



INDRAPRASTHA GAS LIMITED

TENDER DOCUMENT FOR SUPPLY OF MDPE PIPE FITTINGS, VALVES AND TRANSITION FITTINGS

TENDER DOCUMENT NO. IGL/ET2/CP/CP18921

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SECTION I

INTRODUCTION

OPEN DOMESTIC TENDER E-TENDER

SECTION I
INTRODUCTION

SUPPLY OF MDPE PIPE FITTINGS, VALVES AND TRANSITION FITTINGS

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1.0 INTRODUCTION

Indraprastha Gas limited (IGL) (hereinafter referred as “*Purchaser*”) is a leading natural gas retailing and distribution company and is a joint venture of GAIL India Ltd., BPCL and Govt. of NCT of Delhi. It is supplying Piped Natural Gas (PNG) to domestic, commercial and Industrial consumers and Compressed Natural Gas (CNG) to automobiles through steel / PE pipeline networks in NCT of Delhi & NCR along with geographical areas in UP, Haryana and Rajasthan state.

2.0 PURPOSE

The present document covers the technical specifications for the procurement of MDPE Pipe Fittings, Valves and Transition Fittings.

3.0 SCOPE

The brief scope of work includes Manufacture, Testing, Inspection and supply of MDPE Pipe Fittings, Valves And Transition Fittings to IGL’s designated stores located in NCT of Delhi, NCR, UP, Rajasthan and Haryana.



SECTION II

MATERIAL REQUISITION OF MDPE PIPE FITTINGS, VALVES AND TRANSITION FITTINGS

1.0 GENERAL

This document along with the referred and attached Technical Specifications for MDPE Pipe Fittings, Valves & Transition fittings and other referred specifications, codes and standards describes the minimum requirements for design, manufacturing, inspection, testing, supply, and performance guarantee, packing & shipment for MDPE Pipe Fittings, Valves & Transition fittings.

The VENDOR shall provide a statement of compliance with his technical offer, confirming that the product offered complies with the specification and documents referred to therein. It is the VENDOR's sole responsibility to highlight any deviation/exception made to this MR and its attachments in a separate and complete list of all discrepancies (if any), and deviations in his technical offer for COMPANY review. All deviations subsequently must be agreed by the COMPANY in writing.

2.0 SCOPE

Indraprastha Gas Ltd (IGL) intends to augment the PNG Network. Therefore, Vendor scope shall include, but not limited to the design, manufacturing, inspection, testing, supply, packing & shipment for MDPE Pipe Fittings, Valves & Transition fittings.

MDPE Pipe Fittings and Valves shall be supplied, as per IGL specification for supply of MDPE Pipe Fittings, Valves and Transition Fittings.

VENDOR shall be responsible to meet the requirements of this material requisition with its attachments, and the documents referred to within, in order to ensure safe and trouble free operation.

In case of conflicting requirements amongst any of the specified standards, the standard having the most stringent requirement shall be governing. It is the VENDOR's responsibility to resolve these conflicts before proceeding with design, manufacturing, inspection, testing, supply, and packing & shipment for MDPE Pipe Fittings, Valves and Transition Fittings. All deviations/ conflicts shall be subjected to IGL review and approval.

3.0 DESCRIPTION OF GOODS AND/OR SERVICES

This document covers supply of MDPE Pipe Fittings, Valves and Transition Fittings to be used in City Gas Distribution Project in NCT of Delhi, U.P., Haryana and Rajasthan by IGL.

The scope of supply covers design, manufacturing, inspection, testing, supply, packing & shipment and documentation requirements of these items in accordance with the requirements of this Requisition.

Groun & Description	Sl. No.	DESCRIPTION	QUANTITY (NOS)
GROUP I - MDPE PIPE BALL VALVE	1	MDPE BALL VALVES (WITHOUT STEM) OF SIZE 63 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 63 MM COUPLERS FOR BOTH ENDS IN A SINGLE PACKAGE.	100
	2	MDPE BALL VALVES (WITHOUT STEM) OF SIZE 125 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 125 MM COUPLERS FOR BOTH ENDS IN A SINGLE PACKAGE.	56
GROUP II – MDPE PIPE FITTINGS	3	MDPE BENDS OF SIZE 63 MM OD OF 45 DEGREE PE 100 SUITABLE TO SDR 11 PIPES SUPPLIED WITH EF ENDS OR WITH 63 MM COUPLERS FOR BOTH ENDS IN A SINGLE PACKAGE. SPIGOT END FITTINGS ARE NOT ALLOWED.	752
	4	MDPE BENDS OF SIZE 63 MM OD OF 90 DEGREE PE 100 SUITABLE TO SDR 11 PIPES SUPPLIED WITH EF ENDS OR WITH 63 MM COUPLERS FOR BOTH ENDS IN A SINGLE PACKAGE. SPIGOT END FITTINGS ARE NOT ALLOWED.	1352
	5	MDPE BENDS OF SIZE 125 MM OD OF 45 DEGREE PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 125 MM COUPLERS FOR BOTH ENDS IN A SINGLE PACKAGE. SPIGOT END FITTINGS ARE NOT ALLOWED.	76
	6	MDPE BENDS OF SIZE 125 MM OD OF 90 DEGREE PE 100 SUITABLE TO SDR 11 PIPES SUPPLIED WITH EF ENDS OR WITH	156

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	125 MM COUPLERS FOR BOTH ENDS IN A SINGLE PACKAGE. SPIGOT END FITTINGS ARE NOT ALLOWED.	
7	MDPE COUPLERS OF SIZE 20 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF END.	2900
8	MDPE COUPLERS OF SIZE 32 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF END.	3300
9	MDPE COUPLERS OF SIZE 63 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF END.	3500
10	MDPE COUPLERS OF SIZE 125 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS.	1052
11	MDPE COUPLERS OF SIZE 180 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS.	92
12	MDPE TAPPING SADDLES (WRAP AROUND TYPE) OF SIZE 32 MM WITH BRANCH END OF 20 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH BRANCH EF END OR WITH 20 MM COUPLER IN A SINGLE PACKAGE.	6252
13	MDPE TAPPING SADDLES (WRAP AROUND TYPE) OF SIZE 63 MM WITH BRANCH END OF 20 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH BRANCH EF END OR WITH 20 MM COUPLER IN A SINGLE PACKAGE.	5500
14	MDPE TAPPING SADDLES (WRAP AROUND TYPE) OF SIZE 63 MM WITH BRANCH END OF 32 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH BRANCH EF END OR WITH 32 MM COUPLER IN A SINGLE PACKAGE.	2600
15	MDPE TAPPING SADDLES (WRAP AROUND TYPE) OF SIZE 125 MM WITH BRANCH END OF 32 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH BRANCH EF END OR WITH 32 MM COUPLER IN A SINGLE PACKAGE.	56
16	MDPE TAPPING SADDLES (WRAP AROUND TYPE) OF SIZE 125 MM WITH BRANCH END OF 63 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH BRANCH EF END OR WITH 63 MM COUPLER IN A SINGLE PACKAGE.	96
17	MDPE REDUCERS OF SIZE 32 MM OD ON ONE END WITH 20 MM OD ON THE OTHER END PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 32 MM & 20 MM COUPLERS FOR BOTH THE ENDS IN A SINGLE PACKAGE.	15300
18	MDPE REDUCERS OF SIZE 63 MM OD ON ONE END WITH 32 MM OD ON THE OTHER END PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 63 MM & 32 MM COUPLERS FOR BOTH THE ENDS IN A SINGLE PACKAGE.	4700
19	MDPE REDUCERS OF SIZE 125 MM OD ON ONE END WITH 63 MM OD ON THE OTHER END PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 125 MM & 63 MM COUPLERS FOR BOTH THE ENDS IN A SINGLE PACKAGE.	132
20	MDPE EQUAL TEE OF SIZE 20 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 20 MM COUPLERS FOR SIDES WHERE IT IS NOT EF END IN A SINGLE PACKAGE.	3600
21	MDPE EQUAL TEE OF SIZE 32 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 32 MM COUPLERS FOR SIDES WHERE IT IS NOT EF END IN A SINGLE PACKAGE.	9752
22	MDPE EQUAL TEE OF SIZE 63 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH 63 MM COUPLERS FOR SIDES WHERE IT IS NOT EF END IN A SINGLE PACKAGE.	4552
23	MDPE EQUAL TEE OF SIZE 125 MM OD PE 100 SUITABLE TO SDR 11 PIPES SUPPLIED WITH EF ENDS OR WITH 125 MM COUPLERS FOR SIDES WHERE IT IS NOT EF END IN A SINGLE PACKAGE.	76
24	MDPE END CAPS OF SIZE 20 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH ONE 20 MM COUPLER IN A SINGLE PACKAGE.	552

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	25	MDPE END CAPS OF SIZE 32 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH ONE 32 MM COUPLER IN A SINGLE PACKAGE.	1800
	26	MDPE END CAPS OF SIZE 63 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH ONE 63 MM COUPLER IN A SINGLE PACKAGE.	110
	27	MDPE END CAPS OF SIZE 125 MM OD PE 100 SUITABLE TO SDR 11 PIPE SUPPLIED WITH EF ENDS OR WITH ONE 125 MM COUPLER IN A SINGLE PACKAGE.	48
GROUP III – (MDPE PIPE TRANSITION FITTINGS)	28	TRANSITION FITTINGS WITH ONE END 20 MM MDPE AND 1/2" STAINLESS STEEL 304 ON OTHER END. STAINLESS STEEL SHALL BE OF SS 304 FEMALE NPT THREADED. 20 MM MDPE END SHALL BE PE 100 SUITABLE TO SDR 11 PIPE WITH EF END OR WITH 20 MM COUPLER IN A SINGLE PACKAGE.	27800
	29	TRANSITION FITTINGS WITH ONE END 32 MM MDPE AND 1" STAINLESS STEEL 304 ON OTHER END. STAINLESS STEEL SHALL BE OF SS 304 FEMALE NPT THREADED 32 MM MDPE END SHALL BE PE 100 SUITABLE TO SDR 11 PIPE WITH EF END OR WITH 32 MM COUPLER IN A SINGLE PACKAGE.	400

NOTE:

- The above quantities are indicative and for evaluation purpose only. Purchase order/ Release order will be released considering consumption rate and stock position.
- Bidder shall quote for materials PE 100.
- Bidder shall quote for SDR 11 for the materials.
- 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.
- EF – Electro Fusion End
- Cost of Third Party Inspection Agency shall be in bidder/supplier scope.

4.0 VENDOR'S COMPLIANCE

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

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

5.0 COMPLIANCE WITH SPECIFICATION

The VENDOR shall be completely responsible for the design, manufacturing, inspection, testing, supply, and packing & shipment for MDPE Pipe Fittings, Valves and Transition fittings shall strictly be in accordance with the Material Requisition and all attachments thereto.

Any exception must be highlighted by the Bidder at bid stage and will be considered accepted only after written approval.

6.0 INSPECTION AND TESTING

VENDOR shall carryout various tests as per applicable codes and standards, specifications, other attachments to the bid package and as per the VENDOR's approved QA and QC plan. Tests certificates shall be submitted for IGL review and approval.

Supplier shall hire Third Party Inspection Agency (to be approved by the Client) to perform inspection work. This agency shall inspect all the equipment/material and issue all inspection certificates/reports as per specifications and codes. The cost of TPIA shall be in supplier's scope.

IGL may also appoint Third Party Inspection Agency in order to carry out the inspection work. This will not relieve the supplier for deputing the Third Party Inspection Agency on their end.

IGL / Its authorized representative or certifying agency shall have access to inspect the material at any stage during manufacture.

For all inspections and tests specified to be witnessed or observed, bidder shall ensure that a written notification reaches the purchaser at least 5 days prior to the date of Material getting ready for inspection and testing.

During inspection material certificates, shop test data, certificates for raw material and other relevant information shall be furnished for purchaser's perusal so as to ascertain that the specifications and quality are complied with.

