

GUJARAT GAS

TECHNICAL SPECIFICATION FOR WARNING MAT/ TAPE

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1.0 INTRODUCTION AND SCOPE

Gujarat Gas Ltd., is a Group Company of Gujarat State Petroleum Corporation Ltd., (State Government undertaking) is supplying natural gas to automobile, industrial, commercial and domestic consumers including CNG stations in various cities of Gujarat.

The present document covers the technical specifications for the procurement of Warning Mat / Tape. Warning mats/tape shall be laid in the ground above the gas main line.

2.0 DEFINITIONS

OWNER / CLIENT	Gujarat Gas Ltd., (GGL)
PNG	Natural Gas produced from Gas wells, Gas condensate wells or Oil wells and the residue Gas remaining after conditioning being metered, regulated / controlled, odorized & distributed through pipelines for various applications, i.e. for industrial, commercial and domestic.
Manufacturer	Manufacturer of the Warning Mat/tape
Vendor	The person(s), firm, company, organization from whom Client/Contractor procures materials.
TPIA	Third Party Inspection Agency
EIC	Engineer In Charge
PNGRB	Petroleum and Natural Gas Regulatory Board
T4S	Technical Standard and Specification including Safety Standards
LDPE	Low density Polyethylene
HDPE	High Density Polyethylene

3.0 REFERENCE CODE

IS 2508	Specification for Low Density Polyethylene Films
ASTM D-638	Standard test method for Tensile Properties of plastics.
ASTM D-882	Standard test method for Tensile Properties of thin plastic sheeting
ASTM D-792	Standard test method for Density and Specific gravity of plastics by Displacement
IS 10889	High density Polyethylene films

4.0 MATERIAL

The material grade of Warning Mat shall be Virgin Low density polyethylene (PE) material with warning sticker / stamp. The LDPE material shall be having the density as per IS 2508 and HDPE as per IS 10889.



The tape shall be uniform in colour, texture and finish and shall be free from holes and foreign Materials.

The material and colour, if used, for printing shall have no detrimental effects on the environment.

a) Mechanical properties

Description	Properties of Warning Mat/tape (Thickness- 300 micron)	Properties of Warning Mat/tape (Thickness- 1000 micron)
Minimum Tensile strength at break (Machine direction)	120 Kgf / cm ²	185 Kgf/cm2
Minimum Elongation at break Length wise direction Crosswise	200 % 400 %	200%

5.0 RECOMMENDED MANUFACTURER FOR RAW MATERIAL

1. SOLVAY
2. BOREALIS
3. FINA
4. DOW
5. ELENAC
6. RELIANCE
7. GAIL
8. HALDIA
9. IOCL
10. OPAL

However any other reputed national or international Manufacturer may also be consider for supply of Raw material with approval of Owner / Owner's representative.

6.0 DIMENSION AND WALL THICKNESS

Warning Mat/Tape shall have following dimensions:

Description	For PE-PNG	For steel Laying
Width	200 mm ± 5 mm	300 mm ± 5 mm
Thickness (Minimum)	300Micron	1000 Micron
Length of Roll	250 mtrs.	100 mtrs.

Negative tolerance on thickness is not allowed.



7.0 TESTING

Testing of warning mat /tape shall be performed as below.

a) Colour - Fast test

Test specimen 100 mm to 150 mm wide shall be immersed in a 20% solution of ammonium sulphide at 15 to 20 °C temperature for 15 days. The colour fastness shall be evaluated by comparing the test specimen with a sample specimen. The comparison shall be made by placing the two specimens on a white back ground in day light, but without exposing them directly to sun light. Test shall be accepted satisfactory, if the colour of the strip remains intact.

b) Other tests shall be carried out as per relevant national / international standard enclosed in QAP.

8.0 COLOUR

The Mat /Tape shall be of bright golden yellow colour. This colour must not take any appreciable alteration in the course of time.

9.0 WARNING MAT/TAPE VIRGINITY TEST

Differential Scanning Calorimeter (DSC) Scan test along with the temperature of melting (T_m) shall be performed for the Warning Mat/ Tape and its raw polymer i.e. virgin low density polyethylene (LDPE) or High Density Polyethylene (HDPE).

The Differential Scanning Calorimeter (DSC) Scan curve of the Warning Mat / tape obtained from its DSC Scan test along with its Temperature of Melting (T_m) shall then be compared with the DSC

Scan curve and the Temperature of Melting (T_m) of its raw polymer (i.e. virgin LDPE). To ensure the virginity of the Warning mat / tape , the DSC Scan curve and T_m of the Warning Mat / tape (finished product manufactured from the raw polymer) shall match on overlapping with its corresponding raw polymer's DSC Scan curve and T_m .

