



# **TECHNICAL SPECIFICATIONS**

## **FOR BRASS ISOLATION BALL VALVE**

**Document No: GGL/TS/PE-PNG/SUPPLY/ISOVLV/SPEC**

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## 1. INTRODUCTION & SCOPE

Gujarat Gas Ltd., is a Group Company of Gujarat State Petroleum Corporation Ltd., (State Government undertaking) is supplying natural gas to automobile, industrial, commercial and domestic consumers including CNG stations in various Geographical Areas as per authorization from PNGRB.

The intent of this specification is to establish minimum requirements to manufacture and supply of Manually Operated Isolation (Ball) Valves of sizes of ½" Dia., 1" Dia. & 1.5" Dia. made from BRASS material for PNG Connection at Customers end

The scope will include manufacture, supply, inspection, testing, marking, packaging, handling and dispatch of Manually Operated Isolation (Ball) Valves of ratings and grades as per EN 331: 1998 with latest amendments.

## 2. REFERENCE CODES AND STANDARDS:

### 2.1 GOVERNING STANDARDS

PNGRB T4S:	Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks.
EN 331	Manually operated ball valves and closed bottom taper plug valves for gas installations in buildings

### 2.2 REFERENCE STANDARDS

IS 319	Free Cutting Brass Bars, Rods and Section
ASTM B 283	Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)
EN 549	Specification for rubber materials for seals and diaphragms for gas appliances and gas equipment
EN 377	Lubricants for applications in appliances and associated controls using combustible gases except those designed for use in industrial processes
ISO 7	Pipe threads where pressure-tight joints are made on the threads
ISO 228	Pipe threads where pressure-tight joints are not made on the threads
ISO 261	ISO General purpose metric screw threads - General Plan
IS 554	Pipe threads where pressure-tight joints are made on the threads

In case of conflict between the requirements of this specification and the Reference Codes & Standards, the requirements of the specification, having stringent requirement, shall govern. Vendor shall obtain prior permission from GGL in such cases.

### 3. DEFINITION

For this specification the following definitions shall apply:

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

### 4. CLASSIFICATION OF VALVES

#### Pressure Class

Pressure Class is divided into three Classes, corresponding to maximum working pressure as follows:

Sr. No.	Class	Pressure Range
1	0.2 MOP	0 to 0.2 X 10 <sup>5</sup> Pa
2	0.5 MOP	0 to 0.5 X 10 <sup>5</sup> Pa
3	5.0 MOP	0 to 5 X 10 <sup>5</sup> Pa

#### Temperature Classes

Temperature Class is divided into three Classes, corresponding to temperature as follows:

Sr. No.	Class	Temperature Range
1	- 5 °C	- 5 °C to 60 °C
2	- 20 °C	- 20 °C to 60 °C
3	- 40 °C	- 40 °C to 60 °C

### 5. MATERIAL

- The material of isolation valve (Ball, Stem, Bonnet & body) shall conform to ASTM B283/ Alloy UNS C37700 or IS 319
- The material of any part in contact with the gas to the surrounding atmosphere, shall be from the corrosion resistant material or shall be suitably protected and shall withstand the humidity test as per clause of 7.6.5 & 7.6.4 of EN 331: 1998 or Latest edition.
- Springs and other moving parts which shall be suitable protected against corrosion and shall retain their protective coating despite any movement resulting from the operation of the valve.
- All marking shall be durable and resistant to atmosphere conditions. Labels and their markings shall neither deteriorate nor lift nor become unreadable by humidity and temperature.
- Rubber materials shall conform to EN 549 and Lubricants shall conform to EN 377.