Witnessing of inspection and testing by Third Party Inspector are required as per VENDOR's Quality Assurance System. VENDOR shall obtain approval of their quality Assurance System from IGL prior to commencement of manufacturing activities.

7.0 PACKING AND FORWARDING

VENDOR shall ensure proper support and packaging of the items to avoid any damage during shipment. All exposed parts shall be protected against physical damage and weather conditions.

The packaging shall be suitable for outdoor storage.

Packed material shall have a detailed duplicate packing list clearly identifying the packed items with respective material. One packing list shall be placed inside the material package and other shall be properly secured on the outside.

VENDOR shall dispatch and transport the items to IGL designated places.

8.0 LIST OF ATTACHMENTS

The table below 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.

S.NO	DESCRIPTION	DOCUMENT NO.	REVISION
1	Technical Specifications of PE Fittings	PTS/IGL/ET2/CP/CP18921	
2	Quality Assurance Plan-PE Fittings	QAP/PE FITTINGS/IGL/ET2/CP/CP18921	
3	Quality Assurance Plan-PE Valves	QAP/PE VALVES/IGL/ET2/CP/CP18921	
4	Quality Assurance Plan-Transition Fittings	QAP/TF/IGL/ET2/CP/CP18921	

9.0 DOCUMENTS & DATA REQUIREMENTS

BIDDER shall submit documents as per ANNEX - A, standard specifications and other attachments along with the bid. However, following is the broad list of documents required as a minimum.

- a. GA drawings.
- b. Coupling Drawings.
- c. Fittings/Valve Drawings.
- d. Installation & operations manuals

Documents listed in the bid document are the minimum requirement. VENDOR shall submit all documents required to complete design and engineering and to establish that pipe shall be suitability during supply / Dispatch of the product.

Annual trainings (as per IGL requirement across all Geographical Areas of IGL) of MDPE Pipe Fittings, Valves and Transition Fittings for IGL team, explaining the salient features including procedure during installation will also be covered in scope of vendor without any additional financial implication to IGL. Further, the space for physical training will be arranged by IGL.

ANNEXURE A

- The table hereunder specifies the quantities and the nature of the documents to be submitted by the VENDOR 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 VENDOR. 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.

SL. NO	DOCUMENTS & DATA REQUIRED	WITH BID (A)	AFTER NOTIFICATION OF AWARD (B)		DURING FINAL DOCUMENTATION (C)	
		Nos (Copy)	Nos (Copy)	Weeks	Nos (Copy)	Weeks
1	List of Raw Material Manufacturer		1	2		With Final Technical document
2	QA/QC program		1			
3	ISO 9001:2008 (or Latest) Certification	1				
4	Code/Standard Compliance Certification	1				
5	Inspection & Test Plan (ITP)		1	2		
6	Manufactured Test Certificate		1	Before Dispatch		
7	Material certificate EN 10204 Cert.3.2		1	Before Dispatch		Before claim of final payment.
8	Final technical file (Consisting of above document)				2	
9	Product Catalogue of material (with Model being offered)	1	1	2		

NOTES

- 1) Duration in column B (required date) are weeks after award of contract/LOI.
- 2) Duration in column C (required date) are weeks after document approval.
- 3) Due date of each document may be proposed.
- 4) Final technical file shall be supplied in hard copy as indicated, and in electronic format (pdf acrobat) to owner.
- 5) All documents shall be supplied in English language.

- 6) Documents listed in the bid document are the minimum requirement. VENDOR shall submit all documents required to complete design to establish material suitability during supply / Dispatch of the product.
- 7) Latest submittal time for:
Test Procedure : 2 Weeks before test
Test report : Within 2 weeks after test

10.0 OTHERS

1. VENDOR shall furnish in his offer the complete details, data, and documents required as per the enquiry and as per the standard practice.
2. VENDOR shall ensure that all the items supplied are new and free from defects. Vendor shall adhere to the Particular Technical Specification for the supply of materials specified in section 3 of this document.
3. The VENDOR shall be completely responsible for the design, materials, testing, inspection, preparation for shipment and transport of the PE fittings, valves and transition fittings shall strictly be in accordance with the Material Requisition and all attachments thereto.



SECTION III

**PARTICULAR TECHNICAL SPECIFICATION (PTS) OF
MDPE PIPE FITTINGS, VALVES AND
TRANSITION FITTINGS**

INDRAPRASTHA GAS LTD.	PTS-MDPE PIPE FITTINGS, VALVES & TF (Doc. No.-PTS/IGL/ET2/CP/CP18921)	IGL/ET2/CP/CP18921
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1.0 SCOPE

The scope of work shall cover design, manufacturing, inspection, testing, supply, packing & shipment and transportation for the MDPE Pipe Fittings, Valves and Transition Fittings as per technical requirements / specification for City Gas Distribution Project in NCT of Delhi, U.P., Haryana and Rajasthan.

2.0 DEFINITIONS

Subject to the requirements of the context, the terms (hereafter listed in alphabetical order) used in this specification are given the following meaning:

Agreement	Designates the agreement concluded between the Client and the Vendor, under which the latter undertakes to the former the Goods and/or Services according to the stipulations which are agreed and specified in the form of an order.
Client / Owner	Designates the purchaser of the Goods and/or Services, which are the subject of the Agreement.
Vendor/Supplier	Designates the individual or legal entity with whom the order has been concluded by the Client. The term "Vendor / Supplier" may be used in differently for a Supplier, a Manufacturer, an erection Vendor/Supplier, etc.
Days - Weeks – Months	Specify the number of calendar days, weeks or months and not of working days, weeks or months.
Client's representative	designates the individual or legal entity to which the Client has entrusted various tasks in relation with the carrying out of his project.
Goods and/or Services	Designate, depending on the case, all or part of the drawings or documents, substances, materials, materiel, equipment, structures, plant, tools, machinery, to be studied, designed, manufactured, supplied by the Vendor/Supplier under the agreement, including all the studies, tasks, works and services specified by the order. The terms Goods or Services may by indifferently used one for the other as required by the context.
Project	Designates the aggregate of Goods and/or Services to be provided by one or more Vendor / Supplier.
TPIA	Third Party Inspection Agency

3.0 MATERIAL GRADE

The material grade of polyethylene (PE) Fittings shall be PE 100. The bidder shall submit the details by clearly indicating the make, country of origin, part nos.

4.0 APPROVED MANUFACTURER FOR RAW MATERIAL

1. INEOS (Formerly SOLVAY)
2. BOROUGE
3. TOTAL PETROCHEMICALS
4. DOW
5. ELENAC
6. BOREALIS
7. SABIC
8. LYONDELLBASELL

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5.0 TRANSITION FITTINGS

Transition fittings shall be supplied in accordance with “Plastic piping systems for supply of gases fuels – Part 3: Fitting” EN 1555-3.

Bidder shall provide catalogue for all the fittings including transition fittings.

The material grade (SS-304 as per ASTM A-479) and end connection (in built EF Ends with integral pipe fixation device) shall be as per MR. Steel and MDPE pipe should be so joined in factory so as to have a monolithic joint, which is leak free and should be mechanically stronger than the PE pipe. On placement of order, the vendor shall submit the drawing with dimensions for approval of IGL before starting production.

6.0 MDPE PIPE MATERIAL

The raw material of MDPE pipe shall be PE 80, thick as per SDR11. The MDPE pipe shall confirm standards for polyethylene pipes for supply of gaseous fuels IS 14885 (latest edition).

7.0 MDPE BALL VALVE

The requirements for manufacturing, inspection, testing, packaging, transportation and dispatch of MDPE Ball Valves and its component made from extruded or injected moulded polyethylene (PE) is specified in General Technical Specification for PE Valve (Doc No. GTS-02/IGL/ET2/CP/CP18921).

8.0 MDPE PIPE FITTINGS

The requirement for manufacturing, inspection, testing, packaging, transportation and dispatch of "MDPE PIPE FITTINGS" is specified in General Technical Specification for PE Accessories- for Underground networks for natural gas distribution.

9.0 MATERIAL REQUISITION

The quantities of items are mentioned in Material Requisition.

10.0 QUALITY ASSURANCE

Manufacturer to submit their Inspection and Test Procedure (ITP)/QAP for the approval of Owner.

11.0 DEFECT LIABILITY PERIOD

Defect liability period shall be as per the GCC/SCC.

12.0 MARKING

At least following information shall be embossed/engraved onto the fitting. However, Minimum thickness shall be maintained as per tender in the Fittings:

- Manufacturer's name and/or trademark
- Material Grade and SDR
- Design Application Series
- The size of the fitting in mm
- Number of the system standard. This information can be printed/formed directly on the fitting or on a label associated with the fitting
- Manufacturing, year and month

The marking shall stay legible during normal manipulation, storage and installation.

The marking shall not adversely influence the performance of the fitting and prevent the nonconformity of the fitting.

Bidder shall provide the sticker confirming the name of client as "IGL" along with all items.

Following necessary information to be provided on Barcode Sticker:

- Fusion time in seconds

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- b) Cooling time in minutes
- c) Fusion parameters in BAR code
- d) Traceability code (fittings) as per standard ISO 12176-4.

13.0 PACKAGING

All the MDPE fittings & Valves of more than one piece shall be kept in single box/packets according to type and size during packaging.

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

The material for each SOR Item is essentially required to be packed in one case/packet /box.

AMENDMENT TO GTS-01/IGL/ET2/CP/CP18921

3.2 ADD

Branch piping/tapping saddle shall be wrap around type (i.e. to be supplied along with integral PE Clamp (equipped with bottom part) which is to ensure sufficient pressure welding and is to be left in place after the welding.) Further, the upper shell of the Tapping Tees shall be a single piece to avoid dual welds.

5.2 ADD

The raw material PE, used for accessory production, is in compliance with all prescription in EN 1555- 1 standards.

The raw material shall be virgin material belonging to class PE100. The following are strictly forbidden:

- Use of recycled raw materials
- Mixing of different raw materials
- The addition of supplementary additives to the raw material.

5.2.1 ADD

Material and end connection of transition fittings shall be as per MR Doc No. MR/IGL/ET2/CP/CP18921

6.3 REPLACE

All accessories shall be of yellow or black colour.

6.5.2 REPLACE

Classification

Electrofusion accessories are divided into three classes according to the voltage and/or current characteristics.

Class A Electrical supply based on voltage set between 8V and 42 V

Class B Electrical supply based on voltage set between 42 V and 220 V

Class C Electrical supply based on power supply settings.

All supplies, unless otherwise stipulated in the order, concern Class A accessories.

Unless stipulated otherwise in the order, only “wrap-around” saddles, Electrofusion and Transition fittings with integral pipe fixation device to be supplied upto 180 mm dia

Unless otherwise agreed between IGL and the supplier, all electrofusion accessories must be “single wire” type.

6.5.3 REPLACE

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Connector (terminal pin) 4.0 mm/4.7mm shall be required.

6.6 REPLACE

The support drilling equipment to be designed so that during drilling the maximum immediate leak flow will never exceed 200 litres per hour at 5 bar pressure, in the main pipe. According to this flow rate, the supports are divided into two categories:- models 1 and 2 (refer to par. 3.2.).

The bell drill is equipped with a maneuver opening for the insertion of a requisite (range may vary from 5 mm to 21mm) hexagonal spanner/Allen Key.

The bell drill path is limited at the top by a limit block.

The drill mechanism is designed so that no additional tools (except the hexagonal spanner/Allen Key) are required for carrying out drilling operations. On placement of order the proposed sizes of hexagonal spanner/Allen Key required for various sizes of Tapping Saddle shall be informed by the bidder alongwith drawing of particular saddle for approval of IGL.

