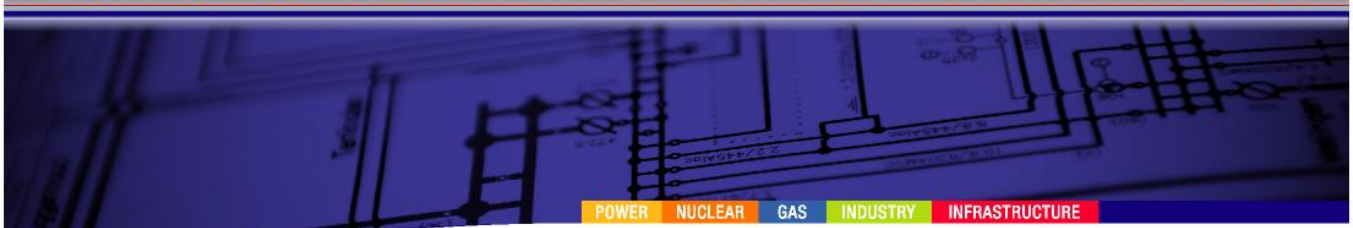
TRACTEBEL Engineering
GDF SUEZ

CNG & CITY GAS DISTRIBUTION PROJECT IN VIJAYAWADA PHASE 1B

Project No.: P.001385
Document No.: P.001385 G09 0012



Vijayawada – INDIA
BHAGYANAGAR GAS LIMITED (BGL)

26 December 2011
SUPPLY OF MDPE PIPES
Vol.II of II - Technical
Rev.2

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BHAGYANAGAR GAS LTD.

CNG & CGD PROJECT IN VIJAYAWADA PHASE – 1B

INTRODUCTION

Rev.	Date	Subject of revision	Author	Checked	Approved
2	26.12.11	Issued for Procurement	MS	DNS	NC
1	19.11.10	Client Comment Incorporated	MS	DNS	NC
0	18.01.11	First Issue	PKN	DNS	NC

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1.0 INTRODUCTION

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

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

TRACTEBEL ENGINEERING pvt ltd is now inviting tenders on Competitive Bidding basis for procurement of MDPE pipes for this project.

The present document covers the technical specifications for the enquiry.

2.0 TECHNICAL SPECIFICATIONS

The technical specifications for this present tender enquiry are as listed in Material Requisition (No. P.001385/L/91/0344).

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BHAGYANAGAR GAS LTD.

CNG & CGD PROJECTS IN VIJAYAWADA PHASE-1B

MATERIAL REQUISITION - MDPE PIPES

2	26.12.11	Issued for Procurement	MS	DNS	NC
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0	18.01.11	First Issue	PKN	DNS	NC
Rev.	Date	Subject of revision	Author	Checked	Approved

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Project : CNG & City Gas Distribution Project in Vijayawada Phase-1B

Subject : **MDPE PIPES**

A. DESCRIPTION OF GOODS AND/OR SERVICES

Item No.	Description	Quantity / unit (m)	End Connection	BGL's Item code
VIJAYAWADA				
1	32 MM PE 100 SDR 11 MDPE PIPE	25,000	Electro-Fusion Weld	
2	63 MM PE 100 SDR 11 MDPE PIPE	20,000	Electro-Fusion Weld	
3	90 MM PE 100 SDR 17.6 MDPE PIPE	10,000	Electro-Fusion Weld	
4	125 MM PE 100 SDR 17.6 MDPE PIPE	10,000	Electro-Fusion Weld	
5	180 MM PE 100 SDR 17.6 MDPE PIPE	500	Electro-Fusion Weld	
HYDERABAD				
6	63 mm PE 100 SDR 11x MDPE PIPE	20,000	Electro- Fusion Weld	
7	90 mm PE 100 SDR 17.6x MDPE PIPE	15,000	Electro- Fusion Weld	
8	125 mm PE 100 SDR 17.6 MDPE PIPE	10,000	Electro- Fusion Weld	

Notes:

1 Tolerances on total length shall be as per PTS - P.001385/L/21/0342

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B. REMARKS / COMMENTS

1. GENERAL NOTES

VENDOR's compliance

Vendor must include the following statement in his bid:

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

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

2. COMPLIANCE WITH SPECIFICATION

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

Any exception must be highlighted by the vendor at bidding stage and will be considered accepted only after written approval from BGL / TEPL.

