



INDRAPRASTHA GAS LIMITED

TENDER DOCUMENT FOR SUPPLY OF MDPE PIPE

TENDER DOCUMENT NO. IGL/ET2/CP/CP18502

TECHNICAL VOLUME

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SECTION I

INTRODUCTION

OPEN DOMESTIC TENDER

SECTION I
INTRODUCTION

SUPPLY OF MDPE PIPE

TENDER DOCUMENT NO. IGL/ET2/CP/CP18502

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 Medium Density Polyethylene (MDPE) Pipe.

3.0 SCOPE

The brief scope of work includes Manufacture, Testing, Inspection and supply of Medium Density Polyethylene (MDPE) Pipe to IGL’s designated stores located in NCT of Delhi, NCR, UP, Rajasthan and Haryana.

SECTION II

MATERIAL REQUISITION OF MEDIUM DENSITY POLYETHYLENE (MDPE) PIPE

1.0 GENERAL

This document along with the referred and attached Technical Specifications for Medium Density Polyethylene (MDPE) Pipe 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.

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.

Medium Density Polyethylene (MDPE) Pipe shall be supplied, as per IGL specification for supply of MDPE Pipe.

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. All deviations/ conflicts shall be subjected to IGL review and approval.

3.0 DESCRIPTION OF GOODS AND/OR SERVICES

This document covers supply of Medium Density Polyethylene (MDPE) Pipe 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.

Sr. No.	Material Description	Quantity (Mtrs.)	End Connection	Min. Lot Size (Mtrs.)
1	20 mm x MDPE 80 SDR 11 MDPE Pipe	324000	Electro-Fusion Weld	20000
2	32 mm x MDPE 80 SDR 11 MDPE Pipe	1483000	Electro-Fusion Weld	30000
3	63 mm x MDPE 80 SDR 11 MDPE Pipe	1707000	Electro-Fusion Weld	30000
4	125 mm x MDPE 80 SDR 11 MDPE Pipe	236000	Electro-Fusion Weld	10000
5	180 mm x MDPE 80 SDR 11 MDPE Pipe	10000	Electro-Fusion Weld	1000

NOTE:

- The above quantities are indicative and for evaluation purpose only. Purchase order/ Release order will be released considering consumption rate and stock position. The diameter wise awarded quantities within a contract may be shuffled upto 20% of the contract value (the total Contract value shall remain same).

- Bidder shall quote for materials PE 80.
- Tolerance on total length shall be as per PTS of this document.
- 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 Medium Density Polyethylene (MDPE) Pipe 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.

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 MDPE Pipe		
2	Quality Assurance Plan		

9.0 DOCUMENTS & DATA REQUIREMENTS

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.

Sr. No.	Documents and Data	With Bid (A)	After Notification of Award (B)		During Final Documentation (C)	
		Number of copies	Number of copies	Required date (Weeks)	Number of copies	Required date
1	Type Test or Compliance or BIS Certificate as per IS-14885	2	-	-	2	Along With Dispatch/ Shipment
2	Compliance to Raw Material Manufacturer	2	2	2	2	
3	Compliance to tender ITP	2	2	2	2	
4	Manufacturer's Test certificates	-	-	2	2	
5	Material certificate	-	-	-	2	
7	Final Technical File with Inspection Report	-	-	-	2	

NOTES

- 1) Duration in column B (required date) are weeks after purchase order date.
- 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 to IGL designated stores, 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 : 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 by him 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, fabrication, testing, inspection, preparation for shipment and transport of the above pipe shall strictly be in accordance with the Material Requisition and all attachments thereto.

INDRAPRASTHA GAS LTD.	PTS-MDPE PIPE (Doc. No.-PTS/IGL/ET2/CP/CP18502)	IGL/ET2/CP/CP18502
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SECTION III **PARTICULAR TECHNICAL SPECIFICATION (PTS) OF MEDIUM DENSITY POLYETHYLENE (MDPE) PIPE**

1.0 SCOPE

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

2.0 GENERAL**2.1 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

2.2 Review and/or Approval

Whenever Client review and/or approval is requested on a document to be submitted by the Vendor/Supplier or before an action is implemented by the Vendor/Supplier, such review and/or approval shall always be requested in writing by the Vendor/Supplier to the Client and/or the Client representative before any action subject of this review and/or approval is taken.