6.7 REPLACE

Flow M3/hr	Saddle type	Maximum load loss Mbar
10	32x20	1.0
10	63x20	1.0
10	63x32	1.0
10	125x32	1.0
10	180x32	1.0
40	125x63	1.0
40	180x63	1.0

12.0 REPLACE

All electro fusion accessories must be printed with a bar code or bar code with an individual magnetic card (manual setting information for data transfer purposes must be supplied in bar code). The magnetic card contains the welding parameters that have been encoded in the magnetic track, as well as the bar code printed on the card. Coding must be carried out according to prescriptions included in ISO TR 13950 standards. The bar codes shall be laminated to ensure that the details are not damaged or erased.

AMENDMENT TO GTS-02/IGL/ET2/CP/CP18921

1.0 ADD

It applies to bidirectional valves with spigot ends or electro fusion sockets intended to be fused with polyethylene pipes in accordance with the IS 14885 PE pipe specification and with spigot fittings in accordance with Specification; AMENDMENT TO GTS-02/IGL/ET2/CP/CP18921

3.7 ADD

Base Plate

Model 2 is applicable for present project.

6.2 ADD

The valve will be designed for a maximum operating pressure (mop) equal to 10 bar.

6.3 ADD

BULLET: 2

The colour of the PE valve shall be black / yellow

7.4 REPLACE

PRESSURE DROP AT LOW PRESSURE

Nominal diameter dn	Flow M3/hr
32	10
63	60
125	450
180	765

8.0 ADD

Marking

b) Material and designation (e.g. PE 100)



SECTION IV

GENERAL TECHNICAL SPECIFICATION (GTS) OF PE ACCESSORIES FOR UNDERGROUND NETWORKS FOR NATURAL GAS DISTRIBUTION

1.0 SUBJECT AND AREA OF APPLICATION

This specification has been established to define the requirements that must be met by injected moulded polyethylene accessories (PE) destined for the construction or the maintenance of underground networks for natural gas distribution where the maximum operating pressure (MOP) is equal to 5 bars.

It also defines some of the more general characteristics of materials used for accessory manufacturing and includes the appropriate classification model.

The specification also includes testing method parameters for the material in question. All accessories included in these specifications are listed as follows:

- Electrofusion welded accessories
- Electrofusion welded saddles
- Accessories equipped with insertion connection for end to end welding and assembly using electrofusion-welded sleeve coupling.

This specification is limited to accessories with a nominal diameter of 225 mm and a working temperature between -20°C and +40°C.

PE and steel accessories with a tapered section and front section connections are not included in these specifications.

2.0 REFERENCE STANDARDS AND SPECIFICATIONS

EN 682	Air-tight rubber seals - specification for air-tight seal materials for gas and hydrocarbon fluid transfer piping
EN 1555-1	Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 1: General
EN 1555-3	Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 3: Fittings
EN 1555-7	Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 7: Guidance for assessment of conformity
ISO DIS 11413	Preparation of test assemblies between a polyethylene (PE) pipe and an electrofusion fitting.
ISO DIS 11414	Preparation of test assemblies between a pipe/pipe or pipe/fitting polyethylene (PE) by butt fusion
ISO DIS 12093	Format for a technical brochure for electrofusion joint characteristics
ISO TR 13950	Electrofusion identification methods
CEI 60335-1	Safety standards for household appliances and similar equipment.
CEI 364	Electrical installations on buildings (including building sites and other temporary installations)
CEI 449	Voltage domains for building electrical installations.

3.0 DEFINITIONS

3.1 ELECTROFUSION ACCESSORY

This term covers all injected moulded polyethylene accessories equipped with a heated element designed to transform electrical energy into heat to create self-welding.

In certain exceptional cases, an accessory can present one or more smooth ends. In this case the accessory will provide for the requirements of each connection end as regards shape, measurement, and technical characteristics.

3.2 ELECTROFUSION SADDLE

This term covers a saddle shaped injection moulded PE accessory that is equipped with one or several heating elements that convert electrical energy into heat. The released heat provides a fusion surface sufficiently large to ensure correct saddle-pipe assembly.

Electrofusion saddles can be subdivided into two categories:

Wrap around Electrofusion saddle whose upper shell is brought against the pipe during welding using a fastening stirrup located on the lower part of the accessory to guarantee that the welding pressure is sufficient. Generally the stirrup is left in place after welding.

Top load Electrofusion saddle where the welding pressure is obtained by pressing down on the saddle head using a fixing system (clamp) that is removed after welding is completed.

There are four different saddle types:

Support This is an accessory designed for joining branch pipes and is equipped with a drill bit made to pierce the wall of the pipe; this bit remains in the saddle body after installation.

Branch piping saddle This accessory is designed for joining branch piping where an additional bit is necessary to pierce the wall of the main pipe next to the branch

Ballooning saddle This accessory provides the positioning of a sealing (or blocking) balloon and that can be filled again after work completion.

Repair saddle This accessory will seal/block any leaks on the pipe or will reinforce piping in the case of localised deterioration.

According to their leakage flow, the supports are divided into two model categories:

Model 1	Supports whose maximum immediate external leak flow is practically equal to zero at 5 bar pressure in the piping.
Model 2	Supports whose maximum immediate external leak flow never exceed 200 litres an hour at 5 bar pressure in the piping.

3.3 END TO END WELDING ACCESSORIES

This term describes injection moulded polyethylene accessories with smooth ends but not equipped with integrated heating elements. These are connected to the network by end-to- end welding using electrofusion sleeves.

In certain exceptional cases, an accessory can also present one or more electrofusion ends. In this case the accessory will provide for the requirements of each connection end in shape, measurement, and technical characteristics

4.0 GENERAL SPECIFICATIONS

This specification is based on the series of EN 1555 standards, which standardize all the gas distribution network plastic piping systems.

The accessories described in this document comply with all prescriptions included in EN standard 1555-3, as well as all complementary requirements and/or options described in the specifications attached with this technical bid package.

5.0 MATERIAL

5.1 GENERAL INFORMATION

The materials used for the manufacturing of the accessories must conform to the requirements demanded for components used in gas fuel distribution networks.

The accessory material that is in contact with the PE piping must not be composed of any material that will provoke a reduction in pipe performance, nor must it provoke cracking under stress.

All equipment will be marked with inscription/description and specification in English language.

5.2 RAW MATERIAL SPECIFICATIONS

The raw material PE, used for accessory production, is in compliance with all prescriptions in EN 1555-1 standards. It must be approved according to the prescriptions mentioned in this tender.

The raw material belongs to class PE100. The following are strictly forbidden:

- use of recycled raw materials
- mixing of different raw materials
- The addition of supplementary additives to the raw material.

5.3 SPECIFICATION FOR COMPONENTS MADE OF MATERIALS OTHER THAN POLYETHYLENE

5.3.1 METAL PARTS

All metal parts subject to corrosion must be protected in an adequate manner.

Metal parts must conform to prescribed standards of that particular material for gas distribution, for quality levels, size/gauge and measurements.

Cast iron, aluminum and its alloys are not authorized for use.

5.3.2 ELASTOMER

Elastomer air and watertight seals, like all other elements manufactured in this material, must comply with the prescriptions of EN 682 standards.

5.3.3 OTHER MATERIALS

All other materials used are in compliance with the prescriptions described in paragraph 5.1. The accessories included in the paragraph comply with the requirements of this specification and are adapted for all general use for natural gas distribution.

6.0 GENERAL ACCESSORIES CHARACTERISTICS

6.1 TECHNICAL INFORMATION

The manufacturer must supply a technical information dossier composed and including the same material and presented in the same manner, in compliance with the prescriptions of the ISO DIS standard 12093. This dossier must mention all of the following information for each accessory:

- PE raw material used
- Measurements and tolerances
- Domain of application (temperature and pressure limits, SDR and ovalisation)
- Assembly instructions
- Welding instructions (welding parameters and limits)
- Test results attesting to the accessory conformity standard: c.f. EN standard 1555-3 for test descriptions.

For electrofusion accessories, the manufacturer must also supply the SDR series for the pipes, which will be used together with their accessory, according to their thickness.

In addition, for the saddles:

- The attaching method (tools necessary and/or lower shell)
- saddle category (refer to 3.2)
- Maximum saddle height (H in figure 2)
- the height of the branch pipe for supports (h in figure 2)

For all smooth ended accessories, the manufacturer must also supply the SDR series of connections; the accessory must be guaranteed for use on piping of the same class.

In the case of welding parameter modification, size or raw material changes, the manufacturer must include a new technical dossier providing proof that the accessory in question is still compliant with the specification prescriptions.

Testing assemblies will take into consideration manufacturing tolerance, assembly tolerance and the variations in environmental temperature corresponding with the conditions where the accessories will be in use. The manufacturer must observe all methods recommended for polyethylene accessory installation as shown in the technical specification attached in volume II of the bid package.

The assembly of piping and accessories manufactured and used in the tests must be in compliance with the manufacturer's technical instructions and the limits of use conditions. When the test assemblies are carried out, the manufacturing and assembly tolerances must be taken into consideration. Samples destined for assembly testing with electrofusion accessories must be prepared according to standard ISO DIS 11413. End - to-end welded samples must be prepared according to standard ISO DIS 11414.

6.2 APPEARANCE AND FINISH

The internal and external surfaces of the accessories must be smooth, clean and free of all scratching, pitting and other surface faults that can possibly reduce accessory and assembly performance.

No element of any accessory must show any signs of damage: scratching, scraping, piercing, blisters, bloating, denting, holes, cracks or other faults that can reduce required performance.

It must be possible to place the accessory on the pipe or on another accessory without moving the electric winding or the air/water tight seals etc. and this must respect the tolerance permitted for piping and accessories.

6.3 COLOUR

All accessories will be black. If agreed previously, they can also be coloured yellow or orange.

6.4 JOINT APPEARANCE

After welding, when examined visually without a magnifying glass, the internal and external surfaces of the pipes and accessories must appear free of welding exudation outside the accessory limits (unless identified by the accessory manufacturer as normal, or carried out deliberately as a welding test, but on condition that there is no wiring position change inside the electrofusion accessories that could provoke a short-circuit). Internal surfaces of all adjacent piping must remain identical to the previous condition before welding.

6.5 ELECTROFUSION ACCESSORIES ELECTRICAL CHARACTERISTICS

6.5.1 General information

The accessories include an electrical system as described in the standards CENELEC 60335-1, CEI 364 and CEI 449. This system is equipped with an appropriate electrical protection for the voltage and intensity of the current in use, and adapted to the characteristics of the electrical supply line.

For voltage over 24 V protection is essential against direct contact with the active parts (conductors on line). The type of protection in question depends on the local site conditions.

6.5.2 Classification

Electrofusion accessories are divided into three classes according to the voltage and/or current characteristics.

Class A Electrical supply based on voltage set between 8V and 42 V

Class B Electrical supply based on voltage set between 42 V and 220 V

Class C Electrical supply based on power supply settings.

All supplies, unless otherwise stipulated in the order, concern Class A accessories.

The power required for electrofusion accessory welding must not exceed 3kW during welding operations. Unless stipulated otherwise in the order, only “wrap-around” saddles can be supplied (refer to par. 3.2.)

Unless otherwise agreed between Client and the supplier, all electrofusion accessories must be “single wire” type.

6.5.3 Connectors

Electrical connectors installed on electrofusion accessories must comply with the diagram included in Annex 1 with these specifications, also including constant current supply where this is the case. The state of the connector terminal surface must offer the minimum possible contact resistance during voltage cable joining.

6.5.4 Protection against overheating

Electrofusion accessories that can only be welded once are equipped with a lock system which prevents re-welding.

Electrofusion accessories that cannot be re-welded immediately after initial welding are equipped with an incorporated security system in their welding program: that is they cannot weld while the wire is still hot.

If the welding program does not possess this lock system, the electrofusion accessory must absolutely be protected against a second or several welding cycles whatever the temperature of the winding wire.

6.6 SUPPORT DRILLING EQUIPMENT

The support drilling equipment has been designed so that during drilling the maximum immediate leak flow will never exceed 200 litres per hour at 5 bar pressure, in the main pipe. According to this flow rate, the supports are divided into two categories:- models 1 and 2 (refer to par. 3.2.).

The bell drill is equipped with a maneuvering opening for the insertion of a 17 mm hexagonal spanner.

