



SLOVENSKI STANDARD

SIST EN 13559:2004

01-maj-2004

Specifikacije udarno modificiranih plošč iz PMMA/ABS za kadi in prhe za uporabo v gospodinjstvu

Specifications for impact modified coextruded ABS/Acrylic sheets for baths and shower trays for domestic purposes

Spezifizierung von coextrudierten schlagzäh-modifizierten PMMA/ABS-Platten für Badewannen und Duschwannen für den Hausgebrauch

Spécifications relatives aux feuilles en acrylique et ABS coextrudées a résistance au choc modifiée pour baignoires et receveurs de douche a usage domestique

[https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-](https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004)

[e51457902256/sist-en-13559-2004](https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004)

Ta slovenski standard je istoveten z: EN 13559:2003

ICS:

91.140.70 Sanitarne naprave Sanitary installations

SIST EN 13559:2004 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 13559:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004>

EUROPEAN STANDARD

EN 13559

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2003

ICS 91.140.70

English version

Specifications for impact modified coextruded ABS/Acrylic sheets for baths and shower trays for domestic purposes

Spécifications relatives aux feuilles en acrylique et ABS coextrudées à résistance au choc modifiée pour baignoires et receveurs de douche à usage domestique

Spezifizierung von coextrudierten schlagzäh-modifizierten PMMA/ABS-Platten für Badewannen und Duschwannen für den Hausgebrauch

This European Standard was approved by CEN on 26 June 2003.

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 Management Centre 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 Management Centre 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 13559:2004](https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004)

<https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions.....	4
4 Requirements	4
4.1 General requirements.....	4
4.2 Thickness.....	5
4.3 Heavy metal contents	5
4.4 Colour.....	6
4.5 Thermal stability.....	6
4.6 Colour fastness	6
4.6.1 Resistance to UV light	6
4.6.2 Resistance to hot water.....	6
4.7 Chemical and stain resistance	6
4.8 Resistance to wet and dry cycling.....	6
4.9 Shrinkage.....	6
4.10 Resistance to stress cracking	7
5 Test methods.....	7
5.1 Determination of tensile strength.....	7
5.2 Determination of thermal stability.....	7
5.3 Determination of colour fastness to hot water.....	7
5.4 Determination of resistance to domestic chemicals and stains.....	8
5.4.1 Reagents.....	8
5.4.2 Apparatus	8
5.4.3 Procedure	8
5.4.4 Results	9
5.5 Determination of resistance to wet and dry cycling.....	9
5.5.1 Test pieces.....	9
5.5.2 Procedure	9
5.5.3 Results	10
5.6 Determination of resistance to stress cracking.....	10
5.6.1 General.....	10
5.6.2 Principle	10
5.6.3 Test specimens	10
5.6.4 Conditioning.....	10
5.6.5 Pieces of cloth.....	10
5.6.6 Test fluid	10
5.6.7 Flexural strain.....	11
5.6.8 Test atmosphere	11
5.6.9 Procedure	11
5.7 Determination of water absorption	12
5.7.1 Principle	12
5.7.2 Apparatus	12
5.7.3 Test specimens	13
5.7.4 General conditions.....	13
5.7.5 Procedure	13
5.7.6 Expression of results	13
Bibliography	15

Foreword

This document (EN 13559:2003) has been prepared by Technical Committee CEN /TC 163, "Sanitary appliances" the secretariat of which is held by UNI.

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 March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 13559:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004>

EN 13559:2003 (E)

1 Scope

This European Standard specifies the properties of coextruded ABS sheets with impact modified acrylic top layer from which baths and shower trays for domestic purposes are manufactured.

Note : For the purposes of this standard the term "domestic purposes" includes use in hotels, accommodation for students, hospitals and similar buildings, except when special medical provisions are required.

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 ISO 15015:1997, Extruded sheets of impact-modified acrylonitrile/styrene copolymers, (ABS, AES or ASA). Requirements and test methods (ISO/DIS 15015: 1997).

ISO 75-2, *Plastics. Determination of temperature of deflection under load - Part 2: Plastics and ebonite.*

ISO 105-A02, *Textiles. Tests for colour fastness. – Part A02 Grey scale for assessing change in colour.*

ISO 179, *Plastics. Determination of Charpy impact properties.*

ISO 527, *Plastics. Determination of tensile properties.*

ISO 4892, *Plastics. Methods of exposure to laboratory light sources.*

<https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004>

3 Terms and definitions

For the purpose of this standard, the following term and definition applies:

3.1

Coextruded impact modified PMMA/ABS sheet

coextruded sheet with ABS substrate and a top layer of modified PMMA.

4 Requirements

4.1 General requirements

The coextruded impact modified PMMA / ABS sheet shall comply with the requirements of table 1 when tested to the methods given in Table 1.

Table 1 General requirements for coextruded impact modified PMMA / ABS sheet

Property	Test method	Test conditions	Unit	Value	
				Minimum	Maximum
Tensile yield strength	ISO 527 ¹⁾	50 mm/min	MPa	38	-
E modulus	ISO 527 ¹⁾	1 mm/min	MPa	1800	-
Heat distortion temperature (HDT)	ISO 75 ²⁾		°C	100	-
Impact resistance (tensile zone PMMA)	ISO 179 1fn (unnotched)	with polishing ³⁾	kJ/m ²	20	-
Water absorption	§ 5.7 of this standard		mg	-	40

1) ISO 527 as specified in 5.1 of this standard.

2) Annealing conditions: 24h at 80°C, then 16h at 23°C and 50% RH. Test flatwise with PMMA as surface layer on which the testing load is applied.

3) Polishing conditions and specimen preparation according prEN 15015:1997 § 5.1.1.