3. VENDOR'S SCOPE

Vendor's scope of work includes the design, materials, manufacture, supply, testing, inspection, loading / unloading according to present specification and applicable codes and standards and all other works necessary for completion of works.

4. INSPECTION

Inspection shall be performed by PNGRB approved Third party Inspection Agency as given below, who is to be nominated by the supplier. Cost of this appointed TPIA is to be borne by the supplier. Vendor to comply with all the related inspection documents.

Vendor has to propose minimum 4 nos. of below listed agencies to be approved by Bhagayanagar Gas Ltd. (BGL) / Tractebel Engineering pvt. ltd.

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

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

5. APPLICABLE DOCUMENTS

General prescriptions, requirements and information are listed in annexure C of this Material requisition.

6. VENDOR'S DOCUMENTS

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

All documents shall be supplied in English language.

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

Document numbering shall consist of Maximum 20 Characters.

Document No. :

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

Where,

Project No. is P.001385;

Item is MDPE PIPES;

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

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

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

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

P.001385	MDPE PIPES	QAP	0001	R0

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C. LIST OF ATTACHMENTS

The table herebelow lists the documents which are integral part of this Material Requisition. The applicable revision index of each document is mentioned in the column below the current Material Requisition revision index. When the Material Requisition revision index is "A" or "1", all listed documents are attached. For other Material Requisition revision index, only modified or new documents are attached.	**Material Requisition revision**							
	0	1	2					
Documents	**Revision of documents**							
Particular Technical Specification for MDPE Pipes P.001385/L/21/0342	0	1	2					
QAP for MDPE Pipes P.001385/Q/93/0343	0	1						

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D. DOCUMENTS & DATA REQUIREMENTS

The table hereunder specifies the quantities and the nature of the documents to be submitted by the CONTRACTOR to the ENGINEER.
The documents required at the inquiry stage and to be included in the bid are listed under column A.
The documents required after award of the AGREEMENT and subject to the written approval of the ENGINEER are listed under column B.
The final and certified documents are listed under column C.
Any document, even when preliminary, shall be binding and therefore duly identified and signed by the CONTRACTOR.
It shall bear the ENGINEER's Project reference, the Material Requisition number and the identification number.
THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTS COMPLYING FULLY WITH THE MATERIAL REQUISITION REQUIREMENTS ARE RECEIVED BY THE ENGINEER.

Item	Documents and Data	A	B		C	
		Number of copies	Number of copies	Required date	Number of copies	Required date
1	List of Raw Material Manufacturer	3	3	2 weeks	3	Along with despatch/Shipment
2	Valid BIS Certificate	3	-	-	-	-
3	List of current orders in hand for similar items with full details such as specification, name of purchaser etc.	3	-	-	-	-
4	Details of the largest supply executed	3	-	-	-	-
5	Name and address of proposed test laboratories along with their credentials/past records for carrying out all required tests	3	-	-	-	-
6	Catalogue	3	-	-	-	-
7	QA/QC program	-	3	2 weeks	3	Along with despatch/Shipment
8	Manufacturer's Test certificates	-	-	-	3	Along with despatch/Shipment
9	Material certificate EN 10204 Cert. 3.2	-	-	-	3	Along with despatch/Shipment
10	Final technical file	-	-	-	3	Before Claim of final payment

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NOTES

1) Documents listed in column A is required to be submitted during bid time (1 original+ 3 copies). Durations in column B (Required date) are weeks after LOA date or as indicated in Table. Durations in column C (Required date) are weeks after document approval or as indicated in Table. Due date of each document may be proposed.

2) Latest submittal time for:

- Test procedure : 2 weeks before test
- Test report : 2 weeks after test

3) Final technical file shall be supplied in hard copy as indicated, and in electronic format (.pdf Acrobat files) on Six (6) CD-ROMs.

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BHAGYANAGAR GAS LTD.

