INTERNATIONAL STANDARD

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Plastics — Decorative solid surfacing materials —

Part 3: Determination of properties — Solid surface shapes

Plastiques — Matériaux décoratifs massifs de revêtement de surface —

Partie 3: Détermination des propriétés — Produits mis en forme

Reference number
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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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.

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.

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).

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.

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.

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.

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*

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.

4 Cleaning the test specimen surface

4.1 General

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

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.

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.

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:

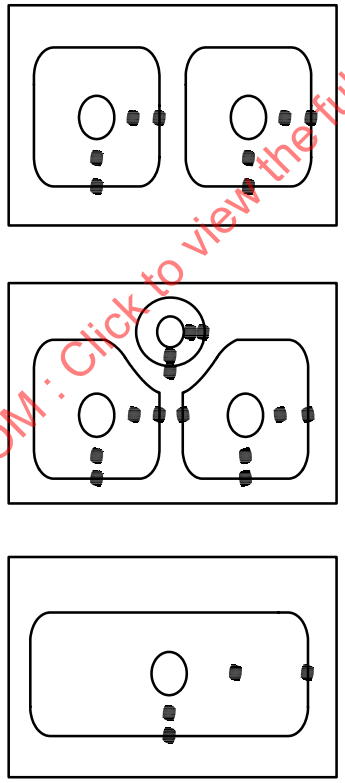
a) a reference to this document, i.e. ISO 19712-3:2022;

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.



Key

- impact points

Figure 1 — Point-of-impact locations

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.

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;

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.

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.

7.1.6 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, 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.

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.

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.

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 %

Table 1 *(continued)*

Parameter	Setting	Tolerance
Power adjustment	Automatic	To maintain steady irradiance levels, allowing for ageing of xenon burners and solarization of filters

The black-panel thermometer shall be mounted at the same distance from the light source as the test specimen. The black coating shall be maintained in good condition in order to achieve as accurately as possible the black-body temperature of the panel.

At the conclusion of the specified exposure period, remove the test specimens from their holders and allow them to condition at room temperature for a period of 24 h.

After this conditioning period, examine each specimen within 4 h by placing the specimen on a horizontal surface under the inspection lights (7.2.3.3) and viewing it at an eye-to-specimen distance of 750 mm to 900 mm, and at an angle of 45° to 75° from the horizontal plane. Rotate the specimen on the horizontal surface and view it from all directions. Direct sunlight or other light sources which might accentuate or minimize the visual effect shall be avoided.

If a difference in appearance is evident between the exposed and unexposed areas of the test specimen, coat the surface of the specimen with a thin film of white petroleum jelly (7.2.2.1) and re-examine it. If the difference persists, report the difference as a colour change; if it disappears, report it as a change in surface finish.

7.2.7 Expression of results

Express the result of the examination in accordance with the following rating scale:

— Rating 5: No change in colour or surface finish

— Rating 4: A slight change in colour or surface finish visible only at certain viewing angles and directions

— Rating 3: A moderate change in colour or surface finish that is just visible at all viewing angles and directions

— Rating 2: A marked change in colour or surface finish that is very evident at all viewing angles and directions

— Rating 1: Surface blistering and/or cracking

7.2.8 Test report

The test report shall include the following information:

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

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

c) details of the apparatus used;

d) the lightfastness of the specimen, expressed in accordance with 7.2.7;

e) any deviation from the method specified;

f) the date of the test.

7.3 Method C (resistance to colour change in light from an enclosed carbon-arc lamp)

7.3.1 Principle

Part of a test specimen taken from the sheet under test is exposed, together with standard blue wool specimens, to the light of an enclosed carbon-arc lamp. The light dosage is determined by the effect on the wool specimens, and the effect on the test specimen is assessed at a specified light dosage by the contrast between the exposed and unexposed portions of the specimen.

The test is fully described in ISO 4892 (all parts).

7.3.2 Apparatus

As specified in ISO 4892 (all parts), without control of humidity.

7.3.3 Test specimen

As specified in ISO 4892 (all parts).