4.2 Thickness

iTeh STANDARD PREVIEW
(standards.iteh.ai)

The total thickness of coextruded impact modified PMMA / ABS sheet shall not be less than 2,7 mm.

Tolerances on total thickness are given in Table 2. [SIST EN 13559:2004
https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004](https://standards.iteh.ai/catalog/standards/sist/7bb297fc-d312-43fa-8574-e51457902256/sist-en-13559-2004)

Table 2 Tolerance on total thickness for coextruded impact modified PMMA/ABS sheet

Total thickness		Tolerance
from	to	
2,8	4,0	± 0,10 mm
4,1	6,0	± 0,15 mm
6,1	9,0	± 0,20 mm
9,1	11,0	± 0,30 mm

The minimum top layer thickness is 9 % of the total thickness of coextruded impact modified PMMA / ABS sheet for bathtub applications and 4 % of the total thickness of the coextruded impact modified PMMA / ABS sheet for shower tray applications.

4.3 Heavy metal contents

Limit values for heavy metal contents of coextruded impact modified PMMA/ABS sheets for baths and shower trays are given in the European Directive 91/338.

Informative note: 91/338/CEE: Council Directive of 19 June 1991 amending for the tenth time Directive 76/769/CEE The Approximation of the laws, regulations and administrative provisions of the member states relating to restriction of the marketing and use of certain dangerous substances and preparations.

EN 13559:2003 (E)

4.4 Colour

For coextruded impact modified PMMA / ABS sheets the top layer shall be transparent or coloured. In the case of coloured top layer, the colourant shall be incorporated during the manufacture of the sheet and the colour shall be throughout the thickness of the material. Colour standards shall be agreed between sheet manufacturer and fabricator.

4.5 Thermal stability

When tested according to the method given in 5.2 the coextruded impact modified PMMA / ABS sheets shall show no evidence of blistering.

4.6 Colour fastness

4.6.1 Resistance to UV light

When tested in apparatus complying with the requirements of the xenon arc lamp method of ISO 4892 for 250 h the colour change noted in the coextruded impact modified PMMA / ABS sheets shall be recorded in terms of the grey scale for assessing colour change specified in ISO 105-A02. The fastness rating shall be not less than grade 3.

The xenon lamp shall only be used when its age is between the limits stated by the manufacturer of the lamp to be the useful life of the lamp or, where the useful life is not stated, is between 10 h and 600 h.

4.6.2 Resistance to hot water

When tested in accordance with 5.3, the colour change noted in the coextruded impact modified PMMA / ABS sheets shall be recorded in terms of the grey scale for assessing colour change specified in ISO 105 A02. The fastness rating shall be not less than grade 3.

4.7 Chemical and stain resistance

When tested in accordance with 5.4 coextruded impact modified PMMA / ABS sheets shall show no permanent staining or deterioration.

4.8 Resistance to wet and dry cycling

When tested in accordance with 5.5 coextruded impact modified PMMA / ABS sheets shall not show any adverse changes in appearance such as blisters, crazes, cracks and discoloration.

4.9 Shrinkage

When tested according to clause 5.7.2 of prEN ISO 15015:1997 with a temperature of 150°C instead of 170°C, the coextruded impact modified PMMA/ABS sheet shall show no change in length exceeding those given in table 3.

Table 3 Permitted changes in length for coextruded impact modified PMMA/ABS sheets

Sheet total thickness	Maximum change in length %	
	In extrusion direction	Cross direction extrusion
2,1 to 3,0	10	2,5
3,1 to 4,0	8	2
4,1 to 6,0	7	2
> 6,1	5	1

4.10 Resistance to stress cracking

The coextruded impact modified PMMA/ABS sheet shall be tested in accordance with the requirements of 5.6. The time at which the first crack appears shall be reported.

5 Test methods

5.1 Determination of tensile strength

5.1.1

The test pieces shall be as described in ISO 527, Type 1 B. They shall be cut so that their length is parallel to extrusion direction. The thickness of the test piece shall be that of the sheet from which it is cut and the width and the thickness shall be measured on the parallel portion of the test piece by means of a micrometer to the nearest 0,025 mm.

5.1.2

The test shall be carried out at a temperature of $(23 \pm 2)^\circ\text{C}$ and the test pieces shall be conditioned to this temperature for at least two days before testing.

5.1.3

The speed of testing shall be (50 ± 1) mm/min (speed B).

5.1.4

The mean of three determinations shall be recorded as the tensile strength of the material but if a test piece breaks in the grips the result shall be disregarded and a further determination made. The tensile strength shall be determined according to ISO 527.

5.2 Determination of thermal stability

Hang two sheets 300 mm square, taken from the coextruded impact modified PMMA / ABS sheet, in a circulating oven at $(165 \pm 5)^\circ\text{C}$ for 20 minutes when this nominal temperature is reached. Remove the sheets from the oven, allow them to cool to room temperature while hanging vertically and visually examine them for the presence of blisters. If defects are present, repeat the test on new samples with preconditioning at $(80 \pm 2)^\circ\text{C}$ for 16h.

5.3 Determination of colour fastness to hot water

5.3.1

Cut a test piece 100 mm x 25 mm from the coextruded impact modified PMMA / ABS sheet and fix in a suitable carrier. Immerse the test piece in a water bath maintained at $(60 \pm 2)^\circ\text{C}$ for 30 min, remove and allow to drain and dry out in air for 30 min.

5.3.2

Repeat the cycle 100 times without interruption.

5.3.3

Allow 48 h for the test piece to dry out before it is compared with a sample of the sheet from which it was cut.

5.3.4

The colour fastness of the material shall be recorded in terms of the grey scale for assessing colour change specified in ISO 105-A02.