## 6. CONSTRUCTION

- a) Valves shall be designed in such a way that once installed, it is impossible to remove the closure member or a seal without damaging the valve or leaving clear signs of tempering on it.
- b) Valves designed to be maintained shall be such that it is difficult to remove parts serving to seal against gas without specialist knowledge and that any tampering is evident and incorrect reassembly is impossible.
- c) All valves components shall be free from burrs and clean (e.g free from swarf and core-sand) and shall be of sound manufacture. All valve components shall be free from sharp edges and corners which could be cause of damage, injury or incorrect operation, when viewed with the naked eye.
- d) Seals for moving parts which separate gas ways from the atmosphere, shall maintain their original leak-tightness without any manual adjustment.
- e) If a spring is used, the two end faces of the spring shall be parallel and perpendicular to the axis of the spring. The end coils of a spring shall not damage their mating faces.
- f) The wall thickness from any gas way to atmosphere to holes connected to the atmosphere shall not be less than 1 mm. Holes for screws, pins, etc which are used for the assembly of part and for mounting, shall not provide any leak path between gas ways and the atmosphere.
- g) Valve in the fully closed position, the angular distance between the gas port in the closure member and both the inlet port and outlet port in the valve body, shall be at least 8° with a measurement uncertainty of 1° when measured according to EN 331.

## 7. CONNECTION THREADS

Threaded inlet and outlet connections for valves with pressure-tight joints made on the threads, shall conform to ISO 7.

Where threads for non pressure-tight joints are required, they shall conform to ISO 228 or ISO 261.

Valve with threaded connections shall have flats on the body which, when used for fitting shall accommodate commercially available tools.

### SEALS

Sealing on the closure member shall be constructed so that tightness is achieved by mechanical means. This excludes all sealing materials such as liquids, pastes, and tapes.

Sealing between split part bodies shall be constructed so that tightness is achieved by mechanical means. Sealant used for such connections shall withstand all torque and bending moment values.

For valves intended to be serviced, the tightness of the serviceable part shall be maintained after dismantling and reassembly.

### OPERATION

Valves shall be constructed so that they can be operated by means of a manual actuator such as a handle. Valves operated by turning shall close in a clockwise direction

The rotation from open to close shall be a quarter turn. If the manual actuator is detached then the end of the operating shaft shall be marked so that the open and closed positions are clearly indicated.

## STOPS

On valves the end positions “open” and “closed” shall be clearly identified and limited by fixed, non-adjustable stops.

The valve handle shall be designed so that it is:

- At right angles to the direction of the flow for the closed position:
- Parallel with the direction of the flow for the open position.

If the stop mechanism is part of the handle, the handle and the shaft shall be all of one piece: the fastening of the handle is sealed.

### 8. PERFORMANCE TEST INCLUDING LEAK TIGHTNESS TEST

Valves shall be confirming to the clause of 6 of EN 331: 1998 or Latest edition.

### 9. TEST METHODOLOGY OF PERFORMANCE TEST

Valves shall be confirming to the clause of 7 of EN 331: 1998 or Latest edition.

### 10. FREEDOM FROM DEFECT

The valves shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

### 11. IMMERSION TEST & PNEUMATIC PRESSURE TEST

All valves shall be confirming to the clause of 6 and 7 of EN 331: 1998 or Latest edition during testing and no leakage is permitted. This test shall be performed on each valve.

### 12. DIMENSIONS & DIMENSIONAL TOLERANCES

#### ISOLATION VALVES

Sr. No	Sizes	Total Length (mm)	End Connection
1	15 mm	56±1 mm	½" BSPT(F) as per IS 554 /ISO-7
2	25 mm	76±1 mm	1" BSPT (F) as per IS 554 /ISO-7
3	38 mm	96±1 mm	1.5" BSPT (F) as per IS 554 /ISO-7

### 13. QUALITY ASSURANCE (QA)

The Contractor/Manufacture /Vendor shall submit following for review of TPIA / OWNER at the time of final inspection at contractor store before installation of materials.

- Material test certificates / reports
- Performance requirements and type test, if any.