7.3.4 Procedure

Carry out the test using the single-exposure method described in ISO 4892:1981, and discontinue the exposure when blue wool standard No. Five shows a contrast between exposed and unexposed portions equal to grade 4 on the grey scale.

7.3.5 Evaluation and expression of results

Examine the contrast between the exposed and unexposed portions of the test specimen and record it in terms of grades on the grey scale.

Express the result in relation to the resistance to colour change of blue wool standard No. Five as one of those given in Table 2.

Table 2 — Colour change evaluation

Specimen contrast (grey scale grade No.)	Resistance to colour change (blue wool standard No.)
> 4	> 5
4	5
< 4	< 5

7.3.6 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) the resistance of the specimen to colour change, expressed as greater than, equal to or less than that of blue wool standard No. 5;

d) any deviation from the specified procedure;

e) the date of the test.

8 Stain/chemical-resistance test

8.1 Method A

8.1.1 Principle

Test specimens are left in contact with a series of staining agents which are likely to be encountered in everyday use. The time and conditions of contact are specified for each staining agent. At the end of the specified contact period, the specimens are washed and examined for residual surface marks.

If the product under test meets specification requirements when tested with each of the six staining agents marked with an asterisk, then it is deemed to comply with the specification for stain resistance. The other staining agents are included for information only. In the case of a specific complaint, the staining agent in question (selected from group 1, 2 or 3) shall be used to verify the quality of the sheet.

8.1.2 Staining agents

Staining agents and test conditions are listed in Table 3.

8.1.3 Apparatus and materials

8.1.3.1 Glass covers (for example watch-glasses), to restrict evaporation.

8.1.3.2 Thermometer, range 0 °C to 100 °C.

8.1.3.3 Cylindrical aluminium-alloy heating vessel, without a lid, the bottom of which has been machined flat. The vessel shall have an external diameter of (100 ± 1,5) mm and an overall height of (70 ± 1,5) mm, and have a safety rim round the top. The thickness of the wall and bottom shall be (2,5 ± 0,5) mm. An example of a suitable vessel is shown in Figure 2.

8.1.3.4 Hotplate, or other suitable heat source.

8.1.3.5 Horizontal inspection surface, illuminated by overhead and low-angle daylight or white fluorescent light of intensity 800 lx to 1 000 lx.

8.1.3.6 Wetting agent, for example domestic detergent.

8.1.3.7 Cleaning solvents, such as ethanol, acetone, methyl ethyl ketone.

8.1.3.8 Soft clean cloth.

8.1.3.9 Hard polyamide bristle brush (for example a nail brush).

8.1.4 Test specimens

Individual specimens of any suitable size may be used, cut from the product under test. Alternatively, a single piece, large enough to allow the staining agents to be applied side by side, can be used.

Table 3 — Staining agents

Staining agent	Test conditions	Contact time
Group 1		
Toothpaste		
Hand cream		
Urine		
Alcoholic beverages		
Natural fruit and vegetable juices		
Lemonade and fruit drinks		
Meats and sausages		
Animal and vegetable fats and oils		
Water	8.1.5.1 Procedure A Apply staining agent at ambient temperature	16 h to 24 h
Yeast suspension in water		
Salt (NaCl) solutions		
Mustard		
Lyes, soap solutions		
Cleaning solution		
23 % dodecylbenzene sulfonate		
10 % alkylaryl polyglycol ether		
67 % water		
Phenol and chloramine-T disinfectants		
Citric acid (10 % solution)		
Group 2		
Coffee (120 g of coffee per litre of water)	8.1.5.1 Procedure A Apply staining agent at approximately 80 °C	16 h
Black tea (9 g of tea per litre of water)		
Milk (all types)		
Cola beverages	8.1.5.1 Procedure A Apply staining agent at ambient temperature	16 h
Wine vinegar		
Alkaline-based cleaning agents diluted to 10 % concentration with water		
Hydrogen peroxide (3 % solution)		
Ammonia (10 % solution of commercial concentrate)		
Lipstick		
Water colours		
Laundry marking inks		
Ball point inks		