Client approval shall always be given in writing.

2.3 Codes, Standard and Legal Requirements

The following National & International codes / standards / references (Latest edition) shall be applicable for PE-80 material as well as Polyethylene pipe.

IS-14885	Polyethylene pipes for supply of Gaseous Fuels.
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ISO-4437	Buried Polyethylene pipe for supply of gaseous fuels – metric series - specification	
IS-2530	Methods of test for PE moulding materials and PE compound	
ISO-1183:1987	Plastic: Methods for determining the density of non-cellular plastics.	
ISO-1872- 2B	Plastic: polyethylene (PE) moulding and extrusion material.	
ISO- 527	Plastics: Determination of tensile properties.	
EN 728	Plastic Piping and Ducting System – Determination of oxidation Induction time	
EN 12099	Polyethylene piping system - Determination of Volatile Content	
ISO 13949:1997	Method of assessment of the degree of pigment dispersion in polyolefin pipes,fittings and compounds	
EN 12118	Plastic Piping system – Determination of moisture content in thermoplastic bycoulometer	
ISO-1133	Plastics – determination of the melt-mass flow rate (MFR) and melt volume flow rate (MVR) of thermoplastic.	
EN 1555-7	Gaseous fuels supply polyethylene (PE)	
ISO-760 :1978	Determination of water - Karl Fisher method (General method) Buried polyethylene (PE)pipes for the supply of gaseous fuels- Metric Series-Specifications	
ISO-6259-3:1997	Plastic pipes- Measurement of dimensions	
ISO-4440-1:1994	Thermoplastics pipes and fittings - Determination of melt mass-flow rate, Part1: Test method.	
Part –D	Acceptance Procedure for MDPE Pipes.	

3.0 TERMINOLOGY

- **Maximum Allowable Operating Pressure (MAOP):** The maximum effective pressure of gas in a piping system, expressed in MPa, which is allowed in continuous use. It takes in account physical & mechanical characteristics of the components of piping system.

The equation for MAOP (in MPa) = $(2 \times \text{MRS}) / [C \times (\text{SDR} - 1)]$

- **Minimum Required Strength (MRS):** Minimum value in MPa, for long-term hydrostatic strength (LTHS) of the polyethylene resin which represents the 97.5 percent confidence limits of the predicted hydrostatic strength at 20 °C for 50 years. This is considered as the property of the material.
- **Nominal Outside Diameter (d_n):** Specified outside diameter, in millimeters, assigned to a nominal size DN/OD.
- **Out of roundness (Ovality):** Ovality shall be measured as the difference between maximum outside diameter and minimum outside diameter measured at the same cross-section of the pipe, at 300 mm away from the cut end, for the pipe to be coiled.
- **Nominal Wall Thickness (e_n):** Numerical designation of the wall thickness of a pipe, which is a convenient round number approximately equal to the manufacturing dimension in millimeters.
- **Resin:** A material (solid or semi-solid) which has a high molecular weight and is a product of polymerization.

