INTERNATIONAL STANDARD

ISO 19712-3

Second edition
2022-03

Plastics — Decorative solid surfacing materials —

Part 3: Determination of properties — Solid surface shapes

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Plastiques — Matériaux décoratifs massifs de revêtement de surface —

Partie 3: Détermination des propriétés — Produits mis en forme

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Foreword

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

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This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11 *Products,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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This second edition cancels and replaces the first edition (ISO 19712-3:2007), of which it constitutes a minor revision.

The changes compared to the previous edition are as follows:

— the normative references clause has been updated;

— the rate of flow of water has been updated in Table 6 and subclause 12.2.4.

A list of all parts in the ISO 19712 series can be found on the ISO website.

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.

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Plastics — Decorative solid surfacing materials —

Part 3:
Determination of properties — Solid surface shapes

SAFETY STATEMENT — Persons using this document should be familiar with normal laboratory practice, if applicable. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

1 Scope

This document specifies the methods of test for determination of the properties of solid surfacing materials, as defined in Clause 3, in the form of shaped products. These methods are primarily intended for testing the materials specified in ISO 19712-1.

The tests can be carried out on finished products, but are generally carried out on test panels of a size sufficient to meet the requirements of the test, and of the same material and finish as the finished product.

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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.

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

ISO 105-B02, *Textiles — Tests for colour fastness — Part B02: Colour fastness to artificial light: Xenon arc fading lamp test*

ISO 209, *Aluminium and aluminium alloys — Chemical composition*

ISO 1770, *Solid-stem general purpose thermometers*

ISO 2039-1, *Plastics — Determination of hardness — Part 1: Ball indentation method*

ISO 2039-2, *Plastics — Determination of hardness — Part 2: Rockwell hardness*

ISO 3668, *Paints and varnishes — Visual comparison of colour of paints*

ISO 4211:1979, *Furniture — Assessment of surface resistance to cold liquids*

ISO 4892 (all parts), *Plastics — Methods of exposure to laboratory light sources*

ISO 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc sources*

ISO 9370, *Plastics — Instrumental determination of radiant exposure in weathering tests — General guidance and basic test method*

ASTM D 2244, *Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates*

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ASTM D 2583, *Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor*

CIE Publication No 85:1989, *Solar spectral irradiance*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
solid surfacing material
SSM
material, composed of polymeric materials together with pigments and fillers, intended to be cast into sheets or shaped products

Note 1 to entry: The material is of the same composition throughout the whole thickness of the sheet or product.

Note 2 to entry: Sheets and products made from SSMs are repairable and renewable to the original finish.

Note 3 to entry: SSMs can also be fabricated into continuous sheets with inconspicuous seams.

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4 Cleaning the test specimen surface

4.1 General

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The surface to be tested shall be prepared prior to testing using the procedure specified in 4.3.

4.2 Materials

4.2.1 Cellulose sponge.

4.2.2 Non-abrasive cleanser, containing a bleaching agent.

4.2.3 Water.

4.2.4 Clean, absorbent, lint-free material.

4.3 Procedure

Clean the surface using a damp sponge and non-abrasive cleanser containing a bleaching agent, scrubbing the surface with light hand pressure for up to 1,0 min/m^2. Rinse the prepared surface with water and dry with clean, absorbent, lint-free material.

5 Surface defects

5.1 Procedure

The entire finished surface of the shaped product under test shall be rubbed with a sponge and a 50 % solution of tap water and water-soluble black or blue-black ink after the surface has been washed and

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dried as described in 4.3. When inspecting coloured sheets, contrasting-coloured ink shall be used. The ink shall be wiped from the surface with a damp cloth and the surface dried before inspection.

5.2 Method of inspection of surface

After being inked in accordance with 5.1, the surface of the shaped product shall be inspected with the unaided eye for defects and blemishes from a distance of between 305 mm and 610 mm, using a light source giving an illumination intensity of (1 615 ± 540) lx near the surface to be inspected.

5.3 Performance requirements

The finished surfaces of shaped products shall be free from cracks, chipped areas, pinholes and blisters.

Spots, dirt and similar surface blemishes are admissible provided the total area covered by such blemishes is not more than 1,0 mm^2/m^2 of the surface of the shaped product. The blemishes may be concentrated in one place or scattered over the product.

5.4 Test report

The test report shall include the following information:

a) a reference to this document, i.e. ISO 19712-3:2022;

b) the name and type of product;

c) whether the surface was free from cracks, chipped areas, etc.;

d) whether the area covered by spots, dirt, etc., was more than 1,0 mm^2/m^2 of sheet surface;

e) any deviation from the method specified;

f) the date of the test.

