

Recommended technical specification

مشخصات فنی پیشنهادی



شرکت ملی گاز ایران

مدیریت پژوهش و فناوری

امور تدوین استانداردها

# IGS

این مشخصات فنی با توجه به تجربیات عملی و فنی کارشناسان شرکت ملی گاز تهیه گردیده و استفاده از آن به مدت حداقل 2 سال از زمان انتشار الزامی نبوده و صرفاً جهت کاربرد آزمایشی می باشد. از کلیه کاربران محترم این مشخصات درخواست می گردد نظرات اصلاحی خود را جهت بررسی به امور تدوین استانداردها اعلام نمایند. بدیهی است پس از طی دوره مذکور این ضمیمه به استاندارد مشخصات فنی لوله های پلی اتیلن به شماره IGS-M-PL-014-1(3) اضافه خواهد شد

## ضمیمه C

مشخصات فنی لوله های چند لایه حاوی مواد دور کننده جوندگان

## Annex C

**Pipes with co-extruded layers exclusively use for Anti-rodent pipes**

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## 14. Annex C

### 14.1. Normative

#### Pipes with co-extruded layers exclusively use for Anti-rodent pipes

##### 14.1.1 General

This annex specifies the additional geometrical, mechanical and physical properties of polyethylene (PE) pipes (PE100&SDR11) with co-extruded layer(s) exclusively use for Anti-rodent pipes, intended to be used for the supply of gaseous fuels. Additional marking requirements are given. The outside diameter,  $d_e$ , is defined as the total outside diameter, including the coextruded black layer(s) at the outside of the pipe, and the wall thickness ( $e_n$ ) is defined as the total wall thickness including all layers, on either or both the outside and/or inside of the pipe.

The PE compounds used for the layer(s) of the pipe shall be in accordance with Clause 4 and of the same MRS rating.

##### 14.1.2 Characteristics

###### 14.1.2.1 Geometrical characteristics

The geometrical characteristics of the pipe, inclusive of the Anti-rodent co-extruded layer(s), shall conform to table C.1. The manufacturer shall declare the thickness of each layer and tolerance in the technical file.

**Table C.1 - Dimension**

Nominal Size DN/OD (mm)	Minimum Mean Outside Diameter (mm) <sup>a</sup>	Maximum Mean Outside Diameter (mm) <sup>a</sup>	Maximum Out-of-roundness (mm) <sup>ab</sup> (straight pipe)	Wall thickness tolerances(PE 100)				Pipe Length (m)	Dimension of Strips	
				SDR11		PLUS Tolerance			Coil <sup>d</sup> / Straight <sup>e</sup>	Width (mm)
				Inner layer	Outer layer <sup>c</sup>	Inner layer	Outer layer <sup>c</sup>			
25	25.0	25.3	1.2	2.4	0.6	0.36	0.04	100 (coil)	3-5	MAX 10% OF W.T
32	32.0	32.3	1.3	2.4	0.6	0.36	0.04	100 (coil)	3-5	
63	63.0	63.4	1.5	5.2	0.6	0.63	0.07	100 (coil)	3-5	
90	90.0	90.6	1.8	7.4	0.8	0.9	0.10	50 (coil)	5-10	
110	110.0	110.7	2.2	9.0	1.0	1.08	0.12	50 (coil) or 12(straight)	5-10	
125	125.0	125.8	2.5	10.3	1.1	1.17	0.13	12 (straight)	5-10	
160	160.0	161.0	3.2	13.1	1.5	0.36	0.16	12 (straight)	5-10	
200	200.0	201.2	4.0	16.4	1.8	0.36	0.20	12 (straight)	5-10	
225	225.0	226.4	4.5	18.4	2.1	0.63	0.20	12 (straight)	5-10	

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a- Measurement of out of roundness and other dimensions shall be measured at the stage of manufacturing after being conditioned for at least 4 hour. The measurement shall not be made less than 24 hour after manufacture.

b- The maximum ovality (out of roundness) for coiled / drum pipes shall not exceed the value of 6% of OD. Nevertheless during the welding process, the maximum ovality in fusion zone shall not exceeds the value of 1.5% of OD

c- Outer layer include of Anti-rodent Material.

d- Coiled pipe length tolerance  $\pm 3\%$

Otherwise, shall be agreed by purchaser and manufacturer and not more than 10 percent of total number of coil which is related to purchase order

e- Straight pipe length tolerance  $\pm 1\%$

#### 14.1.2.2 Mechanical characteristics

The mechanical characteristics of the pipe, inclusive of the Anti-rodent co-extruded layer(s), shall be in accordance with Clause 8.