- **Batch of Pipe:** is meant a homogenous lot of pipes with identical dimensions, made in a continuous process by the same extrusion machine and from the same batch of compound.
- **Mean outside Diameter (d_o):** Average value of the measurement of the outer circumference of the pipe or spigot end of a fitting in any cross-section divided by π (3.142), for the number of measurements taken, rounded to the next greater 0.1 mm.
- **Minimum Wall Thickness (e_{min}):** Minimum value of the wall thickness at any point of the body of the pipe, around its circumference as specified.
- **Maximum Wall Thickness (e_{max}):** Maximum value of the wall thickness at any point of the body of the pipe, around its circumference as specified.
- **Lower Confidence Limit (LCL):** A quantity with the dimensions of stress, in Megapascal, which can be considered as a property of the material under consideration and represents the 97.5% lower confidence limit of the predicted long-term hydrostatic strength at a temperature of 20°C for 50 years with internal water pressure.
- **Thermal Stability (Oxidation Induction Time):** The minimum oxidation induction time (OIT) of the pipe when tested in accordance with the method given in shall be not less than 20 min at 200 °C.
- **Volatile Matter Content:** When tested, the value of volatile matter content shall be not more than 350 mg/kg.
- **Melt Mass Flow Rate:** The melt mass flow rate (MFR) – 190 °C @ 5 kg (load), measured on a sample taken from the pipe in accordance with IS 2530 or IS 14885: 2022 or ISO 4440-1, is within the limits stated in the table characteristics of PE compound.
- **Water Content:** The water content may be estimated by measuring the volatile content.
If the volatile content, measured in accordance with IS 14885: 2022 is more than 300 mg/ Kg, water content must be ascertained.
The water content, measured in accordance with IS 14885: 2022 or equivalent, must be 300 mg/ Kg or lesser.
- **Melt Flow Rate (MFR):** is a value relating to the viscosity of the molten thermoplastic material at a specified temperature and a rate of shear.
- **Standard Dimension Ratio (SDR):** The ratio of nominal outside diameter of a pipe to its nominal thickness.
$$SDR = d_n / e_n$$

For any other terminology, IS-14885-2022 (latest) and / or other applicable National & International codes / Standards can be referred.

4.0 RAW MATERIAL GRADE AND PROPERTIES

Raw material grade / classification shall conform to Cl.4.2 of IS-14885: 2022. i.e. PE 80

The raw material of polyethylene pipes shall be PE 80. The properties of PE-80 compound shall conform to the table 2 of IS-14885: 2022.

Other materials / additives such as anti-oxidant, UV stabilizer, pigment dispersion etc. shall conform to IS-14885: 2022.

Raw material of polyethylene pipes shall be virgin quality. PE compound shall be Cadmium free pigment compound.

Anti-oxidant & UV stabilized used in PE resin shall not exceed 0.3 and 0.5 % by mass of finished resin respectively.

Raw material supplier to submit the certificate for percentage use of U.V. stabilizer in the raw materials (PE compound)

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Characteristic of PE-80 Compound is as per below table

Table-I

Sr.	Characteristic	Unit	Requirement	Test Method
1	Conventional Density	Kg/m ³	≥ 930 at 23°C	IS-14885/IS 7328
2	Tensile Yield Point	Mpa	Min. 15 MPa at 23°C	IS-14885:2022
3	Elongation at break	%	Min 350 at 23°C	IS-14885:2022
4	Melt-mass Flow Rate	g/10 min.	± 20 % of value nominated by compound producer @ 190°C / 5.0 kg	IS-14885/IS 2530
5	Thermal stability (Oxidation Induction time)	Minute	≥ 20@ at 200°C	IS-14885:2022
6	Volatile Content	(mg/kg)	≤350	IS-14885:2022
7	Pigment Dispersion	Grade	≤3	Annex. A of IS-14885:2022
8	Resistance to gas condensates	H	No failure during the test period of the test piece Test Temperature = 80°C Test Period = 20 h, Min	Clause 5.5 of IS-14885:2022
9	Resistance to Slow crack growth rate (hydraulic characteristics of notched test pieces for pipes of size 125 mm and 180 mm)	H	No failure during the test period of the test piece. Test Temperature = 80°C Internal Test Pressure: PE 80 = 0.8 Mpa Test Period = 500 h, Min	IS-14885:2022
10	Water Content	Mg/Kg	≤300	IS-14885:2022

The above requirement is also same for the final product

PE compound quality evaluation shall be as per IS – 14885: 2022

5.0 RECOMMENDED MANUFACTURER FOR RAW MATERIAL

1. INEOS (Formerly SOLVAY)
2. BOROUGE
3. TOTAL PETROCHEMICALS
4. DOW
5. BASSELL

Note: Above mentioned is recommended list and further amendment/addition/deletion may be done by owner based on PTR

6.0 PIPE SIZE / DIMENSION / TOLERANCE

- **Wall Thickness & Tolerance**

The required minimum wall thickness & tolerance of the pipe shall be as follows which is conforming to IS 14885: 2022:

Nominal Diameter of Pipe (mm)	Minimum wall thickness (e_{min}), mm	Standard Dimension Ratio (SDR)	Plus Tolerance on Wall thickness (mm)
20	3.0	11	0.4
32	3.0	11	0.4
63	5.8	11	0.7
125	11.4	11	1.3
180	16.4	11	1.8

- Length of Pipe**

Nominal Diameter of Pipe (mm)	Packing Length (mtr.) (Roll)	Straight Length (mtr.)
20	200	-
32	150	-
63	100	-
125	50	-
180	-	12

The method of measurement of outside diameter, wall thickness, length, ovality etc. and tolerances on Nominal wall thickness at any points of pipe shall conform to IS-14885: 2022 or equivalent code/standards.

7.0 COLOUR

The pipe shall be of YELLOW color, when the pipe shall be manufactured from PE-80 grade of raw material.

8.0 MARKING

All pipes shall be permanently and legibly marked along their length with a legend, which shall be impressed to a depth of not more than 0.15 mm.

Marking details shall be formed on the pipe in such a way that the marking does not initiate cracks or other types of failure, and in such a way that with normal storage, weathering and processing and the permissible method of installation and use, legibility remains maintained for the life of the pipes.

The marking shall be made in a single strip in case of pipe nominal sizes up to 32 mm, and the same shall be done in two strips on opposite sides of the pipe in case of nominal sizes above 32 mm.

The embossing/inkjet printing for yellow pipe shall have black base. The height of the character shall be uniform and at least of the dimension as given below:

- 3 mm for pipes of nominal size up to 90 mm; and
- 5 mm for pipes of nominal size more than 90 mm.

The legend shall be repeated at intervals of 1 m and shall consist of the following information:

- Owner's name as 'IGL' to be marked on each pipe.
- Manufacturer's identity name or trade name;
- Material designation which shall include the following:
 - Material grade;
 - Nominal outside diameter;

- iii) Nominal wall thickness;
- iv) Standard dimension ratio (SDR); and
- v) Word 'GAS'.
- vi) Lot number/Batch number containing information of date of manufacture.

9.0 INSPECTION AND TEST PROCEDURE (ITP)/QUALITY ASSURANCE PLAN (QAP)

Vendor to submit ITP/QAP, in line with tender QCT for Purchaser approval after award of work. Inspection shall be carried out as per approved ITP/QAP.

10.0 TYPE TEST CERTIFICATE

Vendor to submit Type Test or Compliance Certificate as per IS-14885: 2022 along with the offer.

11.0 FINISH / DEFECT LIABILITY

The internal and external surfaces of the pipes shall generally be smooth, clean and free from cavities and other surface defects, which may affect pipe performance. The pipe ends shall be cut cleanly and square to the axis of the pipe and shall be within the tolerances of ends. Defect liability period shall be 12 months from last date of delivery of pipes at IGL site/store.

12.0 SUPPLY, PACKAGING, HANDLING TRANSPORTATION AND STORAGE OF PE 80 PIPES

Packaging shall be done with polyethylene & Gunny sheet wrapped and tied with black PVC/ PE films around the pipe to avoid direct sunlight and facilitate out-door storage and both ends of pipe shall be protected with proper removable end caps.

Packing size to be mentioned to ensure uniformity in delivery conditions of the pipe being procured. Bidder shall submit the packaging details during offer and also complied with at the time of delivery. Manufacturer shall make an arrangement for unloading of pipes at Owner's premises along with stacking of pipe.

Pipes should be stored in such a manner as to prevent damage from elevated temperatures, direct sunlight and contact with chemicals.

13.0 DOCUMENTS TO BE SUBMITTED ALONG WITH BID

All relevant documents like BIS Certification, Catalogue etc to be submitted along with the bid.

AMENDMENTS TO THE CLAUSES OF IS 14885 : 2022**3 TERMINOLOGY****3.16 Lot of Batch of Compound**

ADD

By lot of batch of compound is meant a homogeneous quantity of PE compound of same origin of particular brand.

The lot must be registered under a single identification number (lot No.) which leaves no doubt as to the origin, identity & date of manufacture of the compound.