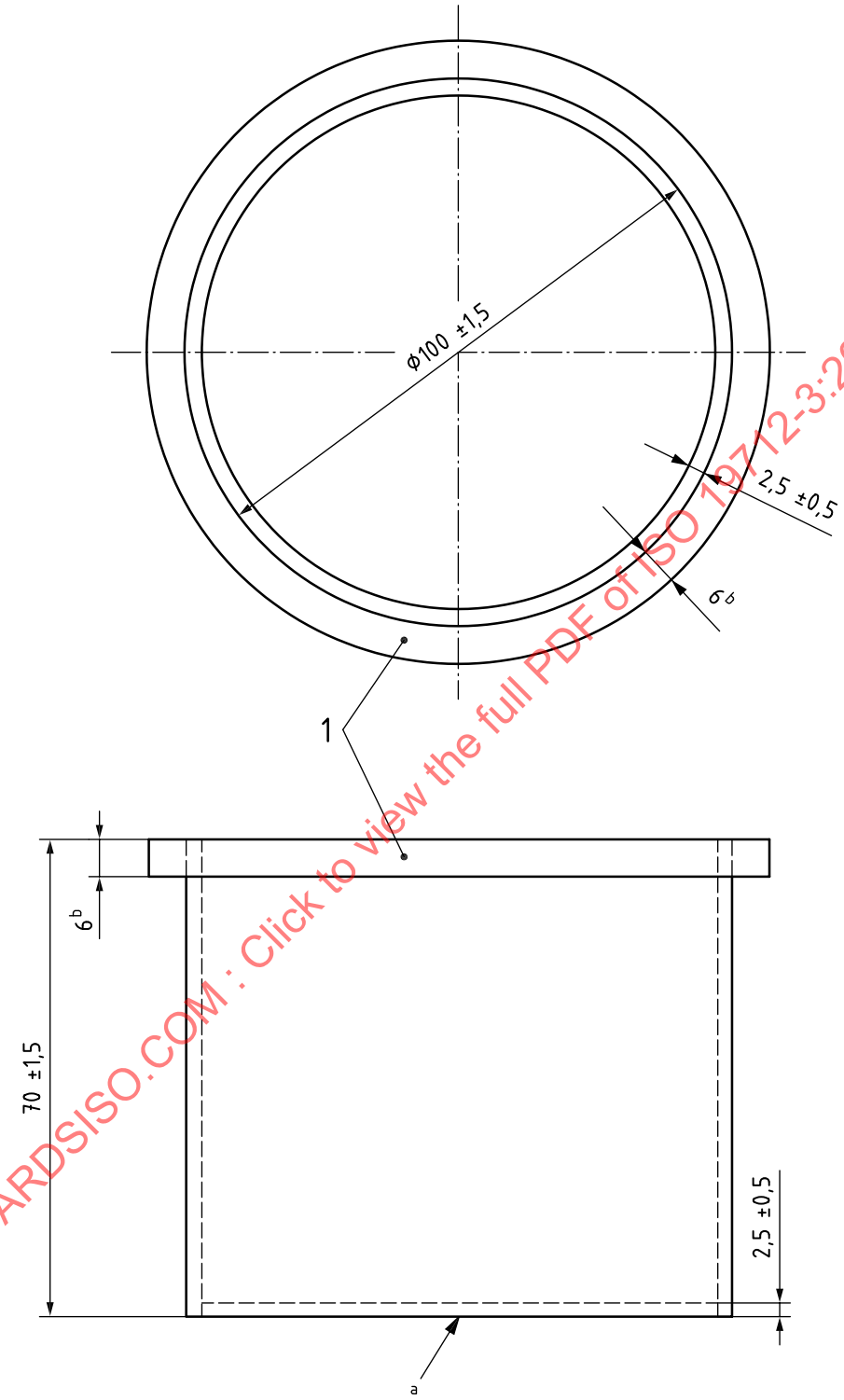
[a] Acids and alkalis, in concentrations stronger than those shown in group 3, which can be contained in commercial cleaning agents, can cause surface damage or marking, even with very short contact times. Any spillage of such materials shall be washed off immediately.