**14. INSPECTION / DOCUMENTS**

- a) Inspection shall be carried out as per design codes/standards, OWNER Technical Specification and QAP enclosed in this tender by TPIA / OWNER.
- b) TPIA /OWNER shall carry out final inspection at contractor store at the time of material acceptance / clearance before installation / work execution at site.
- c) TPIA / OWNER shall carry out random inspection during manufacturing/ final inspection.
- d) Contractor / manufacturer / Supplier / Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per OWNER Technical Specification, at the time of final inspection of each supply lot of material.
- e) Even after third party inspection, OWNER reserves the right to select a sample of items randomly from each manufacturing batch/ lot and have these independently tested. If the results of these tests fall outside the limits specified in OWNER Technical specification, then OWNER reserves the rights to reject all production supplied from the batch.
- f) For any control test or examination required under the supervision of TPIA/OWNER, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

**15. MARKING**

Each valves at least shall be durably marked on the valve in a clearly visible position (No engraving allowed on threaded portion) with following things:-

1. Manufacturer's name or trade mark or identification mark
2. Nominal size DN:
3. Emboss- EN 331
4. Emboss- MOP in bar
5. On Valve's Lever- GGL Name & Logo, ON /OFF Indicator, Gas Flow direction

**16. PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured.

Contractor / Vendor / Bidder shall submit the packaging details and also complied with at the time of delivery.

**17. ENCLOSURE:**

- Annexure-1: DATASHEET OF BRASS ISOLATION VALVE
- Annexure-2: QUALITY ASSURANCE PLAN

**ANNEXURE-1:**  
**DATASHEET OF BRASS ISOLATION VALVE**

Sr. No.	Description	Specification
1	Item	Brass Isolation Valve
2	Governing Standard	EN 331 - Latest Version
3	Valve Location and Function	Riser, Above Ground PNG and Commercial Connection for Gas Line Isolation
4	Service	Natural Gas
5	Maximum Operating Pressure	5 Barg
6	Flow Capacity (Max.)	1/2" - 5m <sup>3</sup> /hr 1" - 16m <sup>3</sup> /hr 1.5" - 40 m <sup>3</sup> /hr
7	Nominal Valve Size	15mm, 25mm, 38mm
8	Material	ASTM B 283 (Alloy UNS C37700) / IS 319
9	Surface Coating	Nickel/chromium Plated
10	Types of Valve Operation	Lever with PVC Coating
11	Ball Position Indicator	Open & Close Indicator
12	Length of the Valve	½" : 56±1 mm 1" : 76±1 mm 1.5" : 96±1 mm
13	Valve Seat	PTFE / Soft Seated
14	End Connection	1/2" BSPT (F), 1" BSPT (F) & 1.5" BSPT (F) as per IS 554/ISO 7
15	Marking	1. Manufacturer's Name 2. Nominal Size DN 3. Emboss- EN 331 4. Emboss- MOP in bar 5. On Valve's Lever- GGL Name & Logo, ON /OFF Indicator, Gas Flow direction



## ANNEXURE-2:

## QUALITY ASSURANCE PLAN (QAP) FOR BRASS ISOLATION VALVE (SPECIMEN COPY)

SR. NO.	INSPECTION AND TESTING	QUANTUM OF CHECK	INSPECTION TYPE OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION		
							MFG.	TPIA / CLIENT	REMARKS
1	Raw material Testing:								
1.1	Raw material Testing: (Chemical / Physical Requirement)	One in each heat	Document	Gujarat Gas Tech Specs	Gujarat Gas Tech Specs	MTC	P	R	
1.2	Springs, Seat, Stem, Seat, Seals and Lubricants	One in each heat	Document	As per EN 331 /EN 549 / EN 377 / PTFE / SOFT SEAT	As per EN 331 /EN 549 / EN 377 / PTFE / SOFT SEAT	MTC	P	R	
1.3	Handle Material	One in each Lot	Document	Steel as per IS2026 Gr.B for Isolation Valve handle/lever	IS 2062	MTC	P	R	
1.4	Nut Material	One in each Lot	Document	Nut material – Steel as per SS304	SS 304	MTC	P	R	
2	Performance test of Final product :								
2.1	- Gas Tightness Test	100%	Document	As per EN 331	Measured leakage rate should not exceed 20 cm³/hr as per clause 7.2 of EN331	MTC	P	Rw	Random Witness by TPI 10 piece in each lot
	- Twist (Torque) Test	1 piece in each lot	Document	As per EN 331	Operating torque should not exceed 7 Nm at ambient temperature as per table 4 of EN 331	MTC	P	W	
	- Bending Test - Turning Torque Test		Document		Should confirm to clause 6.5 of EN 331	MTC	P	W	
2.2	Flow Capacity test	1 piece in each lot	Document	As per EN 331	For ½" - 5 m³/hr. (max.) For 1" - 16 m³/hr. (max.) For 1.5" – 40 m³/hr (max)	MTC	P	R	
2.3	Immersion test	100%	Document	As per EN 331	5.0 Bar to 7.0 Bar	MTC	P	Rw	Random Witness by TPI 10 piece in each lot