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6 Resistance to impact by large-diameter ball

6.1 Principle

While this test method can be used for any shaped product of suitable size and shape, it is intended principally for sinks and is therefore written for that particular product.

A sink made of solid surface material is covered with a sheet of carbon paper and subjected to the impact of a steel ball which is allowed to fall from a known height. The impact resistance is expressed as the maximum drop height which does not incur visible surface cracking or chipping.

6.2 Test specimen

Sinks to be tested shall be taken from the finished-goods inventory.

6.3 Procedure

A 38,1-mm-diameter, 0,225 kg steel ball shall be dropped from a height of 610 mm to impact once on each of four different areas in each sink compartment.

Two of these areas shall be on the flat area of the sink bottom, and the other two points shall be on the convex rim radius.

Service sinks without rolled rims, and other cast products, shall be impacted only on the compartment bottom. Impact locations for typical sink configurations shall be as shown in Figure 1.

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Additionally, the 0,225 kg steel ball shall be dropped to impact once on each of three different points on flat areas of sinks with tops or integral tops and drainboards.

The sink shall be mounted in accordance with the manufacturer's instructions for normal use.

6.4 Performance requirement

The sink shall not show any cracks or chips after inking and inspection as described in 5.1 and 5.2.

6.5 Test report

The test report shall include the following information:

a) a reference to this document, i.e. ISO 19712-3:2022;

b) the name and type of sink;

c) whether the sink showed any cracks or chips;

d) any deviation from the method specified;

e) the date of the test.

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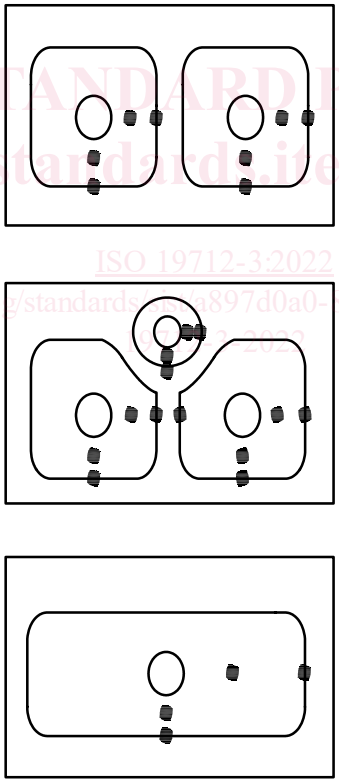

Key

- impact points

Figure 1 — Point-of-impact locations

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7 Lightfastness

7.1 Method A

7.1.1 Principle

A specimen taken from the product under test is exposed to daylight simulated by the filtered light of one or more xenon-arc lamps. The effect on the colour of the specimen, at a specified radiant exposure, is assessed by the contrast between the exposed and unexposed portions of the test specimen. The radiant exposure is determined both instrumentally and by assessing the effect on blue wool references which are exposed simultaneously.

Daylight spectral distribution is specified since SSM products may, in certain applications, be exposed to direct daylight through open windows.

7.1.2 Apparatus

7.1.2.1 Test device, as specified in ISO 4892-1 and ISO 4892-2, equipped with:

a) one or more xenon-arc lamps, filtered to provide a spectral energy distribution which closely approximates to that of solar irradiance as described in CIE Publication No. 85:1989, Table 4, and ISO 4892-2:2013, Table 1 (method A);

b) stainless-steel specimen holders, in the form of an open frame, which provide the test specimens with a solid backing;

c) a black-standard thermometer as specified in ISO 4892-1;

d) a photoelectronic sensor (radiometer) of one of the types specified in ISO 9370 to measure the irradiance and the radiant exposure at the specimen surface in the wavelength range 300 nm to 400 nm, or at 340 nm.

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7.1.2.2 Viewing enclosure, having a matt interior colour corresponding approximately to Munsell N5. It shall be equipped with an artificial light source, located at the top, simulating average north sky daylight (e.g. tungsten-halogen incandescent lamps) and generating a colour temperature of (6 500 ± 200) K and at least 800 lx at the surface of the specimen. The viewing enclosure shall be placed in a position where the surrounding lighting conditions will not affect the visual assessment of the specimen.

7.1.3 Test specimen

One test specimen shall be prepared, of a size suitable for the specimen holder used and appropriate for the method of assessment after exposure.

7.1.4 Procedure

The test specimen and a set of blue wool references 5, 6 and 7 (as specified in ISO 105-B02) shall be exposed simultaneously. Blue wool references 5 and 7 are included to provide confirmation that wool reference 6 has degraded to the specified degree of contrast.

Using opaque stainless-steel covers, shield approximately one-half of both the test specimen and the set of blue wool references.

