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 natural gas to domestic & commercial connections.

2.0 SCOPE OF WORKS

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 EN331 (latest edition).

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

2.2. 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 Indraprastha Gas Ltd. (IGL)
Manufacturer	Means the Manufacturer of the isolation ball valves
SS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by IGL.

4.0 MATERIAL SPECIFICATION FOR ISOLATION VALVES

Please Refer Data Sheet

4.1.1. Markings

Markings shall be provided & shall include:

i) Manufacturer's name or trade mark, Model designation.

ii) Rate working pressure in Bar(g).

iii) Embossing on valves shall be "**EN 331**" only.

4.1.2. Packaging

Isolation valve 1/2",3/4",	**100 nos. per box**	Packed in cardboard boxes of standard design, & surrounded by polyester band & mentioned description & weight
Isolation valve 1",1*1/2",2"	**20 per box**	Packed in cardboard boxes of standard design, & surrounded by polyester band & mentioned description & weight

4.1.3. Gas Tightness

Valves shall be leak tightness tested in closed position and shall not leak to atmosphere in open and closed position when subjected progressively to internal air pressure of first 0.006 barg and then to at least 1.5 times the maximum operating pressure (MOP) of the valve. This test shall be performed as per EN331 (latest edition).

4.1.4. Temperature resistance test

This test shall be carried out as per EN331 (latest edition).

4.1.5. Mechanical Strength

i) The body of the valves shall be capable of withstanding, without deformation or leakage, a min. torque as per EN331 (latest edition) as applied to a pipe being connected to the valve.

ii) Valve shall be capable of withstanding, without deformation or leakage, a min. bending moment as per EN331 (latest edition) as applied to a pipe being connected to the valve.

iii) The valves shall be capable of withstanding impact without breakage or leakage as per EN331 (latest edition).

iv) Vendor shall submit Model Number along with catalogues in English language along with un-priced bids.

v) Maximum turning torque to operate the valve as per EN331 (latest edition).

DATA SHEET - ISOLATION VALVE

S.NO	DESCRIPTION	DATA	
1.00	**PROCESS DATA**		
1.01	Fluid	Natural Gas	
2.00	**Operating condition**		
2.01	Pressure	4 bar (g)	
2.02	Temperature (^{0}C)	0 - 45	
3.00	**Design condition**		
3.01	Pressure	6 bar (g)	
3.02	Temperature (^{0}C)	-5 to 60	
4.00	**VALVE DATA**		
4.01	Size	½" , ¾" & 1"	1 ½" & 2"
4.02	Type	Isolation Ball Valve, Full Bore with NPT (Confirming to ANSI B1.20.1) Female Threaded Ends (both inlet & outlet) for natural gas application with operating knob and locking arrangement, sealing wire and lead seal (without Key). Valve full open/close position shall be at 90^0. The material is required for Domestic Natural Gas Service.	
4.03	Pressure Rating	*	
4.04	End connection	End connection should be NPT Female (conforming to ANSI B1.20.1).	
4.05	Body material	Total body shall be of Forged Brass (ASTM B 283, Alloy UNSC37700) with hard Nickel / Chrome Plated. UTS – Min. 345 Mpa & Elongation 25 %	
4.06	Ball material	Hard Chrome / Nickel Plated (*), Forged Brass (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	*	
4.11	Antistatic	*	
4.12	Extension stem	NA	
4.13	Operator	Knob and locking arrangement with Butterfly type Handle	Knob and locking arrangement with Lever type Handle
5.00	**PAINTING**		
5.01	Surface preparation	*	
5.02	Primer	*	
5.03	Finish	*	
5.04	Insulation	*	
6.00	**TEST**		
6.01	Hydrostatic Shell Test		
	Test Pressure	7.8 bar(g)	
	Test Medium	*	
6.02	Hydrostatic Seat Test		

	Test Pressure	*
	Test medium	*
6.03	Functional / Pneumatic Test	
	Test Pressure	7.8 bar(g)
	Test medium	Air
6.04	Tensile Strength Test	As per EN331 (latest edition)
6.05	Bending Test	As per EN331 (latest edition)
6.06	Torque Test	As per EN331 (latest edition)
6.07	Turning Torque Test	As per EN331 (latest edition)
6.08	Antistatic Test	*
6.09	Fire Test	*
6.10	Visual and dimensional examination	As per QAP
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.00	**QUALITY CONTROL**	
7.01	Material certificates	EN-10204, 3.2 Certificate
7.02	All testing certificates	*
8.00	**NICKEL-CHROME PLATING**	
8.01	Body, Ball etc.	* (Note-3)

NOTE:

1. All Tests shall be carried out as per EN-331 (Latest Edition).
2. Data / Information as marked " * " shall be provided by Vendor / Manufacturer for review and approval by Client / PMC.
3. Nickel-Chrome Plating thickness shall be 10 micron ± 2 micron on valve body and ball.