The bell drill path is limited at the top and bottom by a limit block.

The drill mechanism is designed so that no additional tools (except the hexagonal spanner described above) are necessary for carrying out drilling operations.

6.7 BRANCH SUPPORT AND SADDLE LOAD LOSS UNDER LOW PRESSURE

The maximum load loss measured with natural gas at an inlet pressure of 20 mbar must not exceed the values listed below.

Flow m ³ /hr	Saddle Type	Maximum load loss (Mbar)
10	63 x 32	1.0
10	110 x 32	1.0
10	160 x 32	1.0
10	200 x 32	1.0
40	63 x 63	2.0
40	110 x 63	1.0
40	160 x 63	1.0
40	200 x 63	1.0

6.8 ELECTROFUSION SLEEVE BLOCK

All electrofusion sleeves are equipped with an immovable block in the centre of the sleeve.

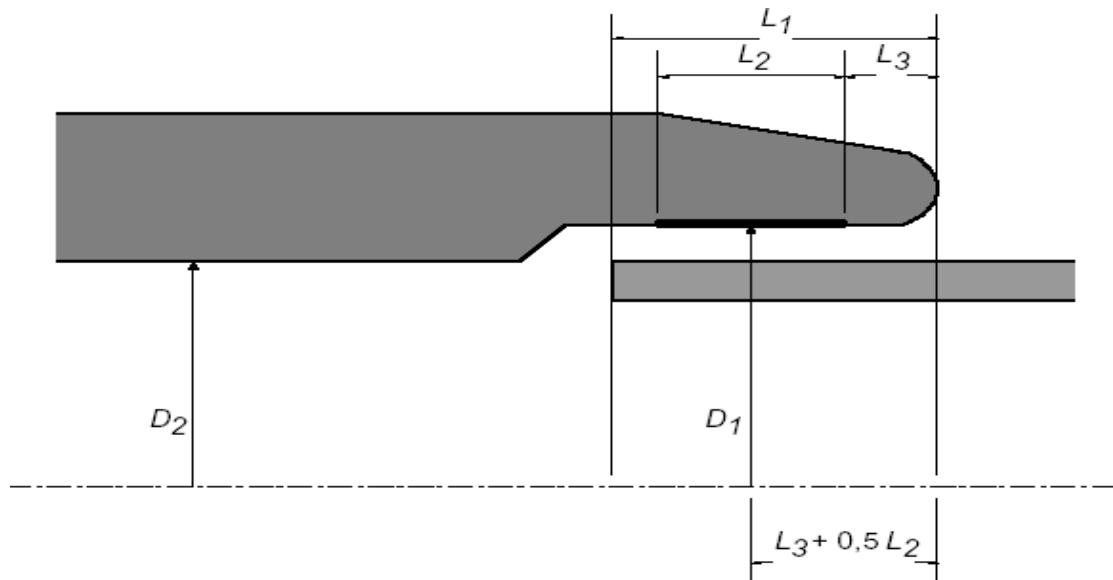
7.0 GEOMETRICAL CHARACTERISTICS

7.1 SIZE OF ELECTROFUSION SLEEVES

The sizes of the electrofusion accessory sleeves and their tolerance limits are described in chapter “geometrical characteristics” of EN standard 1555-3.

They are controlled according to the method described in the specification standard. Any possible sealing plugs are removed from the sleeve 4 hours before the size control check. Measurements are controlled without the plugs inserted.

The main symbols are shown in the figure 1 below:



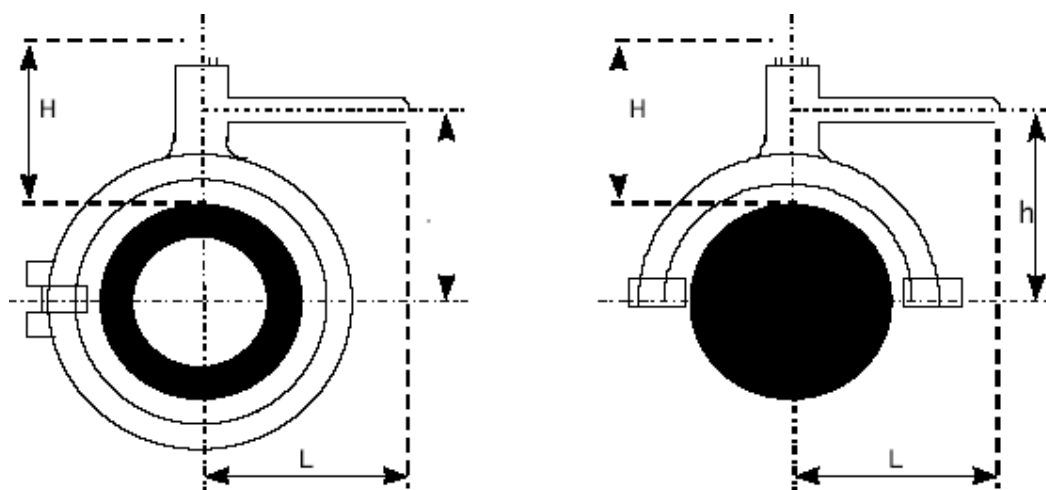
D1	The “average internal diameter in the welding zone” – that is: the average internal diameter measured in a parallel plane to the opening plane, at a distance of $L_3 + L_2/2$ of the latter.
D2	“Minimum drilling/boring” – that is the minimum diameter of the draining canal through the body of the accessory.
L1	“penetration depth” of the pipe or the inserted (male) end of the accessory
L2	“Nominal length of the welding zone” that corresponds with the length subject to heating.
L3	“Nominal non-heated entry/inlet length of the sleeve”. This refers to the distance between the tip of the accessory and the beginning of the welding zone.

7.2 ELCTROFUSION SADDLE MEASUREMENTS

The measurements of the electrofusion saddles and their tolerance limits are described in EN standard 1555-3

They are controlled according to the method described in the specification standard. Any possible sealing plugs are removed from the sleeve 4 hours before the size control check. Measurements are controlled without the plugs inserted.

The main symbols are shown in the figure 2 below:



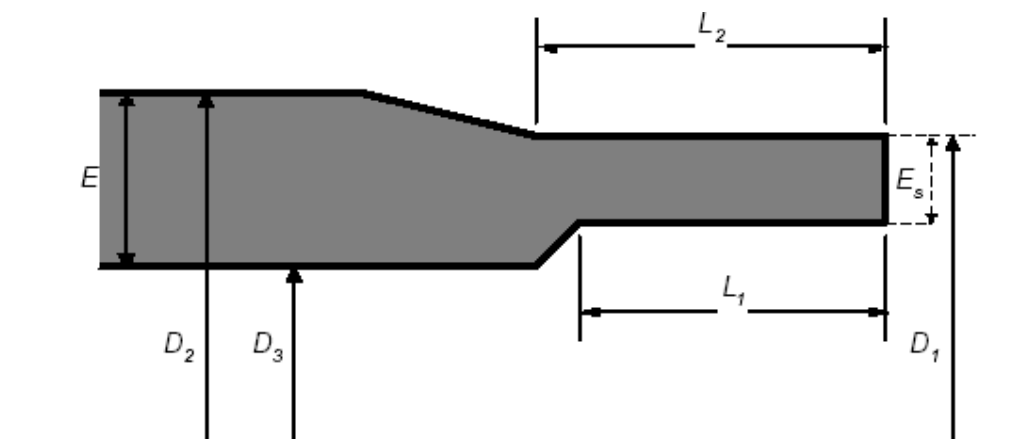
H	The “height of the saddle” – that is the distance between the upper generator of the main pipe and the top of the branch pipe saddle
h	The “height of the branch pipe” – that is the distance between the axis of the main pipe and the axis of the branch pipe
L	The “width of the branch pipe saddle” – that is the distance between the axis of the pipe and the surface plane of the branch pipe opening

7.3 MEASUREMENT OF ACCESSORIES ENDS TO BE WELDED

The measurements of the ends and their tolerance limits are described in EN standard 1555 -3.

They are controlled according to the method described in these specification standards. Any possible sealing plugs are removed from the sleeve 4 hours before the size control check. Measurements are controlled without the plugs inserted.

The measurements and main symbols used in this specification are shown in the figure 3 below:



D1	The “average external diameter of the end to be welded measured on any plane parallel to the inlet/entry plane at a distance where this plane does not exceed L ₂ (tubular section).
D2	The “average external diameter of the body” of the tip of the accessory.
D3	“Minimum drilling/boring” – that is the minimum diameter of the passage through the body of the accessory. Measuring of the diameter must not include any ribbing due to welding.
E	“Thickness of the accessory body wall” – that is: the thickness measured at any point of the accessory wall.
Es	“Thickness of the end to be welded” measured at any point but where the distance does not exceed L ₁ (length that can be cut) compared to the inlet/ entry plane, must be equal to the thickness of the nominal pipe wall.
L1	The “cuttable section” of the end to be welded – that is the initial depth of the tip of the insertion section, necessary for end-to-end welding or for starting an end-to end weld again
L2	The “tubular section” of the end to be welded – that is the initial length of this section. This tubular section permits the following in all types of combination : Use of the clamp stirrups, as is essential for end-to-end welding, or for electrofusion. Assembly using electrofusion sleeves.

8.0 ACCESSORY MECHANICAL CHARACTERISTICS

All accessories must obey the requirements and tests described in the chapter concerning the mechanical characteristics of EN standard 1555-3. They must also comply with the hydrostatic test conditions described in the same standard.

They must be controlled as described in the same standard.

9.0 PHYSICAL CHARACTERISTICS

All accessories must obey the requirements and tests described in the chapter concerning the mechanical characteristics of EN standard 1555-3

They must be controlled as described in the same standard

10.0 MARKING

10.1 ACCESSORY MARKING

- 10.1.1 Identification marking shall be made directly on the accessory. The system used to make the product must not provoke cracking or other faults. All marking shall be permanently legible for the product life

under standard stocking conditions, exposure to external weather conditions, treatment, installation, and use.

- 10.1.2 Where the products are printed, the colour of the printed identification mark must be different from that of the basic product colour.
- 10.1.3 Marking quality and size must be of a standard that can be read with the naked eye without magnification.
- 10.1.4 No marking shall be printed on the minimum length of the insertion section of accessories.
- 10.1.5 Each accessory must be marked with at least the obligatory details required by EN standard 1555-3. The marking must be printed on the accessory itself or on a label as shown in the standard described above.
- 10.1.6 The SDR pipe range to be fitted with these accessories must be clearly marked on the fitting. Details must include each SDR value, or the upper and lower values of the permitted SDR range.

10.2 COMPLEMENTARY INFORMATION

All complementary information on welding conditions (welding time and cooling time) can also be described on a label affixed to the accessory or delivered with the accessory.

11.0 PACKAGING AND DELIVERY

Normally all accessories are packed separately in plastic sheeting and/or cardboard boxes.

Sometimes they can be loosely packed together where there is no danger of damage or deterioration or loss of loose parts.

All boxes and plastic sheeting must be marked with at least one label showing the manufacturer's name, the product type, part measurements, and number of single parts contained in the box or bag, plus all details necessary for stocking and stock expiry dates.

All electrofusion accessories must be printed with a bar code and an individual magnetic card. The magnetic card contains the welding parameters that have been encoded in the magnetic track, as well as the bar code printed on the card. Coding must be carried out according to prescriptions included in ISO TR 13950 standards.

With regard to stocking guarantee, accessories must correspond with the prescriptions of the local laws & regulations if any. If the guarantee period decided by the manufacturer is shorter than that in these document, the owner must be informed in writing at the time of the offer.

12.0 QUALITY CONTROL

12.1 GENERAL RULINGS

12.1.1 Manufacturer's responsibility

The manufacturer is entirely responsible for the quality of the PE accessories manufactured by his firm.

All control checks prescribed above do not relieve him of this responsibility.

To ensure that all PE accessories are in compliance with the specification in all aspects, they must be controlled by the plant control service, which must be independent from the manufacturing department.