Carry out the test in accordance with ISO 4892-2 under the following operating conditions:

a) irradiance at the test specimen surface in the wavelength range 300 nm to 400 nm: (60 ± 3) W/m^2; or at wavelength 340 nm: (0,5 ± 0,03) W/m^2;

b) black-standard temperature: (65 ± 3) °C;

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c) relative humidity: (50 ± 5) %.

Discontinue the exposure when the contrast between the exposed and unexposed portions of blue wool reference 6 is equal to grade 4 on the grey scale, as defined in ISO 105-A02.

NOTE 1 Although the use of blue wool references is no longer the preferred method of measuring radiant exposure, the method is still in common use and is therefore permitted. Once sufficient data have been collected, the end-point of the test will be defined by the level of radiant exposure.

Measure and record the radiant exposure (over 300 nm to 400 nm, or at 340 nm).

Remove the test specimen from the apparatus, take off the cover, and leave the specimen for (24 ± 2) h in dark conditions to prevent extraneous darkening and/or photochromism.

NOTE 2 Extraneous darkening and/or photochromism are due to the shock effect of accelerated exposure, and are not characteristics of natural exposure. Keeping the specimens in dark conditions for 24 h allows recovery from these effects.

7.1.5 Assessment of specimen and expression of results

Place the test specimen in the viewing enclosure (7.1.2.2).

Examine the surface of the test specimen with the naked eye, corrected if necessary, at a distance of approximately 500 mm for any change in colour, assessing the contrast between the exposed and unexposed portions of the test specimen in terms of a grade on the grey scale in accordance with ISO 105-A02.

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The lightfastness of the test specimen is expressed in terms of the contrast being greater than, equal to or less than grade 4 on the grey scale.

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7.1.6 Test report

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The test report shall include the following information:

a) a reference to this document, i.e. ISO 19712-3:2022;

b) the name, type and nominal thickness of the product;

c) details of the apparatus used;

d) the irradiance at the test specimen surface;

e) the radiant exposure;

f) the exposure time;

g) the lightfastness of the specimen;

h) any deviation from the method specified;

i) the date of the test.

7.2 Method B

7.2.1 Principle

The test assesses the effect on the colour of a test specimen of exposure to a filtered xenon-arc light source having a frequency range simulating sunlight through window glass.

It is not intended to show the resistance to continuous exposure to outdoor weathering conditions.

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7.2.2 Materials

7.2.2.1 White petroleum jelly.

7.2.3 Apparatus

7.2.3.1 Suitable xenon-arc test apparatus, as specified in ISO 4892-1 and ISO 4892-2, capable of providing radiant energy closely simulating sunlight, with a spectral passband of 280 nm to 800 nm and with appropriate filtering to simulate daylight through window glass. The apparatus shall incorporate a system for mounting specimen holders at an equal radial distance from the centre of the light source and revolving them around the light source to provide equal radiant exposure.

7.2.3.2 Specimen holders, suitable for the test apparatus, and incorporating a mask to cover half of the exposed face of the test specimen.

7.2.3.3 Overhead white fluorescent lights, with bulb(s) positioned parallel to the line of sight and providing an intensity of 800 lx to 1 100 lx at the specimen surface.

7.2.4 Standardization of apparatus

Calibration, maintenance and filter changes shall be strictly in accordance with the equipment manufacturer's recommendations.

The calibration wavelength for the xenon unit shall be 420 nm.

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7.2.5 Test specimens

The test specimens shall be of the size specified for the test apparatus being used. The longest dimension of the specimens shall be in the machine direction of the product.

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7.2.6 Procedure

Mount each test specimen in a specimen holder (7.2.3.2) so that approximately one-half of the specimen is exposed to the light source, the other half being covered by the mask. Fill all the specimen holders, utilizing blanks if necessary, and keep them filled during the whole of the test in order to maintain correct airflow conditions through the test chamber.

Carry out the test under the operating conditions specified in Table 1.

NOTE The setting of the wet-bulb temperature in relation to the dry-bulb temperature is designed to maintain a relative humidity of (50 ± 5) %.

All test parameters shall be maintained as close as possible to the required settings.

Table 1 — Operating conditions

Parameter	Setting	Tolerance
Total irradiance	279,0 kJ/m^2	±2,0 kJ/m^2
Irradiance level	1,10 W/m^2	±0,03 W/m^2
Black-panel temperature	70 °C	±3 °C
Dry-bulb temperature	50 °C	±3 °C
Wet-bulb temperature	39 °C	±1 °C
Conditioning-water temperature	20 °C	±3 °C
Duration of exposure	72 h	±1 %

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