dia: 63, 90 & 125 mm: 2PS with stem height 690-800 mm, for 160 mm dia-2 PS with stem height of 800 mm.
3	Standard	ASME B16.40/EN 1555-4:latest edition
4	Nominal Pipe Diameter	63 mm, 90 mm, 125 mm & 160 mm
5	Pressure Class	For 63,90,125,160 mm DR 11,
6	Design Pressure (barg)	7.5 bar(g)
7	Design temperature(Deg C)	45 Deg C
8	Operating Pressure(barg)	1.5-5.0 bar(g)
9	Operating temperature(Deg C)	-29 to 60 Deg C
10	Service	Natural Gas
11	Location	Underground
12	Pattern	Full Bore
13	End Connections	Polyethylene PE 100 Grade material(Spigot type) SDR 11
14	Stem Extension	Integral stem extension required(690 to 800 mm from the top of PE Pipe)*
15	Valve design	1 Piece construction
16	Color	Black
17	Ball Position Indication	Open/Close indicator required
18	Mechanical stops	For open/close limits required
19	Tests	As per ASME B 16.40:2008/EN 1555-4:latest edition

*** The stem extension should be an integral part of the valve body. The stem extension along with the protection sleeve (stem protector) should be 690 – 800 mm in height from the top of the PE pipe. The protection sleeve should engulf the stem completely so that the stem with extension does not come into direct contact with soil or any other foreign particles when it is installed underground.**

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ANNEXURE-2: QUALITY ASSURANCE PLAN

SR. No	DESCRIPTION	TYPE OF CHECK	QUANTUM OF CHECK	REF. DOC.	ACCEPTANCE NORMS	DOCUMEN - TATION	INSPECTION	
							M	TPI/GGL
I	Review of mill test certificate for Raw materials	Density, Melt flow rate, Water content, Volatile content, Oxidation induction time, Pigment dispersion, confirming to clause 4 of EN 1555-4(2002)	Each Batch	Raw Material manufacturer's test certificate	Raw Material manufacturer's test certificate	Supplier's test certificate	R	R
	Hydrostatic strength @ 20 degree, 100h @ 80 degree, 165h @ 80 degree, 1000h	Mechanical properties, confirming to Table 2 of EN 1555-4(2002)	Each Batch	EN917/ISO 5208	EN917/ISO 5208	Inspection report	R	R
3	Leak tightness of seat & packing @ 1.5 times design pressure	External & internal leak testing	100%	EN 1555-4	EN 1555-4	Inspection report	P	W
4	Leak tightness of seat & packing @ 25mbar	External & internal leak testing	Each Batch	EN 1555-4	EN 1555-4	Inspection report	R	R
5	Operating torque	Mechanical properties	100%	EN 1555-4	EN-28233	Inspection report	P	W
	Stop resistance	Mechanical properties	Each Batch	EN 1555-4	EN 28233	Inspection report	R	R
7	Actuation mechanism Resistance	Mechanical properties	Each Batch	EN 1555-4	EN 28233	Inspection report	R	R
8	Resistance to bending between support	Mechanical properties	Each Batch	EN 1555-4	EN 28233	Inspection report	R	R
9	Thermal cycling resistance dn>63mm	Mechanical properties	Each Batch	EN 1555-4	EN 12119	Inspection report	R	R
10	Leak tightness under bending with thermal cycling dn≤63mm Leaktigtness	Mechanical properties	Each Batch	EN 1555-4	EN 1704	Inspection report	R	R

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	under tensile load							
11	Leak tightness under tensile load	Mechanical properties	Each Batch	EN 1555-4	ISO 10933	Inspection report	R	R
12	Leak tightness under and after bending applied to the operating mechanism	Mechanical properties	Each Batch	EN 1555-4	EN 1680	Inspection report	R	R
13	Impact strength	Mechanical properties	Each Batch	EN 1555-4	EN 1555-4	Inspection report	R	R
14	Pressure Drop	Air flow rate	Type Test	EN 1555-4	EN 1555-4	Inspection report	R	R
	Oxidation induction time (Thermal stability)	Physical characteristics	Gujarat Gas specification / requirement	EN 728	EN 728	Inspection report	R	R
16	Melt mass/ Flow rate (MFR)	Physical characteristics	Each Batch	ISO 1133	ISO 1133	Inspection report	R	R
17	Dimensional Check & Visual Inspection		Each Batch	ISO 1183/GGL PO	ISO 1183/ GGL PO	Inspection report	P	W
18	Storage		All Products		Manufacturer Recommendation	N/A	H	M
19	Marking & Packing		Each Batch	EN 1555-4/GGL PO	* Manufacturer Recommendation	Inspection report	P	W

LEGEND:

P: Performed **R: Documents Review** **W: Witness** **H: Hold** **M: Monitor**

Remarks:

1. The above testing and acceptance criteria are in accordance to the relevant standard and/or GUJARAT Gas Specifications.

2. Manufacturer shall mark the contents requested by EN 1555-4 on the sticker label which is attached on the body of the valve.

3. TPI would not be economical in case of small quantity order. In case of no field inspection, the inspection by buyer Side is to be 'Document Review'. In case of field inspection, the inspection is to 'Witness' and 'Monitor'.

4. 100% inspection by TPIA for trial order and 10% inspection by TPIA for regular order.

5. Type Test Certificate to be shown to TPI for the approval for above marked Tests (SR No. 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16)