5 MATERIAL**5.1 Polyethylene Compound**

ADD

Polyethylene compound used in manufacture of pipes shall not contain following:

- Recycled Materials
- Mixture of different material

8 PERFORMANCE REQUIREMENT**8.6 Thermal Stability**

ADD

The Maximum admissible decrease in the oxidation induction time measured on a pipe sample compared to that measured on the raw material shall not exceed 20% of the latter.

9 SAMPLING, FREQUENCY OF TEST AND CRITERIA FOR CONFORMITY**9.2 Acceptance Tests****9.2.2 LOT**

ADD

All pipes of the same size, same pressure rating and also manufactured essentially under similar conditions of manufacture i.e. made in a continuous process by the same extrusion machine and from the same Lot of batch of compound shall constitute a lot.

11 ANNEXURE D (CLAUSE 11)-SUPPLY, PACKAGING, HANDLING AND TRANSPORTATION OF POLYETHYLENE PIPES FOR GAS TRANSMISSION**D.1 Supply**

ADD

Prior to execution of the order, the manufacturer must submit to the company the seals which it intends to use for all the types of pipes ordered. The seals shall preferably be made of PE or material which does not adulterate polyethylene. Metal and PVC seals are not permitted. The seals must be able to withstand storage terms as guaranteed in D-6 STORING of this Annexure, and also to withstand handling during installation. They must not be brittle or sharp and the materials, shapes and dimensions thereof must be such that they cannot fully penetrate inside the pipes. They are of the internal plug type for all pipes supplied in straight lengths, and or pipes rolled in coils, the seals may be caps.

All seals shall be placed on the pipes immediately after completion of manufacturing & testing. Their removal on site should not require the use of special tools.

PE can be delivered in straight length or coils, transported, and stored. Care should be taken to maintain the coil diameter at or above the specified minimum to prevent deformation. The pipe should be wrapped with non transparent PE films of 100 micron gauge to protect from ultra violet rays.

D.4 Handling

ADD

PE pipe is relatively light and flexible however, it is susceptible to damage from sharp objects and stones. It should not be dragged, dropped or subjected to rough handling during loading or unloading, transport, storage or actual installation.

D.5 Transportation

ADD

When being transported, care should be taken to ensure pipes are not restrained in such a manner as to cause damage to them. Sharp sections bearing against the pipes should be avoided so as to minimize the chance of indentation or scoring of the pipe wall.

Pipes with end treatment should be stacked or supported in such a way that the ends are free from loading. Pipe ends, particularly ends cut for jointing, should be given special attention at all times to ensure they are free from damage.

SECTION IV

QUALITY ASSURANCE PLAN (QAP) OF MDPE PIPE

INDRAPRASTHA GAS LTD.	QAP – MDPE PIPE (Doc. No.-QAP/IGL/ET2/CP/CP18502)	IGL/ET2/CP/CP18502
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		INSPECTION TEST PLAN/QUALITY ASSURANCE PLAN MEDIUM DENSITY POLYETHYLENE (MDPE) PIPES					QAP NO : QAP/IGL/ET2/CP/CP18502 Rv 0	
							Date:	
SL.NO	ACTIVITY DESCRIPTION	QUANTUM OF CHECK	ACCEPTANCE CRITERIA / NORMS (PTS for Raw Material and IS 14885: 2022 for MDPE Pipe)	FORMAT OF RECORD	CONTROL POINT			REMARK
					VENDOR	TPIA	CA	
1	RAW MATERIAL INSPECTION - Test Result of PE Compound							
1.1	Test result of PE compound	Per Lot of Batch of Compound	PE 80, ISO 1183:1987 & And As per clause 4.2 Table-1 of IS:14885:2022 & PTS	MTC of Manufacturer	R	R	W/R	Witness may be done by CA to ensure use of compound material
1.2	Density	For each lot/Batch of Raw material used	≥ 930 kg/m3 At 23 ° C	RMTC	P	W	W/R	
1.3	Melt flow rate (MFR)		20% +/- of values nominated by compound producer (at 190°C & 5Kg load)	RMTC	P	W	W/R	
1.4	Thermal stability (OIT)		≥ 20 min. @200° C	RMTC	P	W	W/R	
1.5	Volatile content		≤350 mg/kg	RMTC	P	W	W/R	
1.6	Pigment dispersion		≤ 3 Grade	RMTC	P	W	W/R	
1.7	Resistance to gas condensate		≥20 hour @80° C	RMTC	R	R	R	
1.8	Anti-oxidant		Shall not be more than 0.3 percent	RMTC	R	R	R	
1.9	UV Stabilizer		Shall not be more than 0.5 percent	RMTC	R	R	R	
1.10	Classification of PE compound		As per clause 4.2 Table-1 of IS:14885:2022	RMTC	R	R	R	
1.11	Calibration of instruments		Certificates	—	R	R	R	
2	APPROVAL OF TYPE TEST FOR LONG TERM HYDROSTATIC STRENGTH & OTHERS	-	At 80° C for 1000 hours at 4.0 MPa Induced Stress, At 20 ° C for more than100 hours at 9.0 MPa Induced Stress, As per Table 9 of IS 14885	TPIA Approved certificate	R	R	R	

