



# SLOVENSKI STANDARD

## SIST ISO 4427:1997

01-april-1997

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### Polietilenske (PE) cevi za oskrbo z vodo - Specifikacije

Polyethylene (PE) pipes for water supply -- Specifications

Tubes en polyéthylène (PE) destinés à l'alimentation en eau -- Spécifications

Ta slovenski standard je istoveten z: **ISO 4427:1996**

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# INTERNATIONAL STANDARD

**ISO**  
**4427**

First edition  
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## **Polyethylene (PE) pipes for water supply — Specifications**

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*Tubes en polyéthylène (PE) destinés à l'alimentation en eau —  
Spécifications*

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Reference number  
ISO 4427:1996(E)

## ISO 4427:1996(E)

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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International Standard ISO 4427 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 2, *Plastics pipes and fittings for water supplies*.

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Annex A forms an integral part of this International Standard.

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# Polyethylene (PE) pipes for water supply — Specifications

## 1 Scope

This International Standard specifies the required properties of pipes made from polyethylene (PE) to be used for buried water mains and services and for water supply above ground both inside and outside buildings. In addition, it specifies some general properties of the material from which these pipes are made, including a classification scheme.

This International Standard applies to pipes with a nominal pressure of PN 3,2, PN 4, PN 6, PN 8, PN 10, PN 12,5 and PN 16, and nominal outside diameters from 16 to 1 600 (see ISO 161-1), intended to be used for the conveyance of water under pressure at temperatures between 0 °C and 40 °C for general purposes, as well as for the supply of drinking water.

NOTE 1 — Some countries may require specific colour identification for pipes for water intended for human consumption.

For temperatures between 20 °C and 40 °C, the working pressure factor given in figure 1 shall be applied, provided that extrapolation results obtained in accordance with ISO/TR 9080 show this to be possible.

If PE pipes are used above ground, they should preferably be physically protected against UV light in accordance with recommended practice.

NOTE 2 — For information, certain requirements, figures or remarks are given, which have been extracted from appropriate International Standards.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 161-1:1996, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*.

ISO 1133:1996, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*.

ISO 1167:1996, *Thermoplastics pipes for the conveyance of fluids — Resistance to internal pressure — Test method.*

ISO 2505-1:1994, *Thermoplastics pipes — Longitudinal reversion — Part 1: Determination methods.*

ISO 2505-2:1994, *Thermoplastics pipes — Longitudinal reversion — Part 2: Determination parameters.*

ISO 3126:1974, *Plastic pipes — Measurement of dimensions.*

ISO 4065:1996, *Thermoplastic pipes — Universal wall thickness table.*

ISO 4607:1978, *Plastics — Methods of exposure to natural weathering.*

ISO 6259-1:—<sup>1)</sup>, *Thermoplastics pipes — Determination of tensile properties — Part 1: General test method.*

ISO 6259-3:—<sup>1)</sup>, *Thermoplastics pipes — Determination of tensile properties — Part 3: Polyolefin pipes.*

ISO 6964:1986, *Polyolefin pipes and fittings — Determination of carbon black content by calcination and pyrolysis— Test method and basic specification.*

ISO/TR 9080:1992, *Thermoplastics pipes for the transport of fluids — Methods of extrapolation of hydrostatic stress rupture data to determine the long-term hydrostatic strength of thermoplastics pipe materials.*

ISO/TR 10837:1991, *Determination of the thermal stability of polyethylene (PE) for use in gas pipes and fittings.*

ISO 11420:1996, *Method for the assessment of the degree of carbon black dispersion in polyolefin pipes, fittings and compounds.*

ISO 11922-1:—<sup>2)</sup>, *Thermoplastics pipes (for the conveyance of fluids) — Dimensions and tolerances — Part 1: Metric series.*

ISO 12162:1995, *Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient.*

ISO 13761:1996, *Plastics pipes and fittings — Pressure reduction factors for polyethylene pipeline systems for use at temperatures above 20 °C.*

ISO 13949:—<sup>1)</sup>, *Method for the assessment of the degree of pigment dispersion in polyolefin pipes, fittings and compounds.*

*Guidelines for drinking water quality, Volume 1: Recommendations, WHO, Geneva, 1984.*

EEC Council Directive of 15th July 1980 on the quality of water intended for human consumption, Official Journal of the European Communities, L229, pp.11 to 29.

## 3 Material

### 3.1 Compounds

#### 3.1.1 General

The pipes shall be manufactured from polyethylene containing only those antioxidants, UV stabilizers and pigments necessary for the manufacture of pipes conforming to this specification and for its end use, including weldability when it is possible. The pipes for drinking water shall be either black or blue or black with blue stripes.

1) To be published.

2) To be published. (Revision of ISO 3606:1976, ISO 3607:1977, ISO 3608:1976 and ISO 3609:1977)



### 3.1.2 Black pipes

For black pipes, the carbon black content in the compound shall be  $(2,25 \pm 0,25)$  % by mass, when measured in accordance with ISO 6964.

### 3.1.3 Blue pipes and stripes

The use of the colour blue or black with blue stripes shall be specified in accordance with national requirements.

The material for the stripes shall be of the same type of resin as used in the base compound for the pipe.

## 3.2 Dispersion of pigments in compounds

### 3.2.1 Dispersion of carbon black

When determined in accordance with ISO 11420, the dispersion of the carbon black shall be equal to or less than grade 3.

### 3.2.2 Dispersion of blue pigments

When determined in accordance with ISO 13949, the dispersion of blue pigment shall be equal to or less than grade 3.

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## 3.3 Thermal stability

When determined in accordance with ISO/TR 10837, the induction time for materials PE 63, PE 80 and PE 100 shall be either at least 20 min when tested at 200 °C, or an equivalent period when tested at 210 °C, provided the equivalence is supported by a clear correlation between results obtained at 200 °C or 210 °C, respectively.

In cases of dispute, the test temperature shall be 200 °C.

## 3.4 Reworked material

Clean reworked material generated from a manufacturer's own production of pipe in accordance with this specification may be used if it is derived from the same resin as used for the relevant production.

## 3.5 Effects on water quality of pipes intended for the conveyance of water for human consumption

When used under conditions for which they are designed, materials in contact with or likely to come into contact with drinking water shall not constitute a toxic hazard, shall not support microbial growth and shall not give rise to unpleasant taste or odour, cloudiness or discoloration of the water.

The concentrations of substances, chemicals and biological agents leached from materials in contact with drinking water, and measurements of the relevant organoleptic/physical parameters, shall not exceed the maximum values recommended by the World Health Organization in its publication *Guidelines for drinking water quality*, Volume 1: *Recommendations*, or as required by the EEC Council Directive of 15 July 1980 on the quality of water intended for human consumption, whichever is the more stringent in each case.

NOTE — Certain additional requirements may apply, as required, due to local water quality and safety regulations.