#### 14.1.2.3 Physical characteristics

The physical characteristics shall be in accordance with Clause 8. The requirements for thermal stability and for melt flow rate shall apply to the individual layers respectively. Heat reversion shall be applicable to the pipe, inclusive of the Anti-rodent co-extruded layer(s).

#### 14.2. Marking

The marking of pipes with Anti-rodent co-extruded layer(s) shall be in accordance with Clause 10.

#### 14.3. Delamination

No delamination shall occur during all tests of the co-extruded pipe.

#### 14.4. Integrity of the structure

When tested in accordance with the test methods as specified in Table C.2, using the indicated parameters, the pipe shall have the structural performance conforming to the requirements given in Table C.2.

**Table C.2 - Integrity of the structure**

Characteristic	Requirement	Test parameters		Test method
Integrity of the structure after deflection	> 80% of the initial stiffness value	Deflection Position of test piece	30% of <i>dem</i> When applicable, at 0, 45 and 90 from the upper plate	EN ISO 13968

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For the determination of the integrity of the structure after deflection of coextruded pipes, the following procedure shall be applied:

- a) Determine the initial ring stiffness of the pipe according to EN ISO 9969;
- b) Carry out the ring flexibility test according to EN ISO 13968;
- c) After a 1 h period for recovery, determine again the ring stiffness according to EN ISO 9969. The ring stiffness of the coextruded pipe shall be at least 80% of the initial ring stiffness.

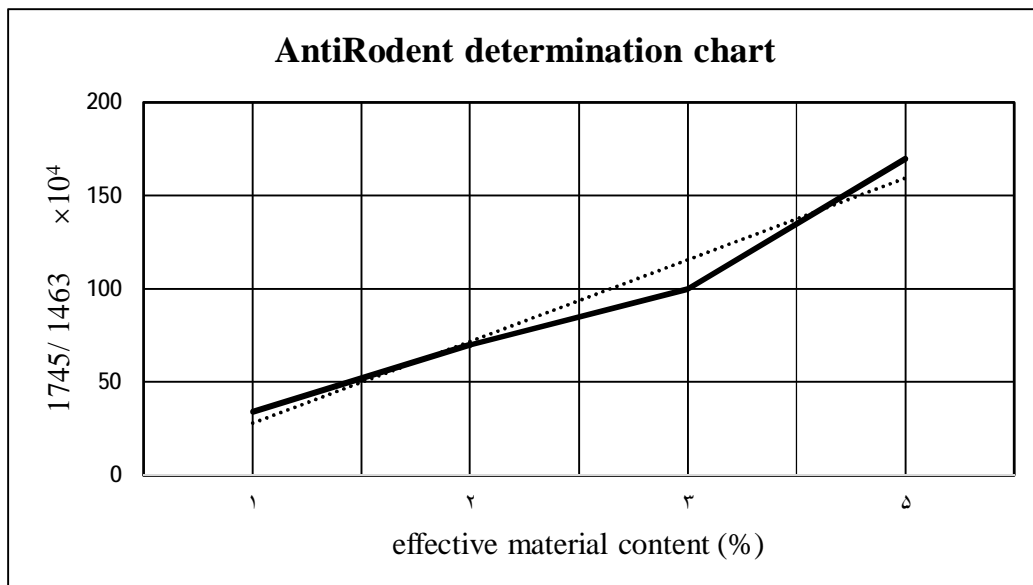
**14.5. Determination of Anti rodent**

For determining the Anti-Rodent content FTIR test shall be performed according to ASTM 3677 Calculate the 1745 and 1463 peak height ratio and based on determine the amount of Anti-Rodent material by using figure C.1.

**14.5.1 Dosing the anti rodent material:**

The amount of anti-rodent shall be 3% (by weight) of pe resin of outer layer. Masterbatch shall be uniformly distributed in the base polymere.

**Figure C.1 - Anti-Rodent determination chart**



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**14.5.2 Anti-rodent material:**

Anti-rodent repellent grade shall provide from approved manufacturers.

**14.5.3 Test on anti-rodent base material:**

The following test shall carry on the anti-rodent resin to check compliance with the requirements specified by the manufacturer of anti-rodent resin.

-Density

-MFR

**14.5.4 storage and handling of anti-rodent material:**

The storage and handling of anti-rodent material shall be as per the guidelines recommended by the supplier of anti-rodent material.

**15.5.5 Documentation:**

A copy of certificate to substantiate that the anti-rodent is non-toxic and non-hazardous for human and environment.

A copy of technical data sheet/MSDS