

CNG & CITY GAS DISTRIBUTION PROJECT IN HYDERABAD PHASE II

Project No.: P.002062
Document No.: P.002062 G09 5020



Hyderabad – INDIA
BHAGYANAGAR GAS LIMITED (BGL)

TRACTEBEL Engineering GDF SUEZ		MAIN TABLE OF CONTENTS (ISOLATION AND APPLIANCE BALL VALVE)			P.002062 G82 5020	
S.No.	Description	Document/ Drawing No.	Rev. No.	Pages	Page No.	
I	COMMERCIAL	VOLUME I OF II				
1	Commercial along with SOR	P.002062 G09 5020	1	81+2		
II	TECHNICAL	VOLUME II OF II				
1	Introduction	P.002062 G79 5020	0	1	200002	
2	MR Material Requisition	P.002062 L91 0356	0	6	200004	
3	PTS Isolation Ball Valves	P.002062 L21 0357	0	3	200011	
4	PTS Appliance Ball Valves	P.002062 L21 0358	0	3	200016	
5	QAP Isolation Ball Valves	P.002062 Q93 0359	0	1	200021	
6	QAP Appliance Ball Valves	P.002062 Q93 0360	0	1	200022	

BHAGYANAGAR GAS LTD.

CNG & CGD PROJECT IN HYDERABAD PHASE – II

INTRODUCTION

0	23.09.11	First Issue	MS	NT	NC
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1.0 INTRODUCTION

Bhagyanagar Gas Limited (BGL), a joint venture of Hindustan Petroleum Corporation Limited (HPCL) and GAIL (India) Limited, is executing Projects for CNG and City Gas Distribution in different cities of Andhra Pradesh.

Bhagyanagar Gas Limited (BGL) (hereinafter referred as Owner), is supplying Piped Natural Gas (PNG) to Domestic, Commercial and Industrial consumers and Compressed Natural Gas (CNG) to automobiles in Hyderabad city of Andhra Pradesh through its CGD and CNG networks. BGL intends to extend its CGD and CNG network in Hyderabad to supply Natural gas to Domestic, Commercial consumers through MDPE network and to existing/ new CNG stations through Steel pipeline network by setting up new facilities.

TRACTEBEL ENGINEERING pvt ltd is now inviting tenders on Competitive Bidding basis for procurement of Isolation and Appliance ball valve for this project.

The present document covers the technical specifications for the enquiry.

2.0 TECHNICAL SPECIFICATIONS

The technical specifications for this present tender enquiry are as listed in Material Requisition (No. P.002062/L/91/0356).

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BHAGYANAGAR GAS LTD.

CNG & CGD PROJECTS IN HYDERABAD PHASE-II

MATERIAL REQUISITION – ISOLATION & APPLIANCE BALL VALVE

Rev.	Date	Subject of revision	Author	Checked	Approved
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200004

Project : CNG & City Gas Distribution Project in Hyderabad Phase – II

Subject : Isolation and Application Ball Valve

A. DESCRIPTION OF GOODS AND/OR SERVICES

Item	Quantity/ Unit	Description
1.	50000	Isolation ball valve ½”
2.	5000	Isolation ball valve ¾”
3.	5000	Isolation ball valve 1”
4.	25000	Appliance ball valve ½”

Note: For Quantity & detailed scope of work refer volume I of II (Commercial)

B. REMARKS / COMMENTS**1.0 GENERAL NOTES****VENDOR's compliance**

Vendor shall submit his bid in full compliance with the requirements of this MR and attachments.

Vendor must include the following statement in his bid:

We certify that our bid is fully complying with your enquiry dated.....,and referenced.....

Compliance with this material requisition in any instance shall not relieve the Vendor of his responsibility to meet the specified performance.

2.0 COMPLIANCE WITH SPECIFICATION

The vendor shall be completely responsible for the design, materials, manufacture, supply, testing, inspection, preparation for shipment, loading of the above item strictly in accordance with the Material Requisition and all attachments thereto.

All items shall be provided with EN 10204 – 3.1 Certificates.

3.0 VENDOR'S SCOPE

Vendor's scope of work includes manufacturing, Supply, testing , marking , packaging , handling and dispatch of Isolation & Appliance valves as indicated in material requisition & Particular technical specification and all unmentioned parts necessary for a satisfactory operation and testing except those which are indicated to be out of the Vendor's supply.