INDRAPRASTHA GAS LTD.	QAP – MDPE PIPE (Doc. No.-QAP/IGL/ET2/CP/CP18502)	IGL/ET2/CP/CP18502
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		INSPECTION TEST PLAN/QUALITY ASSURANCE PLAN MEDIUM DENSITY POLYETHYLENE (MDPE) PIPES				QAP NO : QAP/IGL/ET2/CP/CP18502 Rv 0 Date:		
SL.NO	ACTIVITY DESCRIPTION	QUANTUM OF CHECK	ACCEPTANCE CRITERIA / NORMS (PTS for Raw Material and IS 14885: 2022 for MDPE Pipe)	FORMAT OF RECORD	CONTROL POINT			REMARK
					VENDOR	TPIA	CA	
3	IN-PROCESS INSPECTION							
3.1	Raw Material Identification at the time of pouring the bags in Hopper.	Each Bag	PE80 Cl. No. 5 of IS & PTS	Consumption Report and MTC	P	W	R/W	In each shift, TPI to record consumption of raw bags vs. procured raw material (from raw material invoice)
3.2	Dimension	One out of 10 Pipes						
	a) Outside diameter		Cl no. 6.1 /Table 4 of IS 14885	Inspection Report	P	W	R/W	
	b) Wall Thickness		Cl no. 6.2 /Table 6 of IS 14885	Inspection Report	P	W	R/W	
	c) Ovality		Cl no. 6.1 /Table 5 of IS 14885	Inspection Report	P	W	R/W	
	d) Length		Cl. No. 7.2 & 8 of PTS	Inspection Report	P	W	R/W	
3.3	Visual Appearance							
	a) Smoothness & Cleanliness	One out of 10 Pipes	Smooth & clean or as specified in CL no. 7 of IS 14885	Inspection Report	P	W	R/W	
	b) Surface Defects		Free from grooves, scoring etc. or as specified in CL no. 7 of IS 14885	Inspection Report	P	W	R/W	
	c) Cuttings		Cleanly cut ends & square to axis or as specified in CL no. 7 of IS 14885	Inspection Report	P	W	R/W	
	d) Colour of Pipe		As per clause 4.4 of IS:14885- Yellow	Inspection Report	P	W	R/W	
4	FINAL INSPECTION							
4.1	Hydraulic Characteristics							
	a) Hydraulic pressure resistance 80°C for 165 hrs (plain pipe)	Table 9	Cl 8.1 & Table 9 of IS 14885 (No failure or leakage for 165 hrs. at 4.5mpa induced stress)	Hydro test Report	P	W	R/W	
	b) Hydraulic pressure resistance 80°C for 165 hrs (notched pipe, for dia. 125mm and 180 mm)		Cl 8.10, of IS 14885 (No sign of localized swelling, leakage or weeping and shall not burst during the prescribed test duration of 165hrs. At 80°C with induced stress of 4.0 Mpa)	Hydro test Report	P	W	R/W	

