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Ductile iron pipelines — Polyethylene sleeving for site application

Canalisations en fonte ductile — Manche en polyéthylène pour application sur site

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, Subcommittee SC 2, *Cast iron pipes, fittings and their joints*.

This third edition cancels and replaces the second edition (ISO 8180:2006), which has been technically revised. The main changes compared to the previous edition are as follows:

- recommended installation methods have been added;
- the references and presentation have been reviewed and improved.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html

Ductile iron pipelines — Polyethylene sleeving for site application

1 Scope

This document specifies the characteristics of polyethylene film, commonly called polyethylene sleeving, used as additional protection against corrosion for ductile iron pipelines, particularly when laid in aggressive soil conditions.

This film, the efficiency of which has been proved by experience, takes the form of a sheet or tube fitted around the pipes and fittings, on-site, immediately before pipe-laying.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets*

ISO 7765-1, *Plastics film and sheeting — Determination of impact resistance by the free-falling dart method — Part 1: Staircase methods*

ISO 6383-2, *Plastics — Film and sheeting — Determination of tear resistance — Part 2: Elmendorf method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

polyethylene sleeving

sleeving of piping with *polyethylene film* (3.2) in tube or sheet form

3.2

polyethylene film

film extruded from virgin polyethylene raw material

3.3

regenerated product

polyethylene film (3.2) made by using recycled material, which could be mixed by different material, from different sources

4 Raw material

4.1 Characteristics

The material used for making the film shall be polyethylene or a mixture of polyethylene and/or ethylene and olefin copolymers.

When tested in accordance with ISO 1183-1, its density shall be between 910 kg/m³ and 935 kg/m³.

NOTE The raw material used to produce film to this document typically has a volume resistivity of at least 10¹⁵ Ω·cm and the finished film typically has a dielectric strength of at least 32 V/μm.

4.2 Additives and impurities

If protection against ultra-violet rays is required, the material shall be stabilized by the addition of an appropriate product; if carbon black is used for this purpose, the addition shall be in the range of 2 % to 3 % by mass.

Antioxidants may be added, but shall not be greater than 0,5 % by mass.

Any impurities in the polymer shall be less than 0,1 % by mass.

The product shall not contain any plasticizers or fillers.

4.3 Regenerated products

Regenerated products may be used provided they comply with the requirement of this document.

5 Polyethylene sleeving

5.1 Appearance

The film shall not have holes, splits, punctures, perforations or any other detrimental defects affecting its strength or impermeability.

5.2 Dimensions

5.2.1 Width

The minimum flat width of tube or sheet is as given in [Table 1](#).

Table 1 — Minimum polyethylene width

DN	Minimum polyethylene width	
	Flat tube	Sheet
80	255	510
100	305	610
125	375	750
150	400	800
200	505	1 010
250	620	1 240
300	710	1 420
350	855	1 710
400	900	1 800

Table 1 (continued)

DN	Minimum polyethylene width	
	Flat tube	Sheet
450	1 000	2 000
500	1 070	2 140
600	1 270	2 540
700	1 485	2 970
800	1 695	3 390
900	1 900	3 800
1000	2 105	4 210
1100	2 315	4 630
1200	2 520	5 040
1400	2 940	5 880
1500	3 150	6 300
1600	3 355	6 710
1800	3 770	7 540
2000	4 185	8 370
2200	4 385	8 770
2400	4 780	9 560
2600	5 180	10 360

5.2.2 Thickness

The nominal thickness of the polyethylene sleeving shall be not less than 200 µm. The negative tolerance on the nominal thickness shall not exceed 10 %.

Per designer's recommendation, thicker polyethylene sleeving or double polyethylene sleeving can be used to protect the pipeline in more aggressive environment.

6 Mechanical properties

6.1 Tensile strength

When tested in accordance with ISO 527-3, using test specimens of type 2, a gauge length of 50 mm and a rate of grip separation of 500 mm/min, the tensile stress at break of the film in the longitudinal and transverse directions shall be not less than 20 MPa.

6.2 Elongation

When tested in accordance with ISO 527-3, using test specimens of type 2 a gauge of 50 mm and a rate of grip separation of 500 mm/min, the elongation at fracture of the film in the longitudinal and transverse directions shall be not less than 500 %.

6.3 Impact resistance

When tested in accordance with ISO 7765-1 Method A, the impact resistance of the film shall be not less than 900 g.

6.4 Propagation tear resistance

When tested in accordance with ISO 6383-2, the propagation tear resistance of the film in the longitudinal and transverse directions shall be no less than 20 N.

7 Marking

The polyethylene film supplied shall bear a card or label giving the following information:

- a) the manufacturer's name or trademark;
- b) the year of manufacture;
- c) the number of this document, i.e. ISO 8180;
- d) the nominal film thickness;
- e) the applicable range of nominal pipe diameter size(s).

8 Storage and transportation

The polyethylene sleeving shall be suitably packaged and protected by the manufacturer for transportation and storage.

When the polyethylene sleeving is stored prior to use, it shall be properly protected from direct sunlight.

9 Conditions of use and fitting

Recommended installation methods are given in [Annex A](#). For determining when polyethylene sleeving is required and also the method of fitting, the user should refer to appropriate national specifications or to the manufacturers' catalogues.

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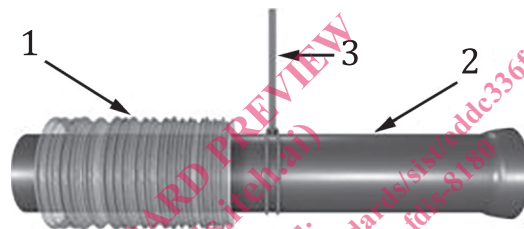
Annex A (informative)

Installation methods

A.1 Installation on pipes with polyethylene tubes

A.1.1 Methods for dry trench conditions

- a) Cut a section of the polyethylene tube about 0,6 m longer than the pipe section. Clean the pipe surface, remove all lumps of clay, mud, cinders, etc. Lift the pipe with a cable, and slip the polyethylene tube around the pipe from the spigot end. Bunch the polyethylene tube accordion-fashion on the spigot end, see [Figure A.1](#).

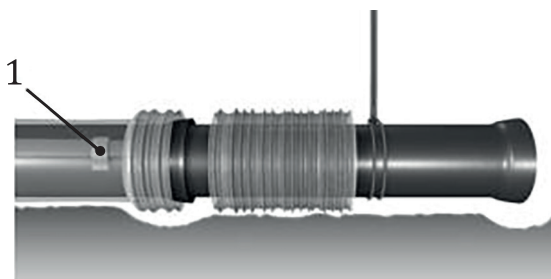


Key

- 1 polyethylene tube
- 2 ductile iron pipe
- 3 cable (fabric-type cable, padded cable or necessary protection between cable and pipe)

Figure A.1

- b) Dig a shallow bell hole in the trench bottom at the joint location to facilitate the polyethylene tube installation. Lower the pipe into the trench and make up the joint with the preceding section of pipe, see [Figure A.2](#).



Key

- 1 adhesive tape

Figure A.2

- c) Move the cable to the socket end and spread the polyethylene tube over the entire barrel of the pipe, see [Figure A.3](#).