4.0 INSPECTION

Vendor shall appoint anyone of the following TPIA for inspection purpose. Vendor has to propose minimum 4 nos. of below listed agencies to be approved by Bhagayanagar Gas Ltd. (BGL) / Tractebel Engineering pvt. ltd.

- a. Tata Projects Ltd.
- b. SGS India Pvt. Ltd.
- c. Quality Services and Solutions Pvt.Ltd.
- d. Bureau Veritas (India) Pvt.Ltd.
- e. Germanischer Lloyd
- f. Certification Engineers International Ltd.
- g. Velosi Certification Services
- h. TUV India Pvt.Ltd.
- i. International Certification Services Pvt.Ltd.

Apart from inspection by TPIA, inspection shall also be performed by Bhagayanagar Gas Ltd. (BGL) and or its authorised representative / Tractebel Engineering pvt. ltd. and or its authorised inspection agency (AIA), as set out and specified in the codes and particular documents forming this MR.

5.0 APPLICABLE DOCUMENTS

General prescriptions, requirements and information are listed in annex C of this Material Requisition.

6.0 VENDOR'S DOCUMENTS

Vendor shall supply the documentation as listed under point D of this Material Requisition.

All documents shall be supplied in English language.

Vendor shall strictly follow the document numbering procedure in their document as illustrated below:

Document numbering shall consist of Maximum 20 Characters.

Document No. :

Project No.	Item	Document Index No.	Serial No.	Revision No.
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Where,

Project No. is P.002062;

Item is APPLIANCE VALVE; & ISOLATION VALVE

Document Index No. will be of three characters as indicated under point D of this MR;

Serial No. shall be 4 digit no. ranging from 0001 to 9999

Revision No. is Revision of the document starting with R0, R1

Example: For QA/QC program, the document no. will be

P.001385	ISOLATION & APPLIANCE VALVE	QAP	0001	R0
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C. LIST OF ATTACHMENTS

<p>The table herebelow lists the documents which are integral part of this Material Requisition. The applicable revision index of each document is mentioned in the column below the current Material Requisition revision index.</p> <p>When the Material Requisition revision index is "A" or "1", all listed documents are attached. For other Material Requisition revision index, only modified or new documents are attached.</p>	Material Requisition revision								
	0								
Documents	Revision of documents								
Particular Technical Specification for Isolation ball valve P.002062/L/21/0357	0								
Particular Technical Specification for Appliance ball valve P.002062/L/21/0358	0								
QAP for Isolation ball valve P.002062/Q/93/0359	0								
QAP for Appliance ball valve P.002062/Q/93/0360	0								

D. DOCUMENTS & DATA REQUIREMENTS

The table hereunder specifies the quantities and the nature of the documents to be submitted by the CONTRACTOR to the ENGINEER.

The documents required at the inquiry stage and to be included in the bid are listed under column A.

The documents required after award of the AGREEMENT and subject to the written approval of the ENGINEER are listed under column B.

The final and certified documents are listed under column C.

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

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

Item	Documents and Data	Document Index No.	A			B		C	
			Number of copies	Number of copies	Required date	Number of copies	Required date		
1	List of Raw Material Manufacturer	RAW	3	3	2 weeks	4	Along with despatch/Ship ment		
2	Drawing/catalogue/data submittal list	LST	3	3	2 weeks	4	Along with despatch/Ship ment		
3	Delivery Schedule	DES	3	3	2 weeks	4	Along with despatch/Ship ment		
4	QA/QC program	QAP	3	3	2 weeks	4	Along with despatch/Ship ment		
5	General Arrangement Drawing with BOM	GAD	3	3	2 weeks	4	Along with despatch/Ship ment		
6	Catalogue	CTL	3	3	2 weeks	4	Along with despatch/Ship ment		
7	Manufacturer's Test certificates	MTC		3	2 weeks	4	Along with despatch/Ship ment		
8	Material certificate EN 10204 Cert. 3.1	MAC		3	2 weeks	4	Along with despatch/Ship ment		
9	Final technical file	FTF		3	2 weeks	4	Before Claim of final payment		

NOTES

- 1) Documents listed in column A is required to be submitted during bid time (1 original+ 3 copies). Durations in column B (Required date) are weeks after LOA date or as indicated in Table. Durations in column C (Required date) are weeks after document approval or as indicated in Table. Due date of each document may be proposed.
- 2) Latest submittal time for:
 - Test procedure : 2 weeks before test
 - Test report : 2 weeks after test
- 3) Final technical file shall be supplied in hard copy as indicated, and in electronic format (.pdf Acrobat files) on Four (4) CD-ROMs.