Table 3 *(continued)*

Staining agent	Test conditions	Contact time
Group 3 [a]		
Sodium hydroxide (25 % solution)		
Hydrogen peroxide (30 % solution)		
Acetone		
Trichlorethane		
Other organic solvents		
Concentrated vinegar (30 % acetic acid)		
Bleaching agents and sanitary cleaners containing them		
Hydrochloric acid based cleaning agents (≤ 3 % HCl)		
Acid-based metal cleaners	8.1.5.1 Procedure A Apply staining agent at ambient temperature	10 min
Mercurochrome (2,7-dibromo-4-hydroxymercurifluorescein, disodium salt)		
Shoe polish		
Hair colouring and bleaching agents		
Tincture of iodine		
Boric acid		
Lacquers and adhesives (except fast-curing materials)		
Amidosulfonic acid descaling agents (<10 % solution)		
Nail varnish		
Nail varnish remover		
Stain or paint remover based on organic solvents		
Group 4		
Citric acid (10 % solution)	8.1.5.2 Procedure B	20 min
Acetic acid (5 % solution)		

[a] Acids and alkalis, in concentrations stronger than those shown in group 3, which can be contained in commercial cleaning agents, can cause surface damage or marking, even with very short contact times. Any spillage of such materials shall be washed off immediately.

Dimensions in millimetres



Key

1 aluminium-alloy safety rim

a Bottom welded in place and machined flat. Vessel shall be completely watertight.

b Nominal value.

Figure 2 — Example of heating vessel

8.1.5 Procedures

8.1.5.1 Procedure A

The specimens shall be initially at ambient temperature.

Apply a small quantity (for example 2 or 3 drops) of staining agent to two specimens. The staining agent shall be at the temperature specified in Table 3. Cover the staining agent on one of the two specimens with a glass cover (8.1.3.1). Keep the specimens flat during the test.

After the specified contact time has elapsed, if necessary remove the staining agent with a suitable solvent as recommended by the manufacturer, then wash with water containing a suitable wetting agent (8.1.3.6), and finally with ethanol or another solvent (see 8.1.3.7), as required, to clean the surface. A suitable brush (8.1.3.9) may be used to remove staining agent from textured surfaces.

1 h after washing, place the specimens on the inspection surface (8.1.3.5) and view them from various angles at a distance of 400 mm.

8.1.5.2 Procedure B

Apply a small quantity (for example 2 or 3 drops) of the staining agent to the specimen. The staining agent shall be at ambient temperature.

Fill the heating vessel (8.1.3.3) with water (to within 15 mm of the top) and heat it until the water boils vigorously. Discontinue heating and immediately place the vessel containing the boiling water on the surface of the specimen directly over the pool of staining agent. Keep the specimen flat during the test.

After the specified contact time, remove the vessel and wash the specimen with water containing a suitable wetting agent (8.1.3.6), and then with ethanol or another solvent (see 8.1.3.7), as required, to clean the surface. A suitable brush (8.1.3.9) may be used to remove staining agent from textured surfaces.

1 h after washing, place the specimen on the inspection surface (8.1.3.5) and view it from various angles at a distance of 400 mm.

8.1.6 Expression of results

The effect on the surface of the specimen shall be expressed in accordance with the following rating scale for each of the six mandatory staining agents:

Rating 5: No visible change

Rating 4: Slight change in gloss and/or colour, only visible at certain viewing angles

Rating 3: Moderate change in gloss and/or colour

Rating 2: Marked change in gloss and/or colour

Rating 1: Surface distortion and/or blistering

8.1.7 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) an assessment of stain resistance for each staining agent applied, expressed in accordance with the rating scale given in 8.1.6;

d) any deviation from the specified procedure;

e) the date of the test.

8.2 Method B

8.2.1 Principle

Test specimens are left in contact with a series of staining agents that are likely to be encountered in everyday household use. At the end of the prescribed contact period, the specimens are subjected to a specified cleaning programme and examined for any residual surface marks.

