



SLOVENSKI STANDARD
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Ekstrudirane plošče iz polietilena (PE-HD) - Zahteve in preskusne metode (ISO/DIS 14632:2020)

Extruded sheets of polyethylene (PE-HD) - Requirements and test methods (ISO/DIS 14632:2020)

Extrudierte Tafeln aus Polyethylen (PE-HD) - Anforderungen und Prüfverfahren (ISO/DIS 14632:2020)

Plaques extrudées en polyéthylène (PE-HD) - Prescriptions et méthodes d'essai (ISO/DIS 14632:2020)

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ICS:

83.140.10 Filmi in folije Films and sheets

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Extruded sheets of polyethylene (PE-HD) — Requirements and test methods

Plaques extrudées en polyéthylène (PE-HD) — Prescriptions et méthodes d'essai

ICS: 83.140.10

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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Material	1
4 Requirements	2
4.1 Appearance.....	2
4.2 Dimensional tolerances.....	2
4.2.1 Thickness.....	2
4.2.2 Length and width.....	2
4.2.3 Rectangularity.....	3
4.2.4 Bow of sheets in rolled form.....	3
4.3 Properties.....	3
4.3.1 Mechanical and thermal properties.....	3
4.3.2 Behaviour after heating.....	3
4.3.3 Physiological behaviour.....	4
5 Test methods	4
5.1 Test specimens.....	4
5.1.1 Preparation of test specimens.....	4
5.1.2 Conditioning.....	4
5.1.3 Testing.....	4
5.2 Delivery condition.....	4
5.3 Appearance.....	4
5.4 Dimensions.....	5
5.4.1 Thickness (<i>h</i>).....	5
5.4.2 Length (<i>l</i>) and width (<i>b</i>).....	5
5.4.3 Rectangularity.....	5
5.4.4 Rectangularity.....	5
5.5 Density.....	5
5.6 Tensile stress at yield (σ_y) and tensile strain at yield (ϵ_y).....	5
5.7 Modulus of elasticity in tension (E_t).....	5
5.8 Charpy impact strength of notched specimens (a_{cn}).....	5
5.9 Melt mass-flow rate (<i>MFR</i>).....	5
5.10 Determination of shrinkage after heating.....	6
6 Designation	7
6.1 Example for PE-HD sheets.....	7
6.2 Example for PE- HD sheets in rolled form.....	7
7 Marking	7
Annex A (normative) Requirements for rectangularity	9

ISO/DIS 14632:2020(E)

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 61, [Plastics], Subcommittee SC 11, [Products].

This second edition cancels and replaces the first edition (ISO 14632:1998), which has been technically revised.

The main changes compared to the previous edition are as follows:

- The range of MFR values for PE HD sheet group 1 in [Table 2](#) has been changed to cover the wider PE 100 grade of extruded PE HD sheets.

Extruded sheets of polyethylene (PE-HD) — Requirements and test methods

1 Scope

This standard specifies the requirements and test methods for solid flat extruded sheets of polyethylene homopolymers (PE - HD) without fillers or reinforcing materials. This standard applies only to thicknesses of 0,5 mm to 40 mm. This standard also applies to PE - HD sheet in rolled form.

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.

EN ISO 179, *Plastics - Determination of Charpy impact strength (ISO 179)*

EN ISO 291, *Plastics - Standard atmospheres for conditioning and testing (ISO 291)*

EN ISO 527-1, *Plastics - Determination of tensile properties Part 1: General principles (ISO 527-1 including Corr 1:1994)*

EN ISO 527-2, *Plastics - Determination of tensile properties Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2 including Corr 1:1994)*

ISO 1-133, *Plastics - Determination of the melt mass - flow rate (MFR) and the melt volume - flow rate (MVR) of thermoplastics*

ISO 1-183, *Plastics - Methods for determining the density and relative density of non - cellular plastics*

ISO 1-872-1, *Plastics - Polyethylene (PE) moulding and extrusion materials Part 1: Designation system and basis for specifications*

EN ISO 2-818, *Plastics - Preparation of test specimens by machining (ISO 2818)*

ISO/TR 9-080, *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*

3 Material

Sheets consist of PE extrusion compounds designated by ISO 1 872-1 without fillers or reinforcing materials. Extrusion compounds can contain additives such as processing aids, stabilisers, flame protective agents and colorants.

Compounds and additives of unknown identity shall not be used.

NOTE Legal requirements can cause a specific choice of extrusion compounds (see [4.3.3](#)).

ISO/DIS 14632:2020(E)

4 Requirements

4.1 Appearance

Sheets shall be substantially free from bubbles, voids, cracks, visible impurities and other defects which would make them unfit for the intended use. Surfaces shall be substantially smooth and free from sharp grooves, sink marks or damage.

Colorants shall be homogeneously distributed throughout the material. Slight colour differences due to the particular extrusion compound or processing procedure used are admissible. Admissible variations in any of the above shall be agreed between the interested parties. Sheets shall be examined in accordance with 5.3..

4.2 Dimensional tolerances

4.2.1 Thickness

Within any individual sheet, referring to the nominal thickness, the tolerance on thickness shall be:

$$|\Delta h| \leq \pm |0,08 \text{ mm} + 0,03 \times h_n| \quad (1)$$

where

Δh is the tolerance on thickness, in millimetres

h_n is the nominal thickness, in millimetres

Testing shall be in accordance with 5.4.1.

4.2.2 Length and width

Nominal length, l_n , and nominal width, b_n , of sheets shall be agreed between the interested parties. Unless agreed differently, the length shall be in the direction of extrusion.

For any individual sheet selected at random from any delivery, the tolerances on length and width shall be in accordance with Table 1. Testing shall be in accordance with 5.4.2.

Table 1 — Tolerances for length and width of sheet

Dimensions in millimetres

Nominal value of dimension, D_n	Tolerances	
	Length	Width
$D_n \leq 500$	+2	+2
	-1	-1
$500 < D_n \leq 1\ 000$	+3	+3
	-1	-1
$1\ 000 < D_n \leq 1\ 500$	+4	+4
	-1	-1
$1\ 500 < D_n \leq 2\ 000$	+6	+4
	-1	-1
$2\ 000 < D_n \leq 3\ 000$	+8	+6
	-1	-1
$3\ 000 < D_n \leq 4\ 000$	+11	+7
	-1	-1

For rolled sheets the minimum length shall be the nominal length.

4.2.3 Rectangularity

For any individual sheet, selected at random from any delivery, the rectangularity tolerance expressed as the difference between the length of the diagonals ($|d_1 - d_2|$, see [Figure 1](#)) shall be in accordance with [Table A.1](#) of [Annex A](#) (normative).

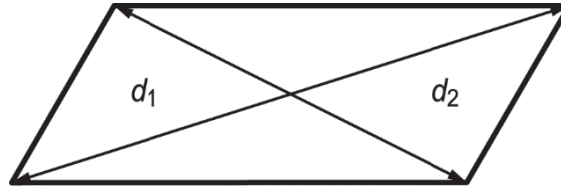


Figure 1 — Difference between diagonals ($|d_1 - d_2|$)

Testing shall be in accordance with [5.4.3](#).

4.2.4 Bow of sheets in rolled form

For sheets in rolled form, a maximum bow of 20 mm in 10 metres length is permissible. Testing shall be in accordance with [5.4.4](#).

4.3 Properties iTeh STANDARD PREVIEW
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4.3.1 Mechanical and thermal properties

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Table 2 — Mechanical and thermal properties

Properties	Unit	Requirements (average values)				Test method subclause
		PE-HD sheet group				
		1 ¹⁾	2	3	4	
Density	g/cm ³	0,95 to 0,96	0,94 to 0,96	0,95 to 0,96	≥ 0,96	5,5
Tensile stress at yield	MPa	≥20	≥15	≥20	≥25	5,6
Tensile strain at yield	%	≥10	≥8	≥8	≥8	5,6
Modulus of elasticity in tension	MPa	≥700	≥700	≥900	≥1 200	5,7
Charpy impact strength of notched specimens	kJ/ m ²	≥10	≥6	≥10	≥15	5,8
MFR 190 °C / 5 kg	g/10 min	0,2 to 0,7	0,1 to 2,0	0,1 to 2,0	0,1 to 2,0	5,9

¹⁾ Sheets of group 1 shall be manufactured from extrusion compounds (black, UV-stabilized with >2 % carbon black) complying with specific requirements for creep rupture strength defined in accordance with ISO/TR 9080 and shall be approved by all interested parties.

4.3.2 Behaviour after heating

4.3.2.1 Maximum shrinkage for general applications

For general applications, the maximum shrinkage in the direction of extrusion shall be less than three percent after heating. Testing shall be in accordance with [5.10](#) and [Table 5](#).

ISO/DIS 14632:2020(E)

4.3.2.2 Maximum shrinkage for thermoforming applications

The maximum shrinkage in the direction of extrusion shall not exceed the values given in [Table 3](#) when measured using the method in [5.10](#) and the conditions given in [Table 6](#).

Table 3 — Maximum shrinkage for thermoforming applications

Nominal thickness, h_n (mm)	0,5	1	2	4	6	8	10	> 10
Maximum shrinkage in the direction of extrusion (%)	75	70	60	50	40	35	30	not applicable

4.3.3 Physiological behaviour

Relevant legislation concerning physiological behaviour shall be taken into consideration.

5 Test methods

5.1 Test specimens

5.1.1 Preparation of test specimens

Representative test specimens shall be cut longitudinally and transversely from locations evenly distributed over the length and width of the sheet.

From a sheet in roll form, a two metre sample shall be cut from the end of the roll to provide test specimens.

Surfaces of the test specimens shall be free from damage and other defects in order to avoid notch effects. Should any burrs occur on the test specimens during production these shall be eliminated without damaging the surfaces of the test specimen. If required, the cut edges shall be finished with abrasive paper (grain number 220 or finer), the direction of abrasion being along the length of the test specimens. If it is necessary to machine the sheet to reduce it to the thickness required, one original surface shall be left intact. In particular, test specimens over 4,2 mm thick intended to be used in the tests described in [5.6](#) to [5.8](#) shall be machined down on one side to a thickness of 4,0 mm ± 0,2 mm in accordance with EN ISO 2818.

5.1.2 Conditioning

All test specimens shall be conditioned for at least 16 hours at standard atmosphere (23) in accordance with EN ISO 291. Shorter conditioning times shall be used by agreement between the interested parties when it can be shown that there is no significant difference in the results obtained.

5.1.3 Testing

Testing shall be carried out at standard atmosphere (23) in accordance with EN ISO 291, unless agreed differently between the interested parties or specified differently in the individual testing standards.

5.2 Delivery condition

Sheets should be visually examined when delivered to ensure freedom from mechanical damage or other obvious defects. Sheets can be inspected by means of ultrasonics or X-rays where required.

5.3 Appearance

Where possible, sheets shall be examined for visual defects by transmitted light using a suitable light source. Otherwise, sufficiently bright reflected light should be used. Any defects thus identified shall be compared with the agreed specification (either in written or sample form) and sentenced accordingly.