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BHAGYANAGAR GAS LTD.

CNG & CGD PROJECTS IN HYDERABAD PHASE-II

PTS – ISOLATION BALL VALVE

Rev.	Date	Subject of revision	Author	Checked	Approved
0	23.09.11	First issue	MS	NT	NC

TABLE OF CONTENTS

1.0 INTENT OF SPECIFICATION1

2.0 SCOPE OF WORKS1

3.0 DEFINITIONS.....1

4.0 REFERENCE STANDARDS AND SPECIFICATIONS.....1

5.0 DMATERIAL SPECIFICATION FOR ISOLATION VALVES.....1

6.0 DATASHEET.....2

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Isolation Ball Valves used for supply of domestic natural gas.

2.0 SCOPE OF WORKS

2.1. The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Isolation Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard ANSI B16.33.

2.2. All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

2.3. Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 DEFINITIONS

Owner	Shall mean Bhagyanagar Gas Ltd. (BGL)
Manufacturer	Means the Manufacturer of the isolation ball valves
PTS	Means the present <<Particular Technical Specification>> and all its appendix, if any.

Third Party Inspection Agency Means the Inspection Agency to be appointed by BGL.

4.0 REFERENCE STANDARDS AND SPECIFICATIONS

BS EN 331 – Manually operated Ball Valves and closed Bottom Taper plug Valves for Gas installations in buildings.

5.0 MATERIAL SPECIFICATION FOR ISOLATION VALVES

Please refer data sheet.

5.1. Markings

Markings shall be provided & shall include:

- i) Manufacturer's name or trade mark Model designation
- ii) Rate working pressure in Bar.
- iii) Direction of flow

5.2. Packaging

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

5.3. Gas Tightness

All Valves shall be leak tightness tested at 1.5x 4 bars for a period of 15 seconds and no leakage is permitted. This test shall be performed as per clause no. 4.2 of ASME 16.33.

5.4. Temperature Resistance Test

This test shall be carried out as per 4.3 clause of ASME B 16.33.

5.5. Mechanical Strength

- i) The body of the valves shall be capable of withstanding without deformation or leakage at 125 Nm torques, as applied to a pipe being connected to the valve.
- ii) Valve shall be capable of withstanding without deformation or leakage, when bending moment as per Table 3 of ASME B 16.33, if applied to a pipe connected to the valve.
- iii) The valves shall be capable of withstanding 25 Nm impact without breakage or leakage.
- iv) Vendor shall submit Model Number along with catalogues in English along with un-priced bids.
- v) Maximum turning torque to operate the valve as per table 5 of ASME B 16.33.

6.0 DATASHEET

S.NO.	DESCRIPTION	DATA
1.00	PROCESS DATA	
1.01	Fluid	Natural gas
2.00	Operating condition	
2.01	Minimum pressure	0.1 bar (g)
2.02	Minimum Temperature (°C)	0-45
3.00	Design condition	
3.01	pressure	4 bar (g)
3.02	Temperature (°C)	0-50
4.00	VALVE DATA	
4.01	Size	½", ¾" & 1"
4.02	Type	Isolation Ball Valve with Full Bore, NPT Female (Confirming to ANSI B1.20.1) ends for natural gas application with operating Leaver arrangement . Valve full open/close position shall be at 90°.
4.03	Rating	-
4.04	End connection	End connection should be NPT Female (conforming to ANSI B1.20.1).
4.05	Body material	Forged Brass (ASTM B 283, Alloy UNSC37700) with Nickel/ Chrome Plated.
4.06	Ball material	Hard Chrome/ Nickel Plated , Forged Brass Bar (ASTM B 283, Alloy UNSC37700) with Teflon Seat
4.07	Stem	-
4.08	Seat & seal	-
4.09	Fire safe	-
4.10	Anti blow out	-
4.11	Antistatic	-
4.12	Extension stem	-
4.13	Operator	Leaver arrangement
5.00	PAINTING	-