CNG & CGD PROJECT IN VIJAYAWADA PHASE–1B

PTS - MEDIUM DENSITY POLYETHYLENE PIPES (MDPE)

2	26.12.11	Issued for Procurement	MS	DNS	NC
1	19.11.11	Client's Comment Incorporated	MS	DNS	NC
0	18.01.11	First issue	PKN	DNS	NC
Rev.	Date	Subject of revision	Author	Checked	Approved

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TABLE OF CONTENTS

ΣΣΣ

1.0 INTRODUCTION & SCOPE

BHAGYANAGAR GAS LTD. (BGL) plans to augment the PE Network. It supplies natural gas to domestic & commercial consumers in the city of Vijayawada. The present document covers the technical specifications for the procurement of medium density "Polyethylene Pipes" The Polyethylene Pipes shall be manufactured, supplied in accordance with PrEN: 1555-1 Plastic Piping System for the Supply of Gaseous Fuels. IS 14885:2001 Polyethylene Pipes for Supply of Gaseous Fuels and ISO-4437 Buried Polyethylene (PE) for the supply of gaseous fuels metric series specifications.

2.0 DEFINITIONS

Owner	Means Bhagyanagar Gas Ltd., BGL
Manufacturer	Means the Manufacturer of the PE pipe.
PTS	Means the present <<Particular Technical Specification>>and all its appendix, if any.
TPIA	Means Third Party Inspection Agency to be appointed by BGL.

3.0 TERMINOLOGY

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

  The equation for MAOP = 20 x MRS/C X (S D R- 1)

- Minimum Required Strength (MRS): The value of lower confidence limit rounded down to next value as defined in ISO 3:1973 MRS is expressed as a hoop stress in megapascals.

- Nominal Outside Diameter(dn): A convenient round number(in millimetres) for reference purposes which is common to all components in all thermoplastic systems ,except for flanges and components which are designated by thread size.

- Out of roundness (Ovality): The absolute out of roundness is the difference between the measured maximum outside diameter and the measured minimum outside diameter in the cross – section of pipe.

- Nominal Wall Thickness (en): The wall thickness in millimetres corresponding to minimum wall thickness at any point around circumference of the pipe.

- Resin: A material (solid or semi-solid) which has a high molecular weight and is a product of polymerization.

- Metal Flow Rate (MFR): is a value relating to the viscosity of the molten 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= dn/en

For any other terminology, IS-14885-2001 (latest) and / or other applicable National & International codes / Standards can be referred.

4.0 DESIGN CODES/ STANDARDS/REFERENCES

The following National & International codes / standards / references (Latest edition) shall be applicable for PE-100 material as well as Polyethylene pipe.

prEN 1555 -1	Plastic Piping System for the Supply of Gaseous Fuels.
prEN 1555-2	Standard PE Pipes and Fitting, Suitable for Gas Transportation System Solutions
IS-14885	Polyethylene pipes for supply of Gaseous Fuels.
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 – Determication of moisture content in thermoplastic by coulometry
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)

5.0 RAW MATERIAL GRADE AND PROPERTIES

5.1. Raw material grade / classification shall conform to Cl.4.2.1 of PrEN 1555-1.

5.2. The raw material of polyethylene pipes shall be PE 100. The properties of PE-100 compound shall conform to the table 1 of PrEN 1555-1 and shall be Virgin.

Other materials / additives such as anti oxidant, UV stabilizer, pigment dispersion etc. shall conform to IS-14885: 2001.

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

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

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

5.3. Properties of PE-100

Table – 1

Property	Unit	Parameter	Value	Test Method	Requirement
Conventional Density	Kg/m^3	Test Temperature No. of test pieces[2]	23 Degree C As Specified in ISO 1183:1997	ISO 1183:1987	>= 930.0 at 23°C
Stress at Yield Point	MPa			IS-14885 : 2001	15 MPa
Elongation at break	%			IS-14885 : 2001	350
Melt-mass Flow Rate	g/10 min.[4]	Loading mass Test temperature Time No. of test pieces[2]	5 Kg 190 DegC 10 Min As specified in EN ISO 1133:1999	EN ISO 1133:1999	± 20% of value nominated by compound producer @ 190°C / 5.0 kg. (load)
Oxidation Induction time (Thermal stability)	Minute	Test Temperature No. of test pieces[2]	200 DegC[3] 3	EN 728	>20
Volatile Matter Content	(mg/kg)	No. of test pieces[2]		EN 12099	≤350
Water Content	Mg/kg	No. of test pieces[2]		EN 12118	≤300
Pigment Dispersion[8]		Preparation of Test pieces NO. of test pieces[2]	Free[7] As specified in ISO 13949 :1997	ISO 13949:1997	≤3
Resistance to gas constituents,	h			IS-14885 : 2001	≥20 @ 100°C