This method may also be used with staining agents other than those specified, to cover specific requirements agreed between supplier and purchaser.

8.2.2 Materials

8.2.2.1 Commercially available non-abrasive cleaner, containing approximately 4 % of butyl cellosolve.

8.2.2.2 Commercially available bleach, containing (5 ± 0,5) % of sodium hypochlorite.

8.2.2.3 Baking soda.

8.2.2.4 Supply of clean, soft, white cloth.

8.2.2.5 Supply of cotton balls.

8.2.2.6 Acetone, 100 % by volume, or **ethanol**, 95 % by volume.

8.2.2.7 Distilled water.

8.2.2.8 Staining agents, as listed in Table 4.

Table 4 — Staining agents and their method of application

Agent number	Description	Preparation notes	Application
1	Distilled water	—	Apply 2 drops (an approximately 6-mm-diameter spot) and cover with a watch-glass.
2	Ethyl alcohol	A mixture of 50 % ethyl alcohol and 50 % distilled water	
3	Household ammonia	Non-sudsing type	
4	10 % citric acid	A solution of 10 % citric acid in distilled water	
5	Vegetable oil	—	
6	Fresh coffee	One teaspoon of instant coffee per 180 ml of distilled water	
7	Fresh tea	Brew 1 tea bag per 120 ml of boiling distilled water for 2 min	
8	Tomato ketchup	—	
9	Yellow mustard	—	
10	Tincture of iodine	—	
11	Acetone	—	Apply a spot approximately 6 mm in diameter; do not cover.
12	Black permanent marker	—	
13	HB pencil	—	
14	Wax crayon	—	
15	Black paste shoe polish	—	
Staining agents shall be kept in closed containers to avoid any change in concentration. Perishable food items shall be kept refrigerated.			

8.2.3 Apparatus

8.2.3.1 Glass covers, approximately 25 mm in diameter (for example watch-glasses), one for each test requiring a cover.

8.2.3.2 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.

8.2.3.3 Cellulose sponge, measuring approximately 75 mm × 100 mm × 50 mm.

8.2.3.4 Hard polyamide bristle brush, for example a nail brush.

8.2.3.5 Weight, of mass 1 kg.

8.2.4 Test specimen

The test specimen shall have a surface area sufficient to permit all 15 test reagents to be placed on the surface in two lines with the individual stains about 50 mm apart. A 100 mm × 400 mm specimen is adequate.

8.2.5 Procedure

8.2.5.1 Staining procedure

Clean the surface of the test specimen using the cleaner (8.2.2.1) and water on a clean cloth (8.2.2.4). Rinse the specimen thoroughly and dry using another clean, soft cloth. Allow to dry completely at room temperature.

Position the test specimen on a flat, level, horizontal surface and fix it down (e.g. with tape or weights) to keep it in the horizontal plane.

Place a small quantity of each staining agent (to give a spot approximately 6 mm in diameter) on the surface of the test specimen. The staining agents shall be at room temperature.

If indicated in Table 4, cover each staining agent with a glass cover (8.2.3.1), concave side down, and move the glass cover gently while in contact with the surface of the test specimen until the entire circular rim of the glass cover is wetted by the staining agent and the staining agent covers an area both under and outside the glass cover.

Mark the test specimen suitably so that each staining agent is identified.

Leave the test specimen undisturbed for a period of 16 h to 24 h then remove the glass covers and subject the test specimen to the cleaning procedures prescribed in 8.2.5.2.

8.2.5.2 Cleaning procedures and ratings

Stage 1: Flush the surface of the specimen with water and wipe gently with the sponge (8.2.3.3) moistened with water. Blot the specimen dry with a clean, soft cloth (8.2.2.4) and examine the surface in accordance with the inspection procedure described in 8.2.5.3. If a staining agent is completely removed by stage 1 cleaning (i.e. no visible marks remain), then give that agent a rating of 0. If any stains remain, proceed to stage 2.