5.01	Surface preparation	-
5.02	Primer	-
5.03	finish	-
5.04	insulation	-
6.00	TEST	
6.01	Hydrostatic shell test	
6.02	Test pressure	6.0 bar(g)
6.03	Test medium	-
6.04	Hydrostatic seat test	6.0 bar(g)
6.05	Test pressure	-
6.06	Test medium	-
6.07	Functional test	-
6.08	Test pressure	-
6.09	Leak test	-
6.10	Impact test	AS per PTS
6.12	Bending Test	AS per ASME B 16.33 / PTS
6.13	Torque test	AS per PTS
6.14	Turning torque test	As per ASME B 16.33
6.15	Antistatic test	-
6.16	Fire test	-
6.17	Visual and dimensional examination	-
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.0	QUALITY CONTROL	-
7.01	Material certificates	EN-10204, 3.1 Certificate
7.02	All testing certificates	-

NOTE:

1. Minimum Nickel/ Chrome Plated on the ball & body of appliance ball valve shall be 25 Micron.
2. The above specified tests in PTS/Data sheet are minimum. However, the other remaining/specified tests shall be done as per ASME B 16.33

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BHAGYANAGAR GAS LTD.

CNG & CGD PROJECTS IN HYDERABAD PHASE-II

PTS – APPLIANCE BALL VALVE

23.09.11	First issue	MS	NT	NC
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TABLE OF CONTENTS

1.0	INTENT OF SPECIFICATION	1
2.0	SCOPE OF WORKS	1
3.0	DEFINITIONS.....	1
4.0	REFERENCE STANDARDS AND SPECIFICATIONS.....	1
5.0	MATERIAL SPECIFICATION	1
6.0	DATA SHEET.....	2

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1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Appliance Ball Valves used for supply of domestic natural gas.

2.0 SCOPE OF WORKS

2.1. The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Appliance Ball Valve, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard ANSI B16.33.

2.2. All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

2.3. Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 DEFINITIONS

Owner	Shall mean Bhagyanagar Gas Ltd. (BGL).
Manufacturer	Means the Manufacturer of the isolation ball valves
PTS	Means the present <<Particular Technical Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by BGL.

4.0 REFERENCE STANDARDS AND SPECIFICATIONS

BS EN 331 – Manually operated Ball Valves and closed Bottom Taper plug Valves for Gas installations in buildings.

5.0 MATERIAL SPECIFICATION

Please refer Data sheet.

5.1. Markings

Markings shall be provided & shall include:

- i) Manufacturer's name or trade mark Model designation
- ii) Rate working pressure in Bar.
- iii) Direction of flow

5.2. Packaging

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

5.3. Gas Tightness

All Valves shall be leak tightness tested at 1.5x 4 bars for a period of 15 seconds and no leakage is permitted. This test shall be performed as per clause no. 4.2 of ASME 16.33.

5.4. Temperature resistance test

This test shall be carried out as per 4.3 clause of ASME B 16.33.

5.5. Mechanical Strength

- i) The body of the valves shall be capable of with standing without deformation or leakage 125 Nm torques, as applied to a pipe being connected to the valve.
- ii) Valve shall be capable of withstanding without deformation or leakage 203 Nm bending moment, if applied to a pipe connected to the valve.
- iii) The valves shall be capable of withstanding 25 Nm impact without breakage or leakage.
- iv) Vendor shall submit Model Number along with catalogues in English along with un-priced bids.
- v) Maximum turning torque to operate the valve as per table 5 of ASME B 16.33

6.0 DATA SHEET

S.NO	DESCRIPTION	DATA
1.00	PROCESS DATA	
1.01	Fluid	Natural gas
2.00	Operating condition	
2.01	Minimum pressure	0.1 bar (g)
2.02	Minimum Temperature (°C)	0-45
3.00	Design condition	
3.01	pressure	4 bar (g)
3.02	Temperature (°C)	0-50
4.00	VALVE DATA	
4.01	Size	½"
4.02	Type	Appliance Ball Valve of Bore with ½" NPT (Confirming to ANSI B1.20.1) Female as an inlet and the outlet shall be having Ni/Cr plated brass or steel a nozzle (Serrated to suit ¼" rubber tubing/ hose connection) and the material is required for Domestic Natural Gas Service. With a metallic operating/ knob/ lever for full open/close at 90° position.
4.03	Rating	-
4.04	End connection	Female as an inlet and the outlet shall be having Ni/Cr plated brass or steel a nozzle
4.05	Body material	Total body including the nozzle shall be of Forged Brass (ASTM B 283, Alloy UNSC37700) with Nickel/ Chrome Plated. UTS – Min. 345 Mpa & Elongation 25 %
4.06	Ball material	Hard Chrome/ Nickel Plated , Forged Brass Bar (ASTM B 283, Alloy UNSC37700) with Teflon Seat UTS – Min. 345 Mpa & elongation 25 %
4.07	Stem	-
4.08	Seat & seal	-
4.09	Fire safe	-