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION – MLC PIPE

VPC –SS-PE-0014

00	**22.04.21**	**ISSUED AS STANDARD**	**AS**	**RKT**	**HK**
REV	**DATE**	**Purpose**	**Prepared By**	**Checked By**	**Approved By**

CONTENTS

1 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Multi-Layer Composite (MLC) Pipe used for supply of natural gas.

2 SCOPE OF WORKS

The scope will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and dispatch of MLC pipe, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard ISO 17484-1 (latest edition).

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

3 DEFINITIONS

Owner	Shall mean Indraprastha Gas Ltd. (IGL)
Manufacturer	Means the Manufacturer of the MLC pipe
SS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be Approved by IGL & appointed by vendor.

4 MATERIAL SPECIFICATION FOR MLC PIPE

4.1.1.1 *General*

Materials intended for the stress-bearing layers and inner layers shall conform to the material requirements of the reference product standard(s) specified in Annex A of ISO 17484-1. The pipe manufacturer shall declare the reference material standard applicable to his product, as listed in Annex A of ISO 17484-1.

Adhesives are not considered as stress-bearing layers.

4.1.1.2 *Metallic materials*

Aluminium materials used shall be in accordance with EN 573-3.

4.1.1.3 *Color of pipes*

The outer layer of pipes shall be yellow.

5 MECHANICAL PROPERTIES

5.1.1.1 *Long-term pressure strength*

The test shall be carried out in accordance with clause 5.4.1 of the ISO 17484-1.

5.1.1.2 *Strength of the joint line of M-pipe*

When the outside diameter of the pipe is increased by 10 %, no failures relative to the joint line of the metal layer shall occur. The test shall be carried out in accordance with Annex B of ISO 17484-1.

5.1.1.3 *Resistance to slow crack growth of the outer layer (cone test) for M-pipes*

When tested in accordance with ISO 13480, the crack growth rate of the outer layer shall be less than 10 mm/day. The test shall be carried out on pipe produced from material used for the outer layer. This test shall be performed as per EN331 (latest edition).

5.1.2 Physical properties

Pipes shall fulfil the requirements for physical properties as given in the table below.

Characteristic	Requirements	Tests		
		Parameter	Value	Reference
Resistance to gas constituents	≥ 20 h No delamination	Conditioning	1 500 h/(23 ± 2) °C	Annex C of ISO 17484-1
		Temperature	80 °C	
		Pressure	0.4 p_D	
	No delamination	Conditioning	1 500 h/(23 ± 2) °C	
		Temperature	(23 ± 2) °C	
		Cone test	10 % expansion	
Thermal durability of theouter layer of M-pipes	No visual cracks in outer layer	PE or PE-X		Annex D of ISO 17484-1
		At 100° or	0.5 year	
		at 110°C	0.25 year	
		Strain	3 %	
Oxidation induction time(OIT)	≥ 20 min	Temperature	(200 ± 2) °C[a]	ISO 11357-6
Delamination: P-pipes	No cracks or delamination	Expansion	10 % (by cone with 15° angle)	Annex B of ISO 17484-1
		Temperature	(23 ± 2) °C	
Delamination: M-pipes	Peel strength ≥ 15 N/ cm	Temperature	(23 ± 2)°C	Annex E of ISO 17484-1
		Cycling test	(−20 ± 2) °C/ (+60 ± 2) °C	
		Number of cycles	10	
Odorant permeability	No perception of THT smell by experienced observer	Odorant Exposure timeTemperature	THT 60 days (23 ± 2) °C	Annex F of ISO 17484-1

[a] Test may be carried out at 210 °C providing that there is clear correlation with the results at (200 ± 2) °C. In case of dispute, the reference temperature shall be (200 ± 2) °C.

6 FITTINGS

6.1.1.1 *General*

Fittings shall comply with the requirements of clause 6 of ISO 17484-1.

The reference in ISO 17484-1 clause 6 to ISO 10838 (all parts) and ISO 14531-3 should be replaced by ISO 17885, Plastic piping systems – Mechanical fittings for pressure piping systems – Specification, except clause 9.3, Fitting assemblies.

6.1.1.2 *Construction*

The fittings for multilayer pipes shall be able to make a mechanical connection with the multilayer pipe by pressing or clamping.

6.1.1.3 *Fitness for purpose*

Fittings shall comply with the requirements given in Table 3 of ISO 17484-1.

7 MARKINGS

Markings Legend shall be repeated at intervals of 1M and should be of different color from that of external pipe surface & shall include:

i) Manufacturer's name or trade mark.

ii) Owner's name as IGL to be marked on each pipe

iii) Design pressure (Pd) in Bar(g).

iv) Material designation: Layer construction and type of material required; description from outside to inside e.g. PEX-Al-PEX or PE80-PEX.

v) Standard reference number "ISO 17484"

7.1.1.1 *Packaging*

MLC pipe	**200 mtrs. coil**	Wrapping with polythene & Gunny sheet & tied with plastic strips

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION - BRASS FITTINGS

VPC –SS-PE-0009

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD