



SLOVENSKI STANDARD

SIST EN 12324-2:2000

01-oktober-2000

Namakalna tehnika - Bobenski namakalniki - 2. del: Specifikacije za polietilenske cevi za bobenske namakalnike

Irrigation techniques - Reel machine systems - Part 2: Specifications of polyethylene tubes for reel machines

Bewässerungsverfahren - Beregnungsmaschinen mit Regnereinzug - Teil 2: Festlegungen für Polyethylenrohre für Beregnungsmaschinen mit Regnereinzug

Techniques d'irrigation - Installations avec enrouleurs - Partie 2: Spécifications des tubes polyéthylène pour enrouleurs

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Ta slovenski standard je istoveten z: EN 12324-2:1999

ICS:

23.040.20	Cevi iz polimernih materialov	Plastics pipes
65.060.35	Namakalna in drenažna oprema	Irrigation and drainage equipment

SIST EN 12324-2:2000

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12324-2

August 1999

ICS 23.040.20; 65.060.35

English version

Irrigation techniques - Reel machine systems - Part 2: Specifications of polyethylene tubes for reel machines

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Regnereinzug - Teil 2: Festlegungen für Polyethylenrohre
für Beregnungsmaschinen mit Regnereinzug

This European Standard was approved by CEN on 8 July 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 334 "Irrigation techniques", the secretariat of which is held by AFNOR.

Within its programme of work, Technical committee CEN/TC 334 "Irrigation techniques" charged CEN/TC 334/WG 1 "Reel Machine Systems" to prepare the following standard :

- EN 12324-2, *Irrigation techniques - Reel machine systems - Part 2 : Specifications of polyethylene tubes for reel machines*

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

The other standards concerning the irrigation techniques are :

- EN 12324-1, *Irrigation techniques - Reel machine systems - Part 1 : Size series*
- EN 12324-3, *Irrigation techniques - Reel machine systems - Part 3 : Presentation of technical characteristics*
- EN 12324-4, *Irrigation techniques - Reel machine systems - Part 4 : Guidance documents for the users*
- prEN ISO 8224-1, *Traveller irrigation machines - Part 1 : Laboratory and field test methods*

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1 Scope

This European Standard specifies the characteristics that are required for the polyethylene (PE) tubes for irrigation reel machines.

Those tubes are destined to be coiled onto structures of reel machines that conform to the size series specified in EN 12324-1, and to achieve the functions of carrying water and dragging the water emitting system, while it travels along the irrigated lane.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 496, *Plastics piping systems - Plastics pipes and fittings - Measurement of dimensions and visual inspection of surfaces.*

EN 638, *Plastics piping and ducting systems - Thermoplastics pipes - Determination of tensile properties.*

EN 728, *Plastics piping and ducting systems - Polyolefin pipes and fittings - Determination of oxidation induction time.*

EN 921, *Plastics piping systems - Thermoplastics pipes - Determination of resistance to internal pressure at constant temperature.*

EN 1401-1:1998, *Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly (vinyl chloride) (PVC-U) - Part 1 : Specifications for pipes, fittings and the system.*

prEN 1555-1, *Plastics piping systems for gaseous fuels supply - Polyethylene (PE) - Part 1 : General.*

prEN ISO 9080, *Plastics piping and ducting systems - Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation.*

EN 12099, *Plastics piping systems - Polyethylene piping materials and components - Determination of volatile content.*

EN 12118, *Plastics piping systems - Determination of moisture content in thermoplastics by coulometry.*

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

EN 12324-1:1998, *Irrigation techniques - Reel machine systems - Part 1 : Size series.*

EN ISO 13479, *Polyolefin pipes for the conveyance of fluids - Determination of resistance to crack propagation - Test method for slow crack growth on notched pipes (notch test) (ISO 13479:1997).*

ISO 1133:1997, *Plastics - Determination of the melt mass - flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics.*

ISO 1183:1987, *Plastics - Methods for determining the density and relative density of non-cellular plastics.*

ISO 1872-1, *Plastics - Polyethylene (PE) moulding and extrusion materials - Part 1 : Designation system and basis for specifications.*

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

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

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1
reel machine
see EN 12324-1

3.2
structure (ST)
see EN 12324-1

3.3
polyethylene tube
one of the parts of a reel machine which connects the cart to the structure, and achieving the functions of carrying water to- and dragging the system which emits the irrigation water while travelling along the irrigated lane

3.4
range of the polyethylene tubes
see EN 12324-1

3.5
central diameter of the range of the polyethylene tubes
see EN 12324-1

3.6
minimum length of the tube of central diameter in the range of polyethylene tubes
see EN 12324-1

3.7
reference mass per unit length
the rounded mass of a one meter long section of the polyethylene tubes, that is to be used for transportation and packaging purposes

4 Specifications for the material of the polyethylene tubes

4.1 General

Pipes shall be manufactured from either base polymers or compound.

If base polymer is used, additives necessary for manufacture and end use of pipes shall be incorporated during pipe extrusion and dispersed uniformly.

4.2 Characteristics

The polyethylene with its additives shall conform to the requirements given in Table 1.

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Table 1 - Characteristics of the PE material used

Characteristic	Requirements ^a	Test parameters		Test method
		Parameter	Value	
Conventional density, as given in ISO 1872-1	≥ 940 kg/m ³ (tube material including base polymer and all additives)	Test temperature	23 °C	ISO 1183:1987 Test method D
		Number of test pieces ^e	1 (once per batch)	
Oxidation induction time (Thermal stability)	> 20 min	Test temperature	200 °C ^b	EN 728
		Number of test pieces ^e	1 (once per batch) ^f	
Melt-mass Flow-Rate (MFR)	Maximum deviation of ± 20 % of the value given by the producer	Loading mass	5 kg	ISO 1133:1997
		Test temperature	190 °C	
		Time	10 min	
		Number of test pieces ^e	1 (once per batch) ^f	
Volatile content	≤ 350 mg/kg	Number of test pieces ^e	1 (once per batch)	EN 12099
Water content ^c	≤ 300 mg/kg	Number of test pieces ^e	1	EN 12118
Carbon black content	(2 to 2,6) % (by mass)	Shall conform to ISO 6964	1 (once per batch)	ISO 6964:1986
Carbon black dispersion	≤ grade 3	Preparation of test pieces	Free ^d	ISO 11420:1996
		Number of test pieces ^e	1 (once per batch) ^f	
Slow crack growth for pipes (110 SDR 11)	No failure during test	Test temperature	80 °C	EN ISO 13479 prEN 1555-1
		Internal test pressure for :		
		- PE 63	0,7 Mpa	
		- PE 80	0,8 Mpa	
		- PE 100	0,92 Mpa	
Test period	165 h			
Number of test pieces ^e	1 (once a year)			

^a Conformity with these requirements shall be proved by the tube manufacturer.

^b Test may be carried out at 210 °C providing that there is a clear correlation to the results at 200 °C, in case of dispute, the reference temperature shall be 200 °C.

^c Only applicable if the requirement for volatile content is not conformed to. In case of dispute, the requirement for water content shall apply.

^d In case of dispute, the compression method for the preparation of test piece shall apply.

^e The indicated number of test pieces and frequency of test is a minimum. All samples shall satisfy the requirements.

^f The number of measurements per test is defined in the referenced standard.

4.3 Classification and designation

PE used shall be designated by the material type (PE) and the level of Minimum Required Strength (*MRS*) shall conform to Table 2 when tested in form of pipe.

Table 2 - Classification and designation of PE materials

Classification by <i>MRS</i> (MPa)	Designation
6,3	PE 63
8,0	PE 80
10,0	PE 100

The material shall be evaluated according to prEN ISO 9080 (where the test pressure is applied according to EN 921) to find the Lower Confidence Limit (*LCL*). Using this *LCL*, the material shall be classified in accordance with EN ISO 12162 to determine its *MRS*.

The conformity of the designation of the material to the classification given in Table 2 shall be demonstrated by the producer.

4.4 Overall service (design) coefficient and design stress

The minimum value of the overall service (design) coefficient *C* for pipe shall be 1,25.

The maximum value for the design stress (σ_s) shall be :

- for PE 63 5,0 MPa ;
- for PE 80 6,3 MPa ;
- for PE 100 8,0 MPa.

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4.5 Reprocessable materials

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For the manufacture of pipes according to this standard, new material shall be employed. Use of own reprocessable material from the production of pressure pipes of the pipe manufacturer from the same material is admissible. External reprocessable material and recyclable materials shall not be used (see definitions in EN 1401-1:1998).

5 General characteristics for pipes

5.1 Visual inspection

When viewed without magnification, the internal and external surfaces of pipes shall be smooth and clean and shall have no scoring, cavities and shall be free of striae, bubbles, contraction cavities as well as other defects of homogeneousness.

5.2 Colour

Pipes shall be black without identification stripes.

5.3 Geometrical characteristics

Dimensions shall be measured in accordance with prEN 496.

Dimensions shall conform to Table 3.

5.4 Length

The length of polyethylene tubes for reel machines shall be measured according to prEN 496.