4.10	Anti blow out Stem	-
4.11	Antistatic	-
4.12	Extension stem	-
4.13	Operator	-
5.00	PAINTING	-
5.01	Surface preparation	-
5.02	Primer	-
5.03	finish	-
5.04	insulation	-
6.00	TEST	-
6.01	Hydrostatic body test	-
6.02	Test pressure	6.0 bar(g)
6.03	Test medium	-
6.04	Hydrostatic seat test	6.0 bar(g)
6.05	Test pressure	-
6.06	Test medium	-
6.09	Leak test	-
6.10	Impact test	AS per PTS
6.12	Bending Test	AS per ASME B 16.33 / PTS
6.13	Torque test	AS per PTS
6.14	Turning torque test	As per ASME B 16.33
6.15	Antistatic test	-
6.16	Fire test	-
6.17	Visual and dimensional examination	-
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.0	QUALITY CONTROL	-
7.01	Material certificates	EN-10204, 3.1 Certificate
7.02	All testing certificates	-

Note

1. Minimum Nickel/ Chrome Plated on the ball & body of appliance ball valve shall be 25 Micron.
2. The above specified tests in PTS/Data sheet are minimum. However, the other remaining/specified tests shall be done as per ASME B 16.33

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**QUALITY ASSURANCE PLAN
ISOLATION BALL VALVE**

QAP NO : P.002062/Q93/0359
Date : 23.09.11
Prepared : MS
Approved : NC

Rev. 0

Checked : NT

SR. NO.	INSPECTION AND TESTING	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION		REMARKS
						Vendor	TPIA	
1	Raw material Testing:							
1.1	Metallic materials (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700)	As per ASTM B 283 (ALLOY UNS C37700)	INSPECTION TEST REPORT	P	W	Preferably witness by CA
1.2	Seat & Stem Seal Material	One in each heat	As per ASTM B 16.33	As per ASTM B 16.33 / PTS	INSPECTION TEST REPORT	P	W	Preferably witness by CA
2	Final product :							
	- Gas Tightness Test	100%	As per ASTM B 16.33 Cl no. 4.2	As per ASTM B 16.33 Cl no. 4.2	INSPECTION TEST REPORT	P	W	Preferably witness by CA
	- Twist (Torque) Test	100%	As per ASTM B 16.33 Cl no. 4.4.3	As per ASTM B 16.33 Cl no. 4.4.3	INSPECTION TEST REPORT	P	W	
2.1	- Bending Test	100%	As per ASTM B 16.33 Cl no. 4.4.4	As per ASTM B 16.33 Cl no. 4.4.4	INSPECTION TEST REPORT	P	W	
	- Impact Test	100%	As per ASTM B 16.33 Cl no. 4.4.5	As per ASTM B 16.33 Cl no. 4.4.5	INSPECTION TEST REPORT	P	W	
	- Turning Torque Test	100%	As per ASTM B 16.33 Cl no. 4.4.6	As per ASTM B 16.33 Cl no. 4.4.6	INSPECTION TEST REPORT	P	W	
2.2	- Physical Test (Impact / Tensile test)	100%	As per ASTM B 16.33 / PTS	As per ASTM B 16.33 / PTS	INSPECTION TEST REPORT	P	W	
2.3	Temperature Resistance test	100%	As per ASTM B 16.33 Cl no. 4.3	As per ASTM B 16.33 Cl no. 4.3	INSPECTION TEST REPORT	P	W	
2.4	Flow Capacity test	100%	As per ASTM B 16.33 Cl no. 4.5	As per ASTM B 16.33 Cl no. 4.5	INSPECTION TEST REPORT	P	W	
2.5	Hydrostatic pressure test	100%	As per ASTM B 16.33	As per ASTM B 16.33	INSPECTION TEST REPORT	P	W	Preferably witness by CA
2.6	Visual Inspection (Free from defects)	100%	As per ASTM B 16.33	As per ASTM B 16.33	INSPECTION TEST REPORT	P	W	
2.7	Dimension tolerances (Min. length of engagement - OD , wall thk .)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION TEST REPORT	P	W	
3	Marking	100%	As per ASTM B 16.33 Cl no. 2.4 / PTS	As per ASTM B 16.33 Cl no. 2.4 / PTS	INSPECTION TEST REPORT	P	R	
4	Final Documentation		P.O. / PTS	P.O. / PTS	EN 10204 3.1 CERTIFICATE	P	H	