10.0 QUALITY ASSURANCE (QA)

The Contractor/Manufacture /Vendor shall submit QAP after getting firm order from Owner for their review and approval. Prior dispatching of materials, vendor shall offer material lot to TPIA/Owner for final acceptance test as per approved QAP at their premise following for review of TPIA / EIC at the time of final inspection at vendor premise prior to dispatch of materials.

11.0 INSPECTION / DOCUMENTS

- i. Inspection shall be carried out as per design codes/standards, OWNER Technical Specification and QAP enclosed in this tender by TPIA / EIC.
- ii. TPIA /EIC may carry out final inspection at contractor store at the time of material acceptance / clearance before installation / work execution at site.
- iii. TPIA / EIC may carry out random inspection during manufacturing/ final inspection.



- iv. Contractor / manufacturer / Supplier / Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per OWNER Technical Specification, at the time of final inspection of each supply lot of material.
- v. Even after inspection, OWNER reserves the right to select a sample of items randomly from each manufacturing batch/ lot and have these independently tested. If the results of these tests fall outside the limits specified in OWNER Technical specification, then OWNER reserves the rights to reject all production supplied from the batch.
- vi. For any control, test or examination required under the supervision of TPIA/EIC against approved QAP, vendor shall intimate through letter/mail To TPIA/EIC one (1) week in advance about inspection date and place along with production schedule Marking

Marking on the Mat/Tape shall be approved by owner. The warning mat must be engraved with "Caution: High pressure gas pipeline below" in both English and Hindi or local language along with Owner's Logo at a frequency of every meter.

Contractor / manufacturer shall submit proposed Artwork to be marked on the Mat for the approval from Owner / Owner's representative.

12.0 PACKING

The warning mat shall be delivered in rolls as mentioned in clause no. 6.0 .

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

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

Contractor / manufacturer / Supplier / Vendor shall submit the packaging details and also complied with at the time of delivery.

13.0 DOCUMENTS OF PRECEDENCE

Where any portion of the GTS is repugnant or variance with any provisions of the GGL Technical Specification, unless a different intention appears, the provision(s) of GGL Technical Specification shall be deemed to govern the provision(s) of GTS of contract. If there is no variance or repugnance between GTS and GGL Technical Specification both clauses shall be applicable.

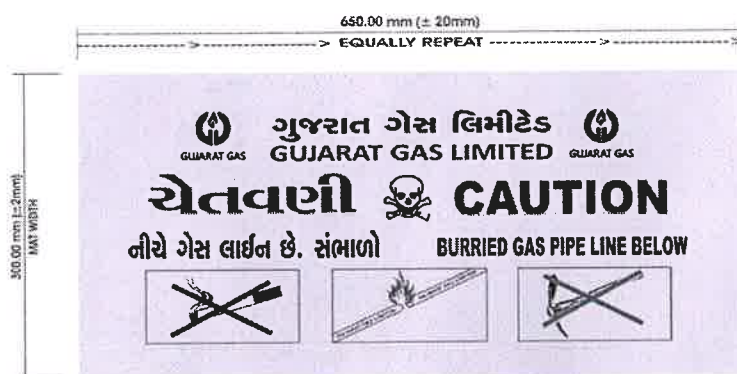
In case of conflict between the requirements of this specification and that of the referred codes, standards and specifications, the requirements of the referred codes, standards and specifications shall govern.

14.0 DRAWING:

Warning Tape for PE-PNG:



Warning Tape for Steel Laying:



15.0

QAP:

Sr. No.	Name of test/Features	Unit	Requirement	Inspection Methodology	Inspection by TPA
1	Material	-	LDPE as per IS 2508 / HDPE as per 10889	Material Test Certificate	Rw
2	Tensile strength at break	kgf/cm ²	For LDPE - 120 (min) FOR HDPE – 185 (Min)		
3	Elongation	%	For LDPE – Length wise direction - 200 Crosswise - 400 FOR HDPE – 200	Material Test Certificate	Rw
4	Virginitiy Test		GGL Tech. Spec. Clause no. 9.0	Test Certificate	Rw
5	Impact Strength Test		LDPE as per IS 2508 / HDPE as per 10889	Test Certificate	Rw
6	Colour	-	Bright Golden Yellow	Visual	Rw
7	Dimensions				
7.1	Width	mm	200 ± 5mm / 300 ± 5 mm	Scale	Rv
7.2	Thickness	micron	LDPE - 300 micron (Min) HDPE – 1000 micron (Min)	Vernier/Micro Meter	Rv
6	Marking	-	*As shown in the drawing	Visual	Rv
7	Colour- Fast test (Type Test)		Temp. 15 to 20°C & Duration 15 days	Material Test Certificate	Rw

Rw- Review of document

V- Verify

Rv – Random Verification