Stage 2: Wet the surface of the specimen with the non-abrasive cleaner (8.2.2.1). Moisten the sponge (8.2.3.3) with water and place it on the surface, then place the 1 kg weight (8.2.3.5) centrally on top of the sponge. Push the weighted sponge back and forth (without any additional downward pressure) over the area to be cleaned for 25 cycles (see the NOTE). Rinse the specimen with water and wipe dry using a clean, soft cloth (8.2.2.4), then examine the surface in accordance with the inspection procedure (see 8.2.5.3). If a staining agent is completely removed by stage 2 cleaning (i.e. no visible marks remain), then give that agent a rating of 1. If any stains remain, proceed to stage 3.

Stage 3: Wet the surface of the specimen with the non-abrasive cleaner (8.2.2.1) and add baking soda to achieve a pasty consistency. Using the stiff-bristle brush (8.2.3.4), scrub any areas where traces of the staining agents are still visible for 25 cycles (see the NOTE). Rinse the specimen with water and wipe dry using a clean, soft cloth (8.2.2.4), then examine the surface in accordance with the inspection procedure (see 8.2.5.3). If a staining agent is completely removed by stage 3 cleaning (i.e. no visible marks remain), then give that agent a rating of 2. If any stains remain, proceed to stage 4.

Stage 4: Using a cotton ball (8.2.2.5) saturated with acetone or ethanol (see 8.2.2.6), rub the stain gently for 2 min. Rinse the specimen with water and wipe dry using a clean, soft cloth (8.2.2.4), then examine the surface in accordance with the inspection procedure (see 8.2.5.3). If a staining agent is completely removed by stage 4 cleaning (i.e. no visible marks remain), then give that agent a rating of 3. If any stains remain, proceed to stage 5.

Stage 5: Place a cotton ball (8.2.2.5) saturated with hypochlorite bleach (8.2.2.2) on the stain, and allow it to remain in contact for a period of 2 min. Rinse the specimen with water and wipe dry using a clean, soft cloth (8.2.2.4), then examine the surface in accordance with the inspection procedure (see 8.2.5.3).

If a staining agent is completely removed by stage 5 cleaning (i.e. no visible marks remain), then give that agent a rating of 4. Give any staining agent that remains visible after stage 5 a rating of 5.

NOTE In stages 2 and 3, one cycle is a movement forward across the area to be cleaned and back again to the starting position.

8.2.5.3 Inspection procedure

After each stage of cleaning, place the specimen on a horizontal surface under the inspection lights (8.2.3.2) and view it at an eye-to-specimen distance of 750 mm to 900 mm and at an angle of 45° to 75° to the horizontal plane. Rotate the specimen on the horizontal surface and view it from all directions. Direct sunlight or other light sources which might accentuate or minimize the visual effect shall be avoided.

8.2.6 Expression of results

8.2.6.1 Cleanability

Add up the ratings given to the 15 staining agents and report the cleanability of the test specimen as the sum of the ratings of the 15 agents.

A typical example, showing a specimen with a cleanability of 16, is shown in Table 5.

Table 5 — A typical example of cleanability

Agent number	Stain	Rating
1	Distilled water	0
2	Ethyl alcohol	0
3	Household ammonia	0
4	10 % citric acid	0
5	Vegetable oil	0
6	Fresh coffee	0
7	Fresh tea	0
8	Tomato ketchup	1
9	Yellow mustard	2
10	Tincture of iodine	2
11	Acetone	0
12	Black permanent marker	2
13	HB pencil	2
14	Wax crayon	3
15	Black paste shoe polish	4
		Total: 16

8.2.6.2 Stain resistance

Assess the stain resistance after completion of the required stages of cleaning and report as one of the following:

Rating 5: The staining agents have no effect. All marks from the staining agents removed, with no impairment to surface appearance other than a change in gloss due to cleaning.

Rating 3: The staining agents have a moderate effect. One or more slight stains evident, with no other impairment to surface appearance other than a change in gloss due to cleaning.

Rating 1: The staining agents have a severe effect. One or more heavy stains evident and/or disturbance of the surface other than a change in gloss due to cleaning.

Record any staining agents that produce a moderate or severe effect.