LEGENDS: R - Review, W - Witness, H - Hold, P - Perform, TPPIA - Third Party Inspection Agency, CA - Control Authority (Owner / Owner's representative)

- Notes :
- The Above Testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Particular Technical specifications(PTS)
 - The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
 - Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc.submitted by supplier.
 - Contractor shall in coordination with Supplier/Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPPIA to organize Inspection.
 - Special manufacturing 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.
 - Owner / Owner's representative including TPPIA will have the right to inspect any activity of manufacturing at any time
 - All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPPIA/BGL at the time of inspection
 - At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

**QUALITY ASSURANCE PLAN
APPLIANCE BALL VALVE**

QAP NO : P.002062/Q93/0360

Rev. 0

Date : 23.09.11
Prepared : MS
Approved : NC

Checked : NT

SR. NO.	INSPECTION AND TESTING	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION		REMARKS
						Vendor	TPIA	
1	Raw material Testing:							
1.1	Metallic materials (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700)	As per ASTM B 283 (ALLOY UNS C37700)	INSPECTION TEST REPORT	P	W	Preferably witness by CA
1.2	Seat & Stem Seal Material	One in each heat	As per ASTM B 16.33	As per ASTM B 16.33 / PTS	INSPECTION TEST REPORT	P	W	Preferably witness by CA
2	Final product :							
2.1	- Gas Tightness Test	100%	As per ASTM B 16.33 Cl no. 4.2	As per ASTM B 16.33 Cl no. 4.2	INSPECTION TEST REPORT	P	W	Preferably witness by CA
	- Twist (Torque) Test	100%	As per ASTM B 16.33 Cl no. 4.4.3	As per ASTM B 16.33 Cl no. 4.4.3	INSPECTION TEST REPORT	P	W	
	- Bending Test	100%	As per ASTM B 16.33 Cl no. 4.4.4	As per ASTM B 16.33 Cl no. 4.4.4	INSPECTION TEST REPORT	P	W	
	- Impact Test	100%	As per ASTM B 16.33 Cl no. 4.4.5	As per ASTM B 16.33 Cl no. 4.4.5	INSPECTION TEST REPORT	P	W	
	- Turning Torque Test	100%	As per ASTM B 16.33 Cl no. 4.4.6	As per ASTM B 16.33 Cl no. 4.4.6	INSPECTION TEST REPORT	P	W	
2.2	- Physical Test (Impact / Tensile test)	100%	As per ASTM B 16.33 / PTS	As per ASTM B 16.33 / PTS	INSPECTION TEST REPORT	P	W	
2.3	Temperature Resistance test	100%	As per ASTM B 16.33 Cl no. 4.3	As per ASTM B 16.33 Cl no. 4.3	INSPECTION TEST REPORT	P	W	
2.4	Flow Capacity test	100%	As per ASTM B 16.33 Cl no. 4.5	As per ASTM B 16.33 Cl no. 4.5	INSPECTION TEST REPORT	P	W	
2.5	Hydrostatic pressure test	100%	As per ASTM B 16.33	As per ASTM B 16.33	INSPECTION TEST REPORT	P	W	Preferably witness by CA
2.6	Visual inspection (Free from defects)	100%	As per ASTM B 16.33	As per ASTM B 16.33	INSPECTION TEST REPORT	P	W	
2.7	Dimension tolerances (Min. length of engagement , OD , wall thk.)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION TEST REPORT	P	W	
3	Marking	100%	As per ASTM B 16.33 Cl no. 2.4 / PTS	As per ASTM B 16.33 Cl no. 2.4 / PTS	INSPECTION TEST REPORT	P	R	
4	Final Documentation		P.O. / PTS	P.O. / PTS	EN 10204 3.1 CERTIFICATE	P	H	

LEGENDS: R - Review, W - Witness, H - Hold, P - Perform, TPJA - Third Party Inspection Agency, CA - Control Authority (Owner / Owner's representative)

Notes:-

- The Above Testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Particular Technical specifications(PTS)
- The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
- Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc.submitted by supplier.
- Contractor shall in coordination with Supplier/Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPJA to organize Inspection.
- Special manufacturing 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.
- Owner / Owner's representative including TPJA will have the right to inspect any activity of manufacturing at any time
- All reference Codes/Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPJA/BGL at the time of Inspection
- At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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