3.0 FINAL INSPECTION									
3.1	Visual inspection ( Free from defects )	As per Table-I	Visual	As per EN 331	As per EN 331	MTC	P	Rw	
3.3	Sizes of Valves		Visual	As per EN 331	15mm, 25mm, 38mm	MTC	P	Rw	
3.4	Ball Position		Visual	As per EN 331	Open & Close Indicator	MTC	P	Rw	
3.5	Length of valve		Vernier Caliper	As per EN 331 / As per Approved Drawing	1/2"-56±1 mm 1"- 76±1 mm 1"- 96±1 mm	MTC	P	Rw	
3.6	Valve Seat		Document	As per EN 331 / As per Approved Drawing	As per EN 331 / EN 549 / EN 377 / PTFE / SOFT SEAT	MTC	P	Rw	
3.7	End Connection	As per Inspection plan at Table-I	"GO" - "NO GO" Gauge	As per EN 331 / IS 554 / ISO-7/As per Approved Drawing	1/2" BSPT(F), 1"BSPT(F) & 1.5" BSPT(F) as per IS 554/ISO-7	MTC	P	Rw	
3.8	Type of handle		Visual	As per EN 331	For Brass Isolation valve- Lever with Yellow PVC coating	MTC	P	Rw	
3.9	Surface Coating by Nickel / chromium Plated		Visual	As per EN 331 / IS 4736	Gujarat Gas datasheet	MTC	P	R	
4	Marking incl. On / Off indication		Visual	As per EN 331	As per clause No. 9 of EN 331	MTC	P	Rw	
5	Final Documentation					COMPLIANCE CERTIFICATE	P	H	

**LEGENDS:**

- Rw- Random Witness,
- W - Witness,
- R - Review of Documents / test certificates,
- H - Hold,
- P - Perform,
- TPIA - Third Party Inspection Agency appointed by Owner

**Notes: -**

1	The Above Testing and acceptance criteria are minimum requirements, however, vendor shall ensure that the execution of works shall also comply to the additional requirements as per Gujarat Gas Technical specifications.
2	If required, Owner/Owner representative shall review query and give inputs related to QAP / Quality manuals / Drawings etc. published in the tender documents
3	Vendor shall in coordination with detailed Plan and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.

4	Critical or Special works procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
5	Owner / Owner's representative including TPIA will have the right to inspect any activity of execution of works at any time.
6	All reference Codes/ Standards, Documents shall be arranged by Vendor for reference of TPIA/ Owner at the time of Inspection
7	At the time of delivery from the manufacturer place and receipt of material in stores, Vendor will submit copy of all related document of inspection along with release note & MTC to TPIA / CA.
8	Contract / Manufacture / Vendor shall be sent minimum 3 sample for Chemical & Physical testing of materials at his cost in a year.
9	Note: W-Witness of quantity shall as per inspection level 1 AQL 1 as per IS 2500(part 1):2000 **Sampling plan for TPI is 10% of offered quantity upto 100 valves

Table-I: Reference standard: IS 2500				
Sr. No.	Batch Size	Sample Size	Acceptance No.	Rejection No.
1	2 to 500	20	0	1
2	501 to 3200	50	1	2
3	3201 to 10000	80	2	3
4	10001 to 35000	125	3	4
5	35001 to 150000	200	5	6

**Explanation:**

No. of samples inspected will be equal to the sample size given by the plan.

If the no. of nonconforming product(s) is equal to or less than the acceptance no., the non-confirming product(s) will be removed from the lot and the remaining lot accepted.

If the no. of non-confirming product(s) is equal to or greater than the rejection number, the whole lot will be retested for that particular parameter and rejected products, if any, will be replaced by fresh OK products.