All PE accessories supplied are guaranteed for a one-year period after application for use, that is a maximum of three years after the date of production.

12.1.2 Quality assurance

The manufacturer must have some form of quality control to ensure that products comply with EN standards 29001 or 29002. The quality assurance manual must be made available to the owner control service or an external control laboratory appointed by him.

The system of quality assurance must be certified by an authorised body.

12.2 CONTROLS

12.2.1 Control testing by the manufacturer

12.2.1.1 By material batch.

The manufacturer demands a certificate from the raw material manufacturer including the following:

- Fluid index
- Water content
- Volume mass
- Carbon black or yellow stabilising agent content
- Carbon black or yellow stabilising agent quality
- Oit value (thermal stability)

12.2.1.2 By accessory batch

The manufacturer must run control checks as follows :

Control checks and the number of tests must be carried out according to the prescriptions of the EN standard 1555-3

Also refer to table No. 8, paragraph 4.2.3. “lot release tests” of EN standard 1555 -7.

The results must be written out in documents that contain the complete identification of the accessory batch.

These documents must be made immediately available for the owner representative.

12.2.2 Plant Reception by the Owner Control Service representative

12.2.2.1 General information

All quality controls can be witnessed by the owner/ owner control service representative.

All tests and control checks must comply with appropriate standard prescriptions and with the specific specifications established with the order.

At each visit by the owner representative, the manufacturer must provide, free of charge, all means and personnel necessary for running the established control checks.

While the order is under production, the owner representative must have access to stocking installations of all raw materials before manufacturing, manufacturing and control installations, as well as the accessory stocking areas for any control checks he is responsible for.

During his visits, the owner representative will receive a certificate as soon as he reaches the plant for each batch of accessories presented for reception.

Each time this is requested by the owner representative, the manufacturer must provide recent reports of all control checks and measuring instrument results and testing results.

12.2.2.2 Convocation for reception

Convocation instructions for reception are to be defined with the order.

12.2.2.3 Reception control checks

For each accessory batch or any fractions of the batch, minimal batch sampling is established in QAP. These control checks and tests are to be run according to the prescriptions of EN standard 1555-3

12.3 ACCEPTANCE OR REFUSAL

12.3.1 Appearance, measurements and marking

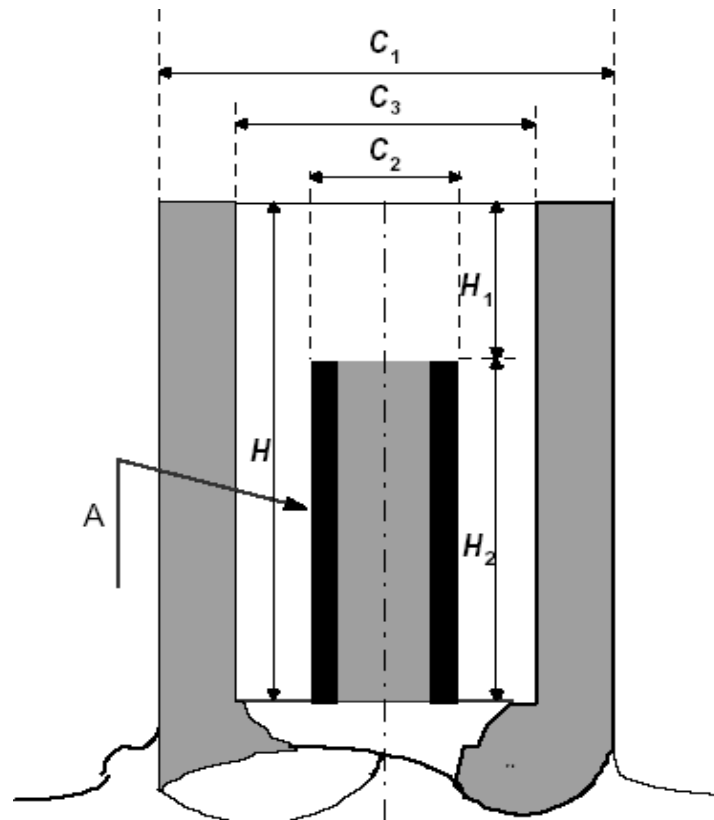
Any requirements not supplied will lead to the refusal of the complete batch. However in the case where a batch is refused, it can be presented for approval again after a control check, on agreement with the owner control service.

12.3.2 Control check on characteristics

All results that do not comply with the specification prescriptions and the particular specifications requested with the order, demand counter-testing on at least double the number of the samples previously tested. If the undesirable result is confirmed, then the batch is refused permanently. If the result is positive, then the batch will be accepted.

As a complementary control check, other analyses and/or tests can be run after common agreement, and at the manufacturer's cost.

ANNEX-1 **CONNECTOR FOR ELECTROFUSION ACCESSORIES**



Symbols

C₁	External diameter of connector	$C_1 \geq 11,8 \text{ mm}$
C₂	Diameter of active part of connector	$C_2 = 4,0 \pm 0,03 \text{ mm}$
C₃	Internal diameter of connector	$C_3 = 9,5 \pm 0,1 \text{ mm}$
C₄	Max. Diameter of active part foot	$C_4 \geq 6,0$
H	Connector internal depth	$H \geq 12,0$ $H \geq H_1 + H_2$
H₁	Distance between upper part of connector and active part	$H_1 = 3,2 \pm 0,5$
H₂	Height of active part	$H_2 \geq 0,7 \text{ mm}$
A	Active zone	



SECTION V

GENERAL TECHNICAL SPECIFICATION (GTS)

**POLYETHYLENE VALVES FOR UNDERGROUND
NETWORKS FOR NATURAL GAS DISTRIBUTION**

1.0 SCOPE AND FIELD OF APPLICATION

This General Technical Specification specifies the requirements for valves and its component made from extruded or injected moulded polyethylene (PE) and which are intended to be used for the Natural gas distribution systems where the maximum operating pressure (MOP) is equal to 5 bar.

In addition, it specifies some general properties of the materials from which these valves are made.

It applies to bi-directional valves with spigot ends or electrofusion sockets intended to be fused with polyethylene pipes in accordance with the technical specifications attached with this bid package.

This specification is limited to valves with a nominal diameter (dn) up to and including 225 mm.

2.0 NORMATIVE REFERENCES

prEN 1555-1	Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 1 : General
prEN 1555-4	Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 4 : Valves
prEN 1555-7	Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 7 : Guidance for assessment of conformity
ISO CD 12176-4	Plastics pipes and fittings - Equipment for fusion Joining polyethylene system - part 4 : raceability coding
ISO TR 13950	Plastics pipes and fittings - Automatic recognition systems for electrofusions

3.0 DEFINITIONS

3.1 NOMINAL SIZE DN/OD

Nominal size, related to the outside diameter.

3.2 NOMINAL OUTSIDE DIAMETER (dn)

Specified outside diameter, in millimetre, assigned to a nominal size DN/OD.

3.3 NOMINAL WALL THICKNESS (en)

Numerical designation of the wall thickness of a component, which is a convenient round number, approximately equal to the manufacturing dimension in millimetre (mm).

Note : For thermoplastics components conforming to prEN 1555, the value of the nominal wall thickness e_n is identical to the specified minimum wall thickness at any point, e_{min} .

3.4 COMPOUND

Homogenous mixture of base polymer (PE) and additives, i.e. anti-oxidants, pigments, UV-stabilisers and others, at a dosage level necessary for the processing and use of components conforming to the requirements of this standard.

3.5 MAXIMUM OPERATING PRESSURE (MOP)

Maximum effective pressure of the fluid in the piping system, expressed in bar, which is allowed in continuous use. It takes into account the physical and the mechanical characteristics of the components of a piping system.

Note : It is calculated using the following equation : $MOP (20 \times MRS) / Cx(SDR-1)$

3.6 VALVES

An obturating device designed to stop or restore the gas flow by operating the opening and closing mechanisms.

3.7 BASE PLATE

The valves are split into two models.

MODEL 1	Valve supply without base plate
MODEL 2	Valve supply with a base plate fixed or integrated

3.8 SPINDLE PROTECTION SLEEVE

A sleeve tube that protect the valve spindle. The protection sleeve exists in two models

VENTILATED	The sleeve is provided with opening and wrapped with textile fabric in order to let the gas escape and prevent the soil to go in.
NON VENTILATED	A normal sleeve tube without textile fabric.

3.9 EXTERNAL LEAK-TIGHTNESS

The tightness of the body enveloping the space containing the gas, with respect to the atmosphere.

3.10 INTERNAL LEAK-TIGHTNESS

The tightness between the inlet and the outlet of the valve, obtained by closing the operating mechanism.

3.11 LEAK-TIGHTNESS TEST

Test to determine

- the internal leak-tightness of the valve's closing seat when closed and pressurised from either side;
- the external leak-tightness of the valve when half open.

3.12 INITIATING TORQUE

Torque required to initiate movement of the obturator.

3.13 RUNNING TORQUE

Torque required to achieve full opening or closing of the valve at maximum allowable operating pressure.

3.14 LEAKAGE

Emission of gas through the body, sealing membrane or any other component of the valve.

4.0 GENERAL SPECIFICATIONS

The present specification is based on the European Standards EN 1555 series prepared by technical committee CEN/TC 155 plastic technical and ducting system.

The requirements of this General technical specification are chosen in order to guarantee a high quality gas system which will respond to the European Standards for gas supply systems.

- The valves described in this General technical specification comply with the standard prEN1555-4 and the complementary particular requirements or options of the present GTS.
- The valves are intended to be use in gas distribution networks made of PE pipes and accessories complying with GTS Doc No P0032806-1-01-IGL-ME-GTS-02 "Acceptance procedure - Polyethylene compounds for manufacture of pipes and fittings for underground networks for natural gas distribution"

5.0 MATERIAL PARTICULARITIES

5.1 GENERAL

All parts of the valve in contact with the gas stream shall be resistant to the gas, its condensates and other occurring substances such as dust.

All metallic parts of the PE valve shall resist to both internal and external corrosion.

5.2 PE COMPOUND FOR POLYETHYLENE VALVES BODIES

- The PE compound from which the valve body, with spigot end or electrofusion socket is made out, shall conform to prEN1555-1 and comply with the GTS -2 "acceptance procedure".
- The PE valves bodies are PE 100 class made from approved material as specified in the technical bid package Volume II.

Are forbidden :

- use of recycled materials,
- mixture of different materials,
- addition of complementary materials.

5.3 SEALS

- The seals shall be homogeneous, without any inner crack, inclusion or impurities and cannot contain any component that can alter the properties of the materials they are in contact with, and prevent the non-conformity of those materials with the present specification.
- additives shall be distributed evenly.
- The rubber seal rings shall comply with standard EN 682.
- Other seals shall comply with the relevant standard and be suitable for gas service.

5.4 LUBRICANTS

Lubricants cannot have any adverse effects on the long-term performance of the valve parts.

5.5 OPERATING CAP

Operating cap are in plastic material or in metal, protected against corrosion.

6.0 VALVES GENERAL PARTICULARITIES**6.1 TECHNICAL FILE**

The manufactures of the valves shall deliver for each type of valve a technical file which includes:

- Raw materiel used,
- drawings, dimensions and tolerances, including for the accessories,
- application range (temperature and pressure limits),
- running torque and initiating torque,
- pressure drop and flow diagram,
- test results and data proving the conformity of the valve in accordance with prEN1555 -4 and prEN1555-7,
- the assembly pipes/valves realised during testing shall be in conformity with the manufactures instructions and the extreme installation conditions.
- For the test assembly due consideration should be taken regarding the fabrication tolerances and the variation of the outside ambient temperature.