8.2.7 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, type and nominal thickness of the product;

c) the cleanability of the specimen, expressed in accordance with 8.2.6.1;

d) the stain resistance of the specimen, expressed in accordance with 8.2.6.2, plus a note of any staining agents that produced a moderate or severe effect;

e) any deviation from the method specified;

f) the date of the test.

9 Resistance to cigarette burns

9.1 Method A

9.1.1 Principle

The shaped product under test is subjected to the heat from a burning cigarette placed on its surface. The test result is expressed in terms of any resultant damage.

9.1.2 Materials

9.1.2.1 Pale-tobacco cigarettes without filters, from each of three well-known brands, each with a mass of 1,0 g to 1,1 g for a length of 70 mm and with the tobacco evenly distributed over its length.

9.1.2.2 Acetone, 100 % by volume, or **ethanol**, 95 % by volume.

9.1.2.3 Soft cloth.

9.1.3 Test specimen

Use a shaped product taken from a production batch.

9.1.4 Procedure

Ignite one cigarette from one of the brands and let it burn to consume a length of approximately 10 mm.

Place the burning cigarette in full-length contact with a horizontal surface of the specimen in a draught-free area so that the glued seam of the cigarette is not in contact with the specimen. Allow the cigarette to continue burning until an additional 20 mm length is consumed. If the cigarette goes out before this occurs, repeat the test.

Follow the same procedure with the two cigarettes from the other two brands.

Remove any superficial combustion residues with a soft cloth (9.1.2.3) moistened with acetone or ethanol (see 9.1.2.2). Examine the surface with the naked eye, corrected if necessary, for any changes such as discolouration, cracks or blisters.

9.1.5 Expression of results

Express the result for each area of cigarette contact in accordance with the following rating scale:

Rating 5: No visible change

Rating 4: Slight change in gloss, only visible at certain viewing angles and/or slight brown stain

Rating 3: Moderate change in gloss and/or moderate brown stain

Rating 2: Severe brown mark, but no destruction of the surface

Rating 1: Blistering and/or cracks

9.1.6 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) the brands of cigarette used;

d) the cigarette burn resistance of the specimen, expressed as the arithmetic mean of the three individual ratings, rounded to the nearest integer;

e) any deviation from the specified procedure;

f) the date of the test.

9.2 Method B (simulated test using electric heater)

9.2.1 Principle

Shaped products are exposed to local radiant heat from an electric heater. The resistance of the material is assessed in terms of the duration of exposure needed to cause visible damage.

9.2.2 Apparatus

9.2.2.1 Heating-element support (see Figure 3), consisting of electrically non-conducting laminated sheet.

9.2.2.2 Heating element (see Figure 3), of iron-aluminium alloy, having the following characteristics:

a) cross-section of flat wire: 1,6 mm × 0,25 mm;

b) wire length: 480 mm;

c) electrical resistance: (1,8 ± 0,1) Ω.

This heating element shall be in the form of a spiral (outside diameter approximately 15 mm, external ring not included).

9.2.2.3 Adjustable mounting, for the heating element (see Figure 3), consisting of an externally threaded brass sleeve located vertically by two knurled brass nuts.

9.2.2.4 Calibration block (see Figure 4), of electrically insulating laminate, on which are mounted:

a) A disc support, made from homogeneous heat-insulating diatomaceous-earth sheet material of bulk density 512 kg/m^3 to 576 kg/m^3, and of thermal conductivity 0,10 W/(m·K) to 0,12 W/(m·K) in the temperature range 0 °C to 300 °C.

b) A stainless steel disc, to the bottom of which is silver-soldered an iron-constantan thermocouple. The surface of the disc shall be highly polished and flat, and shall be in the same plane as the surface of the disc support. The disc shall be clamped firmly on its support.

9.2.2.5 Glass-windowed cover (see Figure 5), with the following nominal dimensions:

length: 240 mm;

width: 110 mm;

height: 80 mm.