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 INDRAPRASTHA GAS		INSPECTION TEST PLAN/QUALITY ASSURANCE PLAN MEDIUM DENSITY POLYETHYLENE (MDPE) PIPES				QAP NO : QAP/IGL/ET2/CP/CP18502 Rv 0 Date:		
SL.NO	ACTIVITY DESCRIPTION	QUANTUM OF CHECK	ACCEPTANCE CRITERIA / NORMS (PTS for Raw Material and IS 14885: 2022 for MDPE Pipe)	FORMAT OF RECORD	CONTROL POINT			REMARK
					VENDOR	TPIA	CA	
4.2	Longitudinal Reversion Test	-	CL 8.2.1, of IS 14885 / shall not be greater than 3%	Inspection Report	P	W	R/W	
4.2	Circumferential reversion of pipes dn ≥ 250 mm		CL 8.2.2, of IS 14885	Inspection Report	P	W	R/W	
4.3	Density (matl. from pipe)		≥ 930 kg/m3 At 23 ° C	Inspection Report	P	W	R/W	
4.4	Melt Flow Rate - Pipe		CL 8.4 of IS 14885	Inspection Report	P	W	R/W	
4.5	Thermal Stability to Oxidation		Cl 8.6, of IS 14885 / OIT ≥ 20 minutes	Inspection Report	P	W	R/W	
4.6	Volatile Matter Content Test		Cl 8.7, of IS 14885 / ≤ 350 mg/kg	Inspection Report	P	W	R/W	
4.7	Tensile Test & Elongation at break	-	Cl. 8.8 of IS 14885 / Tensile Yield Strength = 15 Mpa (min.) Elongation = 350% (min)	Inspection Report	P	W	R/W*	* Witness shall be done in case valid Type Test Report is not available
4.8	Resistance to weathering	-	Cl 8.9 & Annexure B of IS 14885	Type Test Report	P	R/W*	R/W*	
4.9	Squeeze Off Test	-	Cl 8.11 & Annexure C of IS 14885	Type Test Report	P	W	R/W	
5	MARKING INFORMATION							
5.1	Legibility	Continuously during manufacturing	Visual / Should be legible	Inspection Report	P	W	R	
5.2	Depth		As per Cl 8 of PTS, Depth < 0.15 mm	Inspection Report	P	RW	R/W	
5.3	Marking Strip		Cl 10.3 of IS 14885, Single Strip for Pipes with Nominal Size ≤32mm & two strips on opposite side of pipe for other pipes. & as per PTS	Inspection Report	P	RW	R/W	
5.4	Colour or Marking		As per Cl 8 of PTS/ As per Cl 10 IS 14885	Inspection Report	P	RW	R/W	
5.5	Height of Character		As per Cl 10.4 of IS 14885, Min 3mm for pipes of dia upto 90 mm and min 5mm for pipes of dia more than 90 mm	Inspection Report	P	RW	R/W	

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		INSPECTION TEST PLAN/QUALITY ASSURANCE PLAN MEDIUM DENSITY POLYETHYLENE (MDPE) PIPES				QAP NO : QAP/IGL/ET2/CP/CP18502 Rv 0		
						Date:		
SL.NO	ACTIVITY DESCRIPTION	QUANTUM OF CHECK	ACCEPTANCE CRITERIA / NORMS (PTS for Raw Material and IS 14885: 2022 for MDPE Pipe)	FORMAT OF RECORD	CONTROL POINT			REMARK
					VENDOR	TPIA	CA	
6	FINAL DOCUMENTATION	-	P.O. / PTS	Compliance Certificate	P	H	H	
LEGENDS: R - Review, W - Witness, A - Approval, RW - Random Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency , CA - Control Authority (Owner / owner's representative), P.O. - Purchase order								
Notes:-								
The Above Testing and acceptance criteria are minimum requirements. However, manufacturer shall ensure that the product shall also comply to the additional requirements as per Particular								
1 Technical specifications(PTS)								
2 The supplier shall submit their own detailed ITP prepared on the basis of above / Technical specification for approval of Owner.								
3 Owner shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.								
4 Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between specifications, more stringent condition shall be applicable.								
5 Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.								
6 All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA/OWNER at the time of Inspection.								
7 At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.								