1) Conformity to these requirements shall be proved by the compound producer
2) The no. of test pieces given indicate the no. required to establish a value for the characteristic describe in the table.
   The no. of test pieces required for factory production control and process control should be listed in the manufacturer's quality plan for guidance see prENV 1555-7 :1999
   Test may be carried out at 210 DegC providing that there is a clear correlation with the results at 200 DegC. In case of dispute, the reference temperature shall be 200 DegC
3) MFR is the nominated value given by the compound manufacturer
4) Only applicable, if the measured volatile content is not inconformity to its specified requirement.
5) In case of dispute, the requirement for water content shall apply. As an alternative method, ISO 760:1978 may apply.
6) Not Applicable
7) In case of dispute, the compression method for the preparation of test piece shall apply
8) Only for yellow compound

The above requirements are also same for the final product.

5.4. **PE compound quality evaluation**

PE compound quality evaluation shall be as per prEN 1555-1.

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5.5 **Characteristic of PE compound in the form of Pipe shall be as per "Table-2**

Unless otherwise specified by the applicable test method, the test piece shall be conditioned at 23 °C ± 2 °C before testing in accordance with Table-2

The compound in the form of pipe used for the manufacture of pipes, fittings and valves, shall have characteristics confirming to the requirement given in table-2

Table -2

Characteristics	Requirement [1]	Test Parameter		Test Method
		Parameter	Value	
Resistance to Gas Condensate	No failure during the test period of all test pieces	End Caps Test Temperature Orientation No. of test pieces[2] Hop Stress Pipe Dimension Dn, en Type of test Test Period Conditioning period	Type a 80desgree C Free 3 2.0 Mpa 32mm 3mm Synthetic Condensate[3] in water ≥20 hrs 1500 hrs in air at 23 degree C	EN 921:1994
Resistance to weathering [4]	The weather test piece shall fulfill the requirement of the following characteristics	Pre-conditioning (weathering): cumulative solar radiation No. of test pieces[2]	≥3.5 GJ/sq.m See below	EN 1056
a) Oxidation induction time[5] b) Hydrostatic strength (165 hrs at 80 degree C) c) Elongation at break	a) shall confirm to table 1 b) shall confirm to table-4 of prEN 1555-Part2:2001 c) shall confirm to table-4 of prEN 1555-Part2:2001			a) EN 728 b) EN 921:1994 c) ISO 6259-1:1997 and ISO 6259-3 :1997
Rapid to rapid crack propagation(critical pressurePc) (e ≥ 15mm)	Pc >1.5 MOP with Pc = $(3.6\ P_{c,\ s4} + 2.6)$[6]	Test temperature No. of test pieces[2]	0 degree C as specified in ISO 13477 :1997	ISO 13477 :1997

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Resistance to slow crack growth (d_n : 110mm or 125mm – SDR 11)	No failure during the test period	Test temperature Internal Test pressurefor PE 80 PE 100 Test Period Type of Test No. of test pieces[2]	80 degree C 8 Bar 9.2 Bar 165 Hrs Water-in – water As specified in ISO 13479 :1997	EN ISO 13479: 1997

1. Conformity to these requirements shall be proved by the compound producer
2. The no. of test pieces given indicate the no. required to establish a value for the characteristic describe in the table
   The no. of test pieces required for factory production control and process control should be listed in the manufacturer's quality plan for guidance see prENV 1555-7 :1999
3. 50 %(by mass) n-decane and 50% (by mass) 1-3-5 trimethylnenzene
4. Only for yellow compound
5. 0.2 mm from the surface should be taken off before sampling for oxidation-reduction time test
6. Full scale/S4 correlation factor is equal to 3.6 and is defined as the full scale /S4 critical absolute pressure ratio
   $(P_{c,\ full\ scale} + 1) = 3.6\ (P_{c,\ s4} + 1)$
   Note : Attention is drawn to the fact that the correlation factor may be modified when revising this standard, according to the result of work of ISO/TC 138/SC4 " Plastic pipe, fittings and valves for supply of gaseous fuels"
   If the requirement is not met or S4 test equipment not available then (re)testing by using the full scale test shall be perform in accordance with EN ISO 13478:1997. In this case $P_c = P_{c,\ full}$ scale

6.0 INSPECTION AND TESTS ON FININSHED PRODUCT

Following inspection and tests to be carried out for finished product at factory with 'quantum of check' and 'acceptance criteria' as per given below in table-3