6.2 DESIGN

- The valves will be designed for a maximum operating pressure (MOP) equal to 10 bar.
- The wall thickness of the PE valve body shall be equal or greater than the minimum wall thickness of the corresponding SDR 11 series pipes.
- Valves body and valves ends form an indivisible whole.
- Except otherwise stated in the Owner purchase order, all valves will be "ball valve" type.
- The operating cap shall be designed in a way that it cannot be ejected "non blow out" type.
- The design of the extension spindle and the spindle protection sleeve will be such that they will never, in any case, even due to soil settlement, lay on the non reinforced part of the valve body or the valve ends. The spindle protection sleeve cannot turn during valve turning operation.
- The owner will specify if the spindle protection sleeve is a ventilated or non-ventilated type.
- The spindle protection sleeve ventilated type will have holes (min. diameter 10 mm) or slot type holes (min. width 1 mm) all around the sleeve in sufficient number in order to assure a maximum permeability for the gas.
- The sleeve will be covered by a non-waved geo-textile fabric (90 µm). The geo-textile fabric with a 50 mm overlap will be well secured on the sleeve;
- The valves should be equipped with a base plate. In order to achieve this, the valve body will be design with a flat base (model 1) or with an attached base plate or an integrated one (model 2). The Owner or his representative will specify the model.
- The operating mechanism and the stop wedges will be protected against water intrusion.
- The valve body is completely sealed except a passage for the spindle mechanism.

6.3 APPEARANCE AND COLOUR

- The internal and external surfaces of valves shall be smooth clean and shall have no scoring, cavities or other defects to an extend that would prevent non-conformity to the present GTS or to the standard prEN 1555-4.
- The colour of the PE valves shall be either yellow, black or orange.
- The colour of the valve shall be specify by the Owner or his representative in the purchase order;

6.4 DIMENSIONS

- The dimensions will be in conformity with the standard prEN1555-3 and prEN1555-4.
- The dimensions of the extensions spindle are detailed in appendix A.
- The operating cap will be design as per appendix B, C or D.
- The type of the operating cap will be specified by the Owner or his representative in the purchase order.
- The design of the extension spindle is such that the extension can be turn easily at any time to suit the site conditions.

7.0 MECHANICAL CHARACTERISTICS FOR ASSEMBLED VALVES

7.1 GENERAL

The valve shall have mechanical characteristics and be tested as specified in the standard prEN 1555-4.

7.2 RUNNING TORQUE

The running torque and the concept of the valve shall prevent the valve from being easily operated (by hand) without an operating key. To operate the valve designed with running torque as specified in the standard prEN 1555-4, the use of an operating key is requested. Neither the operating cap nor the spindle shall be damaged when operating at maximum operating torque as specified in the standard prEN 1555-4;

7.3 INDIVIDUAL TEST (BATCH RELEASE TEST)

Before delivery each valve will be individually tested for mechanical strength and leak tightness as per standard prEN1555-4.

A combined mechanic resistance and leak-tightness test shall be performed in conformity with the prEN1555-4.

By batch of valves a supplementary leak-tightness test (25 mbar) shall be performed in conformity with the prEN 1555-4 on 3 valves taken at random.

7.4 PRESSURE DROP AT LOW PRESSURE

The drop of pressure is measured with natural gas as a medium and according to the diagram specified in the standard EN 12117 (fig.1).

The maximum drop of pressure measured with natural gas (inlet pressure 25 mbar) will be limited to 0,2 mbar for a nominal gas flow as per table below.

d_n	Flow m³/h
32	10
40	15
63	60
90	180
110	250
160	600
200	1000

8.0 MARKING

At least the information given below shall be printed or formed directly on the valve :

- Manufacturer's name and/or trademark;
- Material and designation (e.g. PE 100);
- Design application series (e.g. SDR 11);
- Nominal diameter;
- Internal fluid "gas";
- Number of the system standard (e.g. prEN 1555-4) this information can be printed/formed directly on the valve or on a label associated with the valve or on an individual bag.
- Production period, year and month;

The marking shall stay legible during normal manipulation, storage and installation.

The marking shall not adversely influence the performance of the valve and prevent the non- conformity of the valve.

No marking will be accepted at the valve spigot ends.

9.0 PACKAGING AND DELIVERY

The valve and its accessories shall be packaged individually in plastic bags in order to prevent them from deterioration. The valves ends shall be protected with 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, number of units in the box and, any special storage conditions and storage time limits.

10.0 GUARANTEE

The manufacturer will extend his guarantee for each part for as per the clause mentioned in commercial volume. This guarantee period is valid if the parts are kept in proper conditions and in the original packaging.

The valves equipped with electrofusion sockets will be supply with a magnetic card and a code bar tag containing the welding parameters. The coding of the parameters shall be in conformity with the standard ISO TR 13950.

The operating manual (in English) will be inserted in the individual part package.

11.0 QUALITY CONTROL

11.1 GENERAL RULINGS

11.1.1 Manufacturer's Responsibility

Manufacturer is entirely responsible for the quality of the PE valves manufactured by his firm. All control checks prescribed above do not relieve him of this responsibility.

To ensure that all PE valves are in compliance with the specification in all aspects, they must be controlled by the plant control service, which must be independent from the manufacturing department.

All PE valves supplied are guaranteed as per the clause mentioned in commercial volume.

11.1.2 Quality Assurance

The manufacturer must have some form of quality control to ensure that products comply with ISO 9001:2008 or latest. The quality assurance manual must be made available to the Owner Control Service or an external Control laboratory appointed by him.

The system of quality assurance must be certified by an authorised body.

11.2 CONTROLS

11.2.1 Control testing by the manufacturer

11.2.1.1 By material batch

The manufacturer demands a certificate from the raw material manufacturer including the following :

- Fluid index
- Water content
- Volume mass
- Carbon black or yellow stabilising agent content
- Carbon black or yellow stabilising agent quality
- OIT value (thermal stability)

11.2.1.2 By accessory batch

The manufacturer must run control checks as specified in the standard prEN 1555 -4 and prEN 1555-7:

Control checks and the number of tests must be carried out according to the prescriptions of the EN standard 1555-4.

Also refer to table N° 8, paragraph 4.2.3. “Lot release tests” of standard prEN 1555 -7.

The results must be written out in documents that contain the complete identification of the accessory batch.

These documents must be made immediately available for the Owner representative.

11.2.2 Plant Reception by the Owner Control Service representative

11.2.2.1 General information

All quality controls must be run in the presence of the Owner Control Service representative.

All tests and control checks must comply with appropriate standard prescriptions and with the specific specifications established with the order.

At each visit by the Owner representative, the manufacturer must provide, free of charge, all means and personnel necessary for running the established control checks.

While the order is under production, the Owner representative must have access to stocking installations of all raw materials before manufacturing, manufacturing and control installations, as well as the accessory stocking areas for any control checks he is responsible for.

During his visits, the Owner representative will receive a certificate as soon as he reaches the plant for each batch of accessories presented for reception.

Each time this is requested by the Owner representative, the manufacturer must provide recent reports of all control checks and measuring instrument results and testing results.

11.2.2.2 Convocation for reception

Convocation instructions for reception are to be defined with the order.

11.2.2.3 Reception control checks

For each accessory batch or any fractions of the batch, minimal batch sampling is established in QAP. These control checks and tests are to be run according to the prescriptions of EN standard 1555-4

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11.3 ACCEPTANCE OR REFUSAL

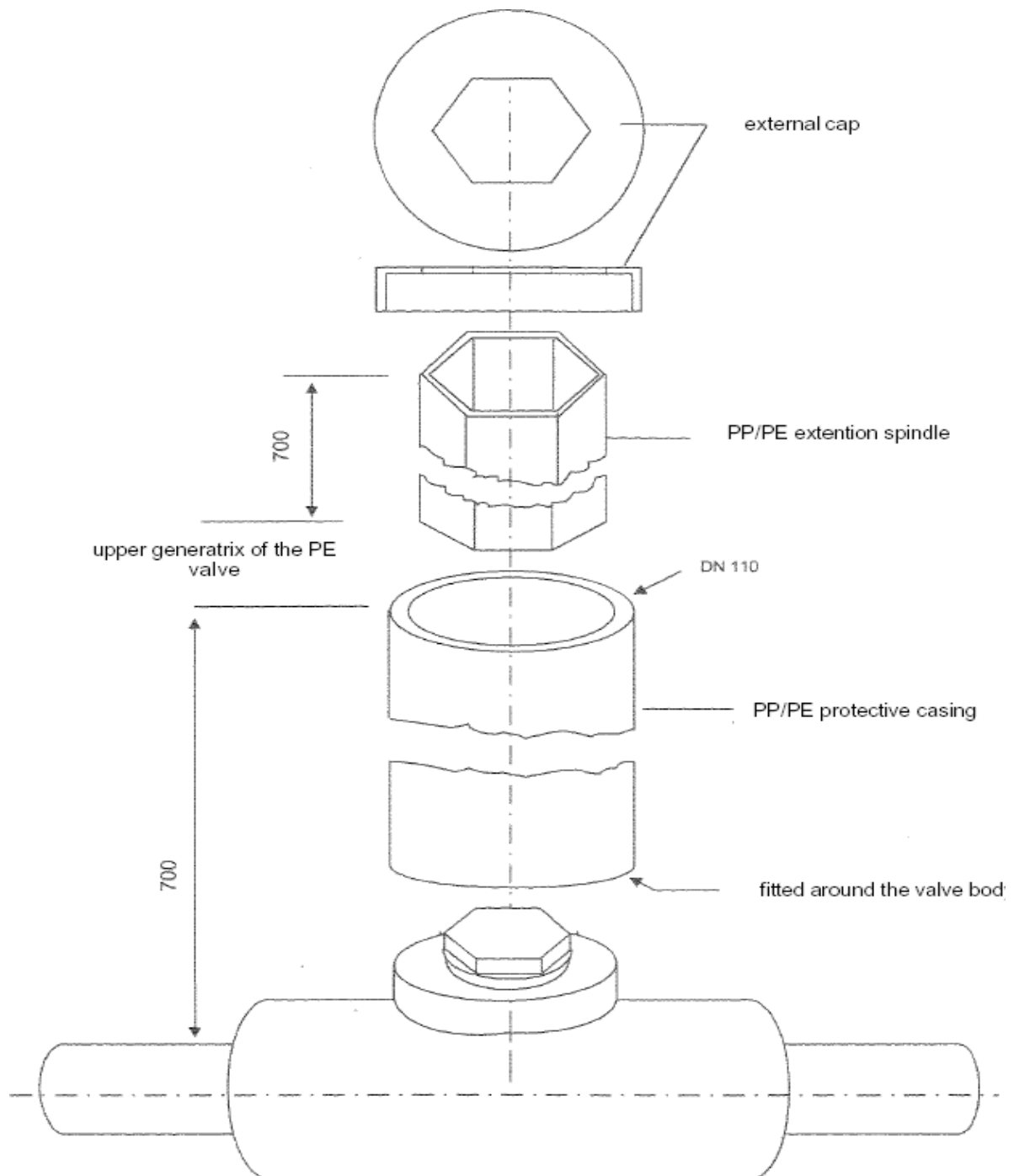
11.3.1 Appearance, measurements and marking