Table -3

Sr. No.	Tests	Quantum of Check	Acceptance Criteria
1	Final Inspection		
1.1	Visual Appearance		
	a) Smoothness & Cleanliness	One out of 10 Pipes	Smooth & clean or as specified in CL no. 7 of IS 14885
	b) Surface Defects		Free from grooves, scoring etc. or as specified in CL no. 7 of IS 14885
	c) Cuttings		Cleanly cut ends & square to axis or as specified in CL no. 7 of IS 14885
1.2	Dimension		
	a) Outside diameter	One out of 10 Pipes	Cl no. 6 /Table 4 of IS 14885
	b) Wall Thickness		Cl no. 6 /Table 4 of IS 14885
	c) Ovality		Cl no. 6 /Table 3 of IS 14885
	d) Length		Cl. No. 7.2 & 8 of PTS

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1.3	Hydraulic Characteristics		
	80°C for 165 hrs	Table 9 of IS 14885	Cl 8.1, Annexure A & B & Table 7 of IS 14885
1.4	Heat reversion test	Table 9 &10 IS 14885 -	CL 8.2, Annexure C of IS 14885 / Not more than 3%
1.5	Density (matl. from pipe)		@ 23 ° C ≥ 928.4 kg/m3 & '@ 27 ° C ≥ 930 kg/m3
1.6	Melt Flow Rate - Pipe		Cl 5.3 of PTS
1.7	Thermal Stability to Oxidation		Cl 8.5, Annexure D of IS 14885 / OIT ≥ 20 minutes
1.8	Volatile Matter Content Test		Cl 8.6, Annexure H of IS 14885 / ≤ 350 mg/kg
1.9	Tensile Test & Elongation at break	Table 11 IS 14885	Cl 8.7& Annexure J of IS 14885 / Tensile Yield Strength = 15 Mpa (min.), Elongation = 350% (Min.)
1.10	Resistance to weathering	-	Cl 8.8 & Annexure F of IS 14885
1.11	Squeeze-off Test	-	Cl 8.9 & Annexure G of IS 14885
2	**Marking Information**		
2.1	Legibility	Table 10 IS 14885	Visual / Should be legible
2.2	Depth	Table 10 IS 14885	As per Cl 10.1 of PTS, Depth ≤ 0.15 mm
2.3	Marking Strip	Table 10 IS 14885	Cl 10.3 of IS 14885, Single Strip for Pipes with Nominal Size <=32mm & two strips on opposite side of pipe for other pipes.
2.4	Colour or Marking	Table 10 IS 14885	As per Cl 10.2 of PTS, Black colour
2.5	Height of Character	Table 10 IS 14885	As per Cl 10.2 of PTS, Min.3 mm for ≤ 90mm pipe sizes & Min. 5 mm for > 90mm pipe sizes.
3	**Legends**	Table 10 IS 14885	As per Cl 10.3 of PTS, At interval of 1 mtr. And should contain information as specified in PTS

7.0 APPROVED MANUFACTURER FOR RAW MATERIAL (PE-100)

1. SOLVAY
2. BOREALIS
3. FINA
4. DOW
5. ELENAC

8.0 PIPE SIZE/ DIMENSION

8.1. Wall Thickness

Sl.no.	Nominal diameter (mm)	Minimum wall thickness (e) , mm	SDR	OVALITY as per
1	20	3.0	11	IS-14885 : 2001
2	32	3.0	11	IS-14885 : 2001

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3	63	5.8	11	IS-14885 : 2001
4	90	5.2	17.6	IS-14885 : 2001
5	110	6.3	17.6	IS-14885 : 2001
6	125	7.1	17.6	IS-14885 : 2001
7	1100	10.3	17.6	IS-14885 : 2001

8.2. Length of Pipes

The required minimum length of straight pipes and coils / reels shall be as Follows:

Nominal Dia meter	Packing Length (m)	Straight Length (m)
20	200, Roll	-
32	150, Roll	-
63	100, Roll	-
90	75, Roll	-
110	75, Roll	-
125	50, Roll	-
180	-	12

METHOD OF MEASUREMENT

The method of measurement of outside diameter, wall thickness, length, ovality etc. **of pipe** shall conform to IS-14885: 2001 or equivalent code/standards.

9.0 TOLERANCE

9.1. Tolerances for Random Length of Pipes

- Tolerances for each rolled pipes - 0 / +0.5m
- Tolerances for each straight pipes - 0 / +0.05m

9.2. Tolerances on Nominal wall thickness at any points of pipe shall be in accordance with IS-14885 2001 or equivalent codes / standards.