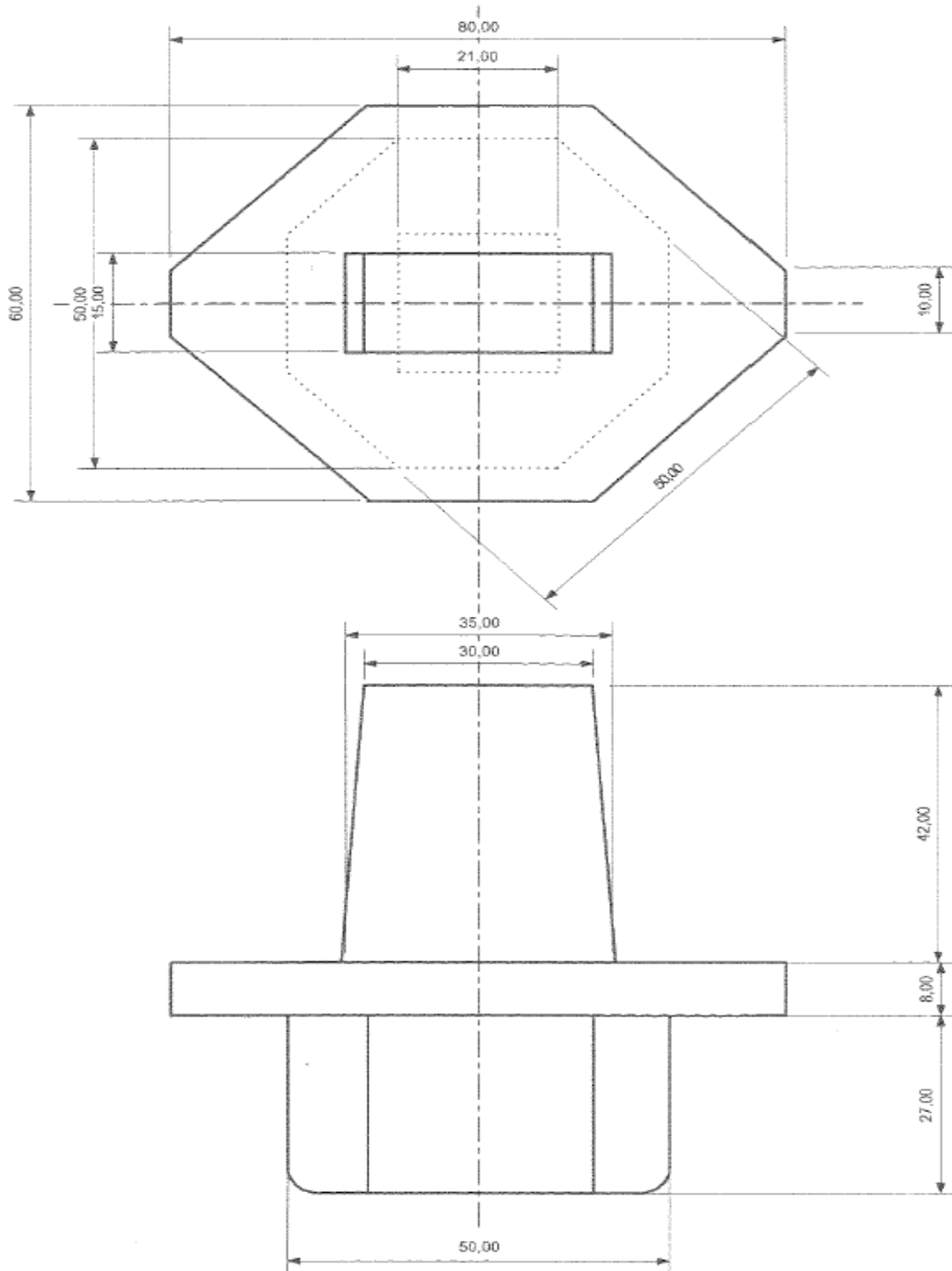
Any requirements not supplied will lead to the refusal of the complete batch. However in the case where a batch is refused, it can be presented for approval again after a control check, on agreement with the Owner Control Service.

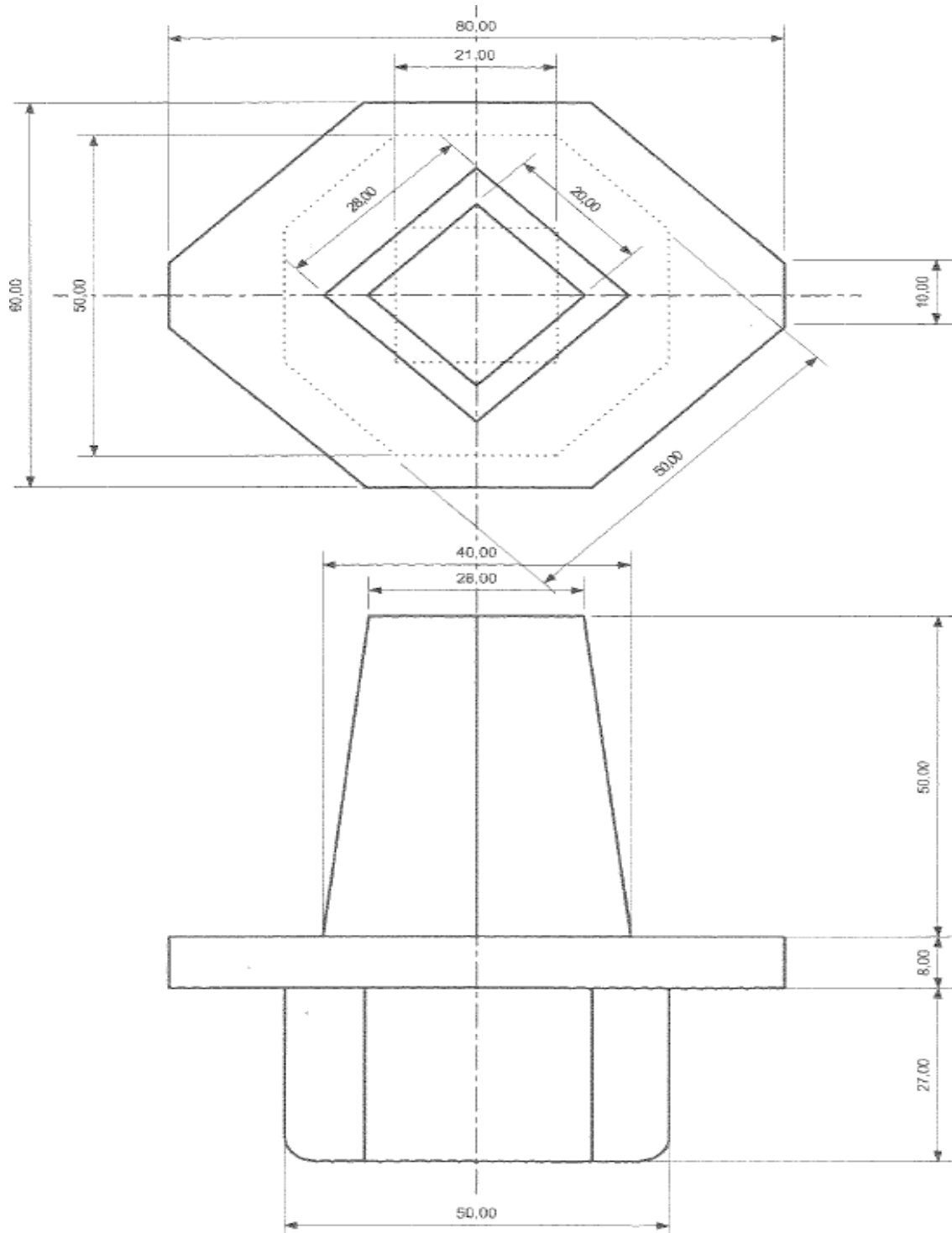
11.3.2 Control check on characteristics

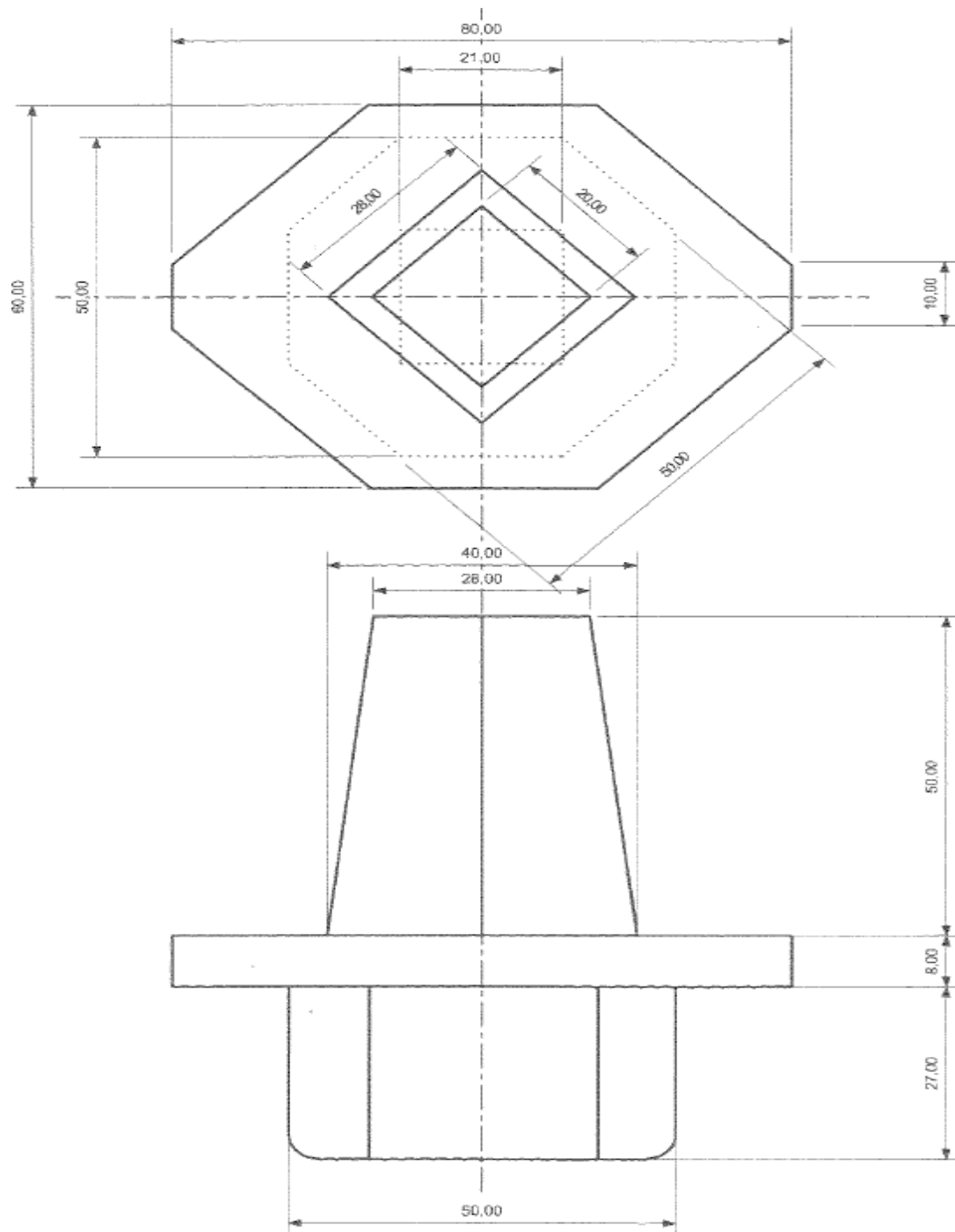
All results that do not comply with the specification prescriptions and the particular specifications requested with the order, demand counter-testing on at least double the number of the samples previously tested. If the undesirable result is confirmed, then the batch is refused permanently. If the result is positive, then the batch will be accepted.

As a complementary control check, other analyses and/or tests can be run after common agreement, and at the manufacturer's cost.

ANNEXURE A
DIMENSIONS OF THE EXTENSION SPINDLE

ANNEXURE B
DIMENSIONS OF THE OPERATING CAP TYPE A

ANNEXURE C
DIMENSIONS OF THE OPERATING CAP TYPE B

ANNEXURE D
DIMENSIONS OF THE OPERATING CAP TYPE C



SECTION VI

QUALITY ASSURANCE PLAN (QAP) OF ELECTROFUSION PE FITTINGS


**QUALITY ASSURANCE PLAN(QAP)/ INSPECTION TEST PLAN (ITP) FOR
ELECTROFUSION PE FITTINGS**

 Document No : QAP/PE FITTINGS/IGL/ET2/CP/
CP18921
 Rev No : 0 Date:
 Project : SUPPLY OF MDPE PIPE FITTINGS,
VALVES & TRANSITION FITTINGS
 Client : INDRAPRASTHA GAS LTD

SR.NO	COMPONENTS / OPERATIONS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	VENDOR	TPI	CA	REMARK
1	Review of test certificate for raw material		Each Batch certificate	Raw Material manufacturer's test certificate	Raw Material manufacturer's test certificate	Test Certificate	R	R	R	
2	Hydrostatic strength									
2.1	At 20°C	Strength test	As per EN 1555-7	EN 1555 - 3/ ISO 1167 / EN 921 / PTS GTS	No leakage through the fittings during the test	Inspection report	P	R	R	
2.2	At 80°C	Strength test	As per EN 1555-7	EN 1555 - 3/ ISO 1167 / EN 921 / PTS GTS	No leakage through the fittings during the test	Inspection report	P	R	R	
3	Cohesive Resistance									
3.1	Length of Initial rupture $\leq$ L2/3 in brittle failure	Mechanical properties	As per EN 1555-7	ISO 13954 / ISO 13955 / PTS / GTS	EN 1555 - 3	Inspection report	P	R	R	This test is applicable only for Electrofusion socket fittings (Type test)
3.2	Surface of rupture $\leq$ 25% brittle failure	Mechanical properties	As per EN 1555-7	ISO / ISO 13956 / PTS /GTS	EN 1555 - 3	Inspection report	P	R	R	This test is applicable only for Electrofusion socket fittings (Type test)
4	Tensile strength for butt fusion	Mechanical properties	As per EN 1555-7	ISO 13953 /PTS / GTS	EN 1555 - 3	Inspection report	P	R	R	This test is applicable only for butt fusion fitting (Type test)
5	Impact strength	Mechanical properties	As per EN 1555-7	EN 1716 /PTS / GTS	EN 1555-3 / PTS / GTS / EN 1716	Inspection report	P	R	R	This test is applicable only for Electrofusion saddle fittings (Type test)
6	Pressure Drop	Mechanical properties	As per EN 1555-7	EN 12117 / PTS	EN 1555 - 3 / EN 12117 / PTS	Inspection report	P	R	R	Type Test
7	Electrical Resistance test		05 NO's. FROM LOT	EN 1555 - 3 / PTS / GTS	EN 1555 - 3 / PTS	Inspection report	P	W	R	
8	Oxidation induction time(Thermal stability)		01 NO's. FROM LOT	EN 1555 -3/ EN 728 / PTS /GTS / ISO 11357-6	> 20 min	Review & Approval of Certificate	P	W	R	

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9	Meltmass/ Flow rate (MFR)		01 NO's. FROM LOT	EN 1555 - 3 / ISO 1133 /ISO 4440 /PTS / GTS	(0.2 ≤ MFR ≤ 1.4) g / 10 min and after processing maximum deviation of ± 20 % of the value measured on the batch used to manufacture the fitting	Inspection report	P	W	R	
10	Dimensional Check	Dimensions	05 NO's. FROM LOT	As per EN 1555 - 3 / PTS / GTS	As per EN 1555 -3 / PTS /GTS	Inspection report	P	W	R	
11	Storage	Visual	All materials		Manufacturer Recommendation	Packing List	P	M	R	
12	Marking	Visual	05 NO's. FROM LOT / SIZE	EN 1555 -3 / PTS /GTS	EN 1555 -3	Inspection report	P	W	R	
13	Documentation	All Inspection Reports and	–	EN 1555	All Inspection Reports and Certificates	Inspection Report	P	R	R	

LEGENDS:

P-PERFORM, R- REVIEW W-WITNESS, M- MONITOR, TPI -THIRD PARTY INSPECTION AGENCY, CA - OWNER / OWNER REPRESENTATIVE

Notes:

1. 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)
2. The supplier shall submit their own detailed ITP/QAP prepared on the basis of above / Technical specification for approval of Owner.
3. Vendor shall in coordination with supplier issue detailed Production and inspection schedule indicating the dates and the locations to facilitate Owner/ Owner's representative and TPIA to organize inspection.
4. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
5. All fittings/saddles in a consignment shall constitute a lot.
6. Only calibrated instruments shall be used for inspection.
7. Before dispatch of the materials to the IGL designated stores/sites, manufacturer/supplier shall submit copy of all related document of inspection along with release note and MTC to the owner for the dispatch clearance.
8. Sampling frequency of the testing shall be done as per EN 1555-3 / manufacturer's specifications/plan.



SECTION VII

QUALITY ASSURANCE PLAN (QAP) OF ELECTROFUSION PE VALVES



QUALITY ASSURANCE PLAN(QAP)/ INSPECTION TEST PLAN (ITP) FOR PE VALVES

Document No : QAP/PE
VALVES/IGL/ET2/CP/CP18921
Rev No : 0 Date:

Client : INDRAPRASTHA GAS LTD

SR.NO	COMPONENTS / OPERATIONS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	VENDOR	TPI	CA	REMARK
1	Test on Raw material	-	Each Batch certificate	As per RMTC	Raw Material manufacturer's test certificate	Test Certificate	R	R	R	
2	Review of mill test certificate for Raw material	-	Each Batch certificate	Raw Material manufacturer's test certificate	Raw Material manufacturer's test certificate	Test Certificate	R	R	R	
3	Hydrostatic strength @ 80 degree C for 165 hours	-	01 NO's. FROM LOT	ISO 1167 / PTS / GTS	ISO 1167 / PTS / GTS	Inspection report	P	R	R	
4	Leak Tightness test	External & internal leak	01 NO's. FROM LOT	EN 1555-4 /PTS /GTS	EN 1555-4 /PTS /GTS	Inspection report	P	R	R	
5	Running torque	Mechanical properties	01 NO's. FROM LOT	EN 1555-4 /PTS /GTS	EN-28233/PTS/GTS	Inspection report	P	R	R	
6	Actual Mechanical Resistance	Mechanical properties	01 NO's. FROM LOT	EN 1555-4 / EN 28233 /PTS/ GTS	EN 1555 - 4	Manufacturers Declaration of Compliance	P	R	R	Review of Manufacturers Declaration of Compliance
7	Impact Loading Resistance	Mechanical properties	01 NO's. FROM LOT	EN 1555-4 / EN 1705 / PTS/ GTS	EN 1555 - 4		P	R	R	
8	Pressure Drop	Mechanical properties	01 NO's. FROM LOT	EN 1555-4 / EN 12117 / PTS/ GTS	EN 1555 - 4		P	R	R	
9	Oxidation induction time(Thermal stability)	-	01 NO's. FROM LOT	EN 728/ ISO 11357-6 PTS /GTS	EN 728/ ISO 11357-6 PTS /GTS	Inspection report	P	W	R	
10	Meltmass/ Flow rate (MFR)	-	01 NO's. FROM LOT	EN 1555-4/ISO 1133/PTS/ GTS	ISO 1133/PTS/ GTS	Inspection report	P	W	R	
11	Dimensional Check	Dimensions	05 NO's. FROM LOT / SIZE	As per EN 1555 -4 / PTS / GTS	As per EN 1555 -4 / PTS /GTS	Inspection report	P	W	R	
11	Storage	Visual	All materials	-	Manufacturer Specification	Packing List	P	M	R	

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12	Marking	Visual	05 NO's. FROM LOT / SIZE	EN 1555-4 /PTS /GTS	EN 1555-4 /PTS /GTS	Inspection report	P	W	R	
13	Documentation	All Inspection Reports and	–	EN 1555	All Inspection Reports and Certificates	Inspection Report	P	R	R	
LEGENDS:		P-PERFORM, R- REVIEW W-WITNESS, M- MONITOR, TPI -THIRD PARTY INSPECTION AGENCY, CA - OWNER / OWNER REPRESENTATIVE								
Notes:										
1. 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)										
2. The supplier shall submit their own detailed ITP/QAP prepared on the basis of above / Technical specification for approval of Owner.										
3. Vendor shall in coordination with supplier issue detailed Production and inspection schedule indicating the dates and the locations to facilitate Owner/ Owner's representative and TPIA to organize inspection.										
4. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.										
5. All valves in a consignment shall constitute a lot.										
6. Only calibrated instruments shall be used for inspection.										
7. Before dispatch of the materials to the IGL designated stores/sites, manufacturer/supplier shall submit copy of all related document of inspection along with release note and MTC to the owner for the dispatch clearance.										
8. Sampling frequency of the testing shall be done as per EN 1555-4 / manufacturer's specifications/plan.										



SECTION VIII

QUALITY ASSURANCE PLAN (QAP) OF ELECTROFUSION TRANSITION FITTINGS



QUALITY ASSURANCE PLAN(QAP)/ INSPECTION TEST PLAN (ITP) FOR TRANSITION FITTINGS

Document No :
QAP/TF/IGL/ET2/CP/CP18921
Rev No : 0 Date:
Project : SUPPLY OF MDPE PIPE
FITTINGS, VALVES &
TRANSITION FITTINGS
Client : INDRAPRASTHA GAS LTD

SR.NO	COMPONENTS / OPERATIONS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	VENDOR	TPI	CA	REMARK
1	Review of test certificate for raw material	-	Each Batch certificate	Raw Material manufacturer's test certificate	Raw Material manufacturer's test certificate	Test Certificate	R	R	R	
2	Hydrostatic strength									
2.1	At 20°C	Strength test	As per EN 1555-7	EN 1555 - 3/ ISO 1167 / EN 921 / PTS / GTS	No leakage through the fittings during the test	Inspection report	P	R	R	Type Test
2.2	At 80°C	Strength test	As per EN 1555-7	EN 1555 - 3/ ISO 1167 / EN 921 / PTS / GTS	No leakage through the fittings during the test	Inspection report	P	R	R	
3	Electrical Resistance test	-	05 NO's. FROM LOT	EN 1555 - 3 / PTS / GTS	EN 1555 - 3 / PTS / GTS	Inspection report	P	W	R	
4	Oxidation induction time(Thermal stability)	-	01 NO's. FROM LOT	EN 1555 - 3 / EN 728 /PTS / GTS / ISO 11357-6	> 20 min	Inspection report	P	W	R	
5	Meltmass/ Flow rate (MFR)	-	01 NO's. FROM LOT	EN 1555 - 3 / ISO 1133 /PTS / GTS	(0.2 ≤ MFR ≤ 1.4) gm / 10 min and after processing maximum deviation of ± 20 % of the value measured on the batch used to manufacture the fitting	Inspection report	P	W	R	
6	Dimensional Check	Dimensions	05 NO's. FROM LOT / SIZE	As per EN 1555 -3 / PTS / GTS	As per EN 1555 -3 / PTS / GTS	Inspection report	P	W	R	
7	Storage	Visual	All materials	-	Manufacturer Specification	Packing List	P	M	R	
8	Marking	Visual	05 NO's. FROM LOT / SIZE	EN 1555-4 /PTS /GTS	EN 1555-4 /PTS /GTS	Inspection report	P	W	R	
9	Documentation	All Inspection Reports and	-	EN 1555	All Inspection Reports and Certificates	Inspection Report	P	R	R	

LEGENDS:

P-PERFORM, R- REVIEW W-WITNESS, M- MONITOR, TPI -THIRD PARTY INSPECTION AGENCY, CA - OWNER / OWNER REPRESENTATIVE

Notes:

INDRAPRASTHA GAS LTD.	QAP – TRANSITION FITTINGS (Doc. No.- QAP/TF/IGL/ET2/CP/CP18921)	IGL/ET2/CP/CP18921
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1. 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)
2. The supplier shall submit their own detailed ITP/QAP prepared on the basis of above / Technical specification for approval of Owner.
3. Vendor shall in coordination with supplier issue detailed Production and inspection schedule indicating the dates and the locations to facilitate Owner/ Owner's representative and TPIA to organize inspection.
4. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
5. All fittings in a consignment shall constitute a lot.
6. Only calibrated instruments shall be used for inspection.
7. Before dispatch of the materials to the IGL designated stores/sites, manufacturer/supplier shall submit copy of all related document of inspection along with release note and MTC to the owner for the dispatch clearance.
8. Sampling frequency of the testing shall be done as per EN 1555-4 / manufacturer's specifications/plan.