10.0 COLOUR

The pipe shall be of ORANGE color, when the pipe shall be manufactured from PE-100 grade of raw material.

11.0 MARKING

11.1. Owner's name as BGL to be marked on each pipe.

- 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 in such a way that marking does not initiate cracks or other type of failure and in such away that with normal storage weathering and processing and permissible method of installation use legibility shall be maintained for the pipe.

11.2. The embossing for orange pipe shall have black base. Height of character shall be uniform and at least as given below:

a) 3mm for pipe not greater than 90mm nominal size.

b) 5mm for pipe greater than 90mm nominal size.

11.3. Legend shall be repeated at intervals of 1 m and shall consist of following

Information:

a) Manufacturer's identity name or trade name,

b) Material and designation

c) Batch no. or lot no.

d) Internal fluid

e) SDR

f) Reference of standard

12.0 QUALITY ASSURANCE PLAN (QAP)

Vendor to submit QAP along with offer based on indicative QAP enclosed in this PTS. However, the same QAP shall be submitted for approval to the Owner / Owner's representative.

13.0 TYPE TEST CERTIFICATE

Vendor to submit along with the offer Type Test Certificates as per IS-14885: 2001.

14.0 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 24 months from last date of delivery of pipes at site.

15.0 SUPPLY, PACKAGING, HANDLING TRANSPORTATION AND STORAGE OF PE-100 PIPES

Packaging shall be done in Hessian cloth (Jute) with polyethylene sheet wrapped around the pipe to avoid direct sunlight and facilitate out-door storage.

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.

16.0 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 14885:2001

8. PERFORMANCE REQUIREMENTS

8.5 THERMAL STABILITY TO OXIDATION

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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.

11.0 ANNEXURE K (CLAUSE 11) - SUPPLY, PACKAGING, HANDLING AND TRANSPORTATION OF POLYETHYLENE PIPES FOR GAS TRANSMISSION

K.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 K.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 most are 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 or on reels, the seals may be caps.

All seals are fitted with valve to prevent pressurization or depressurization of the pipes, depending on climatologically temperature cycles. In theory, they are placed on the pipes immediately after completion of the manufacturing tests, but before storage of the pipes. In the event of acceptance, the pipe plugs are removed and replaced by the supplier. The seals cannot be recycled after the pipes have been installed. 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. Coiled pipe should be contained on a dispensing reel. The pipe should be wrapped with non transparent PE films of 100 mm gauge to protect from ultra violet rays.

K.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.

K.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.

K.6 Storage

ADD

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

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TRACTEBEL Engineering GDF SUEZ	QUALITY ASSURANCE PLAN MDPE PIPES	QC Table No. : P.001385/Q/93/0343 Rev 1 Date : 17.10.2011 Prepared : RP Checked : AG Approved : NKN

S.NO.	Activity	Quantum of Check	Acceptance Criteria (PrEN 1555-1:2001 and PTS-P.001385/L/21/0342 for Raw Material and IS 14885:2001 for Pipe)	Format of Record	Vendor	TPIA (Vendor appointed)	CA	Remarks
1	**Raw Material Inspection - Test result of PE compound**							
1.1	Conventional Density	Per Lot of Batch of Compound	ISO 1183:1987 & PTS	MTC of manufacturer	R	R	R	
1.2	Melt Flow Rate		EN ISO 1133:1999 & PTS		R	R	R	
1.3	Thermal Stabilty		EN 728 & PTS		R	R	R	
1.4	Resistence to Gas Constituents		PE - 100 Cl. No. 5 of IS 14885 & PTS		R	R	R	
1.5	Water Content		EN 12118		R	R	R	
1.6	Volatile Content		EN 12099		R	R	R	
2	**Type approval test for long term hydrostatic strength & Others**	-	@ 81 ° C for 1000 hours @ 20 ° C for more than100 hours As per Table 7 of IS 14885	TPIA approved certificate	R	R /W	A	
3	**Final Inspection**							
3.1	Visual Appearance							
	a) Smoothness & Cleanliness	One out of 10 Pipes	Smooth & clean or as specified in CL no. 7 of IS 14885	--	P	W	RW	
	b) Surface Defects		Free from grooves, scoring etc. or as specified in CL no. 7 of IS 14885	--	P	W	RW	
	c) Cuttings		Cleanly cut ends & square to axis or as specified in CL no. 7 of IS 14885	--	P	W	RW	
3.2	Dimension							
	a) Outside diameter	One out of 10 Pipes	Cl no. 6 /Table 4 of IS 14885	Inspection Report	P	W	RW	
	b) Wall Thickness		Cl no. 6 /Table 4 of IS 14885	Inspection Report	P	W	RW	
	c) Ovality		Cl no. 6 /Table 3 of IS 14885	Inspection Report	P	W	RW	
	d) Length		Cl. No. 7.2 & 8 of PTS	Inspection Report	P	W	RW	
3.3	Hydraulic Characteristics							
	80°C for 165 hrs	Table 9	Cl 8.1, Annexure A & B & Table 7 of IS 14885	Hydrotest Report	P	W	RW	
3.4	Heat reversion test	Table 11	CL 8.2, Annexure C of IS 14885 / Not more than 3%	Inspection Report	P	W	RW	
3.5	Density (matl. from pipe)		@ 23 ° C ≥ 928.4 kg/m3 & '@ 27 ° C ≥ 930 kg/m3	Inspection Report	P	W	RW	
3.6	Melt Flow Rate - Pipe		Cl 5.3 of PTS	Inspection Report	P	W	RW	
3.7	Thermal Stability to Oxidation		Cl 8.5, Annexure D of IS 14885 / OIT ≥ 20 minutes	Inspection Report	P	W	RW	

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TRACTEBEL Engineering GDF SUEZ	QUALITY ASSURANCE PLAN MDPE PIPES				QC Table No. : P.001385/Q/93/0343 Rev 1 Date : 17.10.2011 Prepared : RP Checked : AG Approved : NKN			
S.NO.	**Activity**	**Quantum of Check**	**Acceptance Criteria** (PrEN 1555-1:2001 and PTS-P.001385/L/21/0342 for Raw Material and IS 14885:2001 for Pipe)	**Format of Record**	**Vendor**	**TPIA** (Vendor appointed)	**CA**	**Remarks**
3.8	Volatile Matter Content Test	-	Cl 8.6, Annexure H of IS 14885 / ≤ 350 mg/kg	Inspection Report	P	W	RW	
3.9	Tensile Test & Elongation at break	Table 11	Cl 8.7& Annexure J of IS 14885 / Tensile Yield Strength = 15 Mpa (min.), Elongation = 350% (Min.)	Inspection Report	P	W	RW	
3.10	Resistance to weathering	-	Cl 8.8 & Annexure F of IS 14885	Inspection Report	P	W	RW	
3.11	Squeeze Off Test	-	Cl 8.9 & Annexure G of IS 14885	Inspection Report	P	W	RW	
4	**Marking Information**							
4.1	Legibility	Table 10	Visual / Should be legible	Inspection Report	P	R	R	
4.2	Depth	Table 10	As per Cl 10.1 of PTS, Depth ≤ 0.15 mm	Inspection Report	P	RW	R	
4.3	Marking Strip	Table 10	Cl 10.3 of IS 14885, Single Strip for Pipes with Nominal Size <=32mm & two strips on opposite side of pipe for other pipes.	Inspection Report	P	RW	R	
4.4	Colour or Marking	Table 10	As per Cl 10.2 of PTS, Black colour	Inspection Report	P	RW	R	
4.5	Height of Character	Table 10	As per Cl 10.2 of PTS, Min.3 mm for ≤ 90mm pipe sizes & Min. 5 mm for > 90mm pipe sizes.	Inspection Report	P	RW	R	
5	**Legends**	Table 10	As per Cl 10.3 of PTS, At interval of 1 mtr. And should contain information as specified in PTS	Inspection Report	P	RW	R	
6	**Final Documentation**	-	P.O. / PTS	Compliance Certificate	p	H	A	

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: -

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 QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc.submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. 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.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA/BGL at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

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One of Europe's major engineering consultancies, Tractebel Engineering is part of GDF SUEZ, an industrial group with the financial strength to address the challenges of the future. With approximately 3,700 people in 20 countries, we offer life-cycle engineering solutions for power, nuclear, gas, industry and infrastructure clients. Services include a full range of engineering assignments: Architect Engineer, Owner's Engineer and Consulting Engineer. Our customers are private and public companies, as well as national and international institutions.

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