9.2.2.6 Stopwatch.

9.2.2.7 Power source, producing a constant current for the heating element.

This source may be:

a) either a series of well charged accumulators with elements in good condition, able to provide the heating element with a power greater than 20 W;

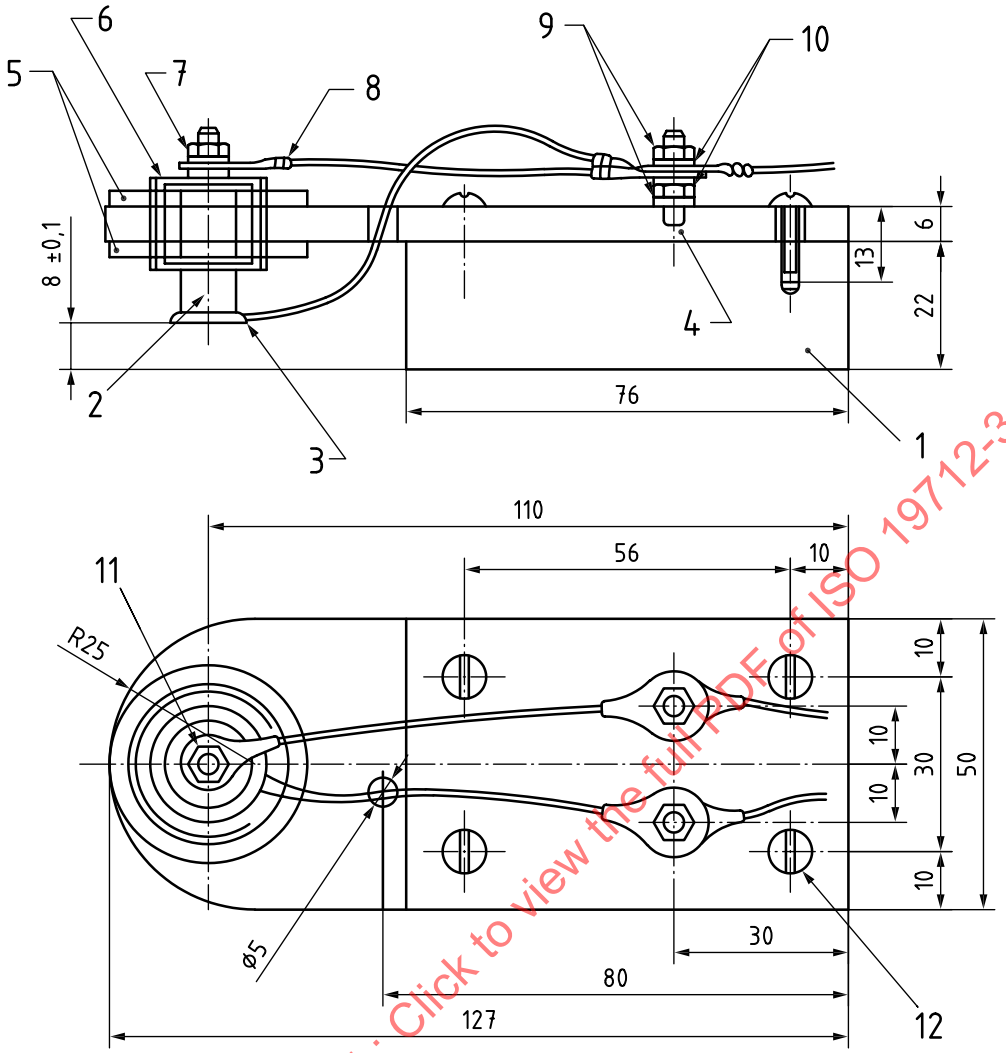
b) or an electrical unit powered from the mains supply.

9.2.2.8 Control circuit, to adjust and maintain the power consumption of the heating element with an accuracy of ±0,1 %. Measurements are made by means of a voltmeter and an ammeter. A circuit for use with a 115 V supply is shown in Figure 6.

9.2.2.9 Potentiometer, for measuring the temperature of the stainless-steel disc.

9.2.2.10 Cotton wick, saturated with liquid paraffin.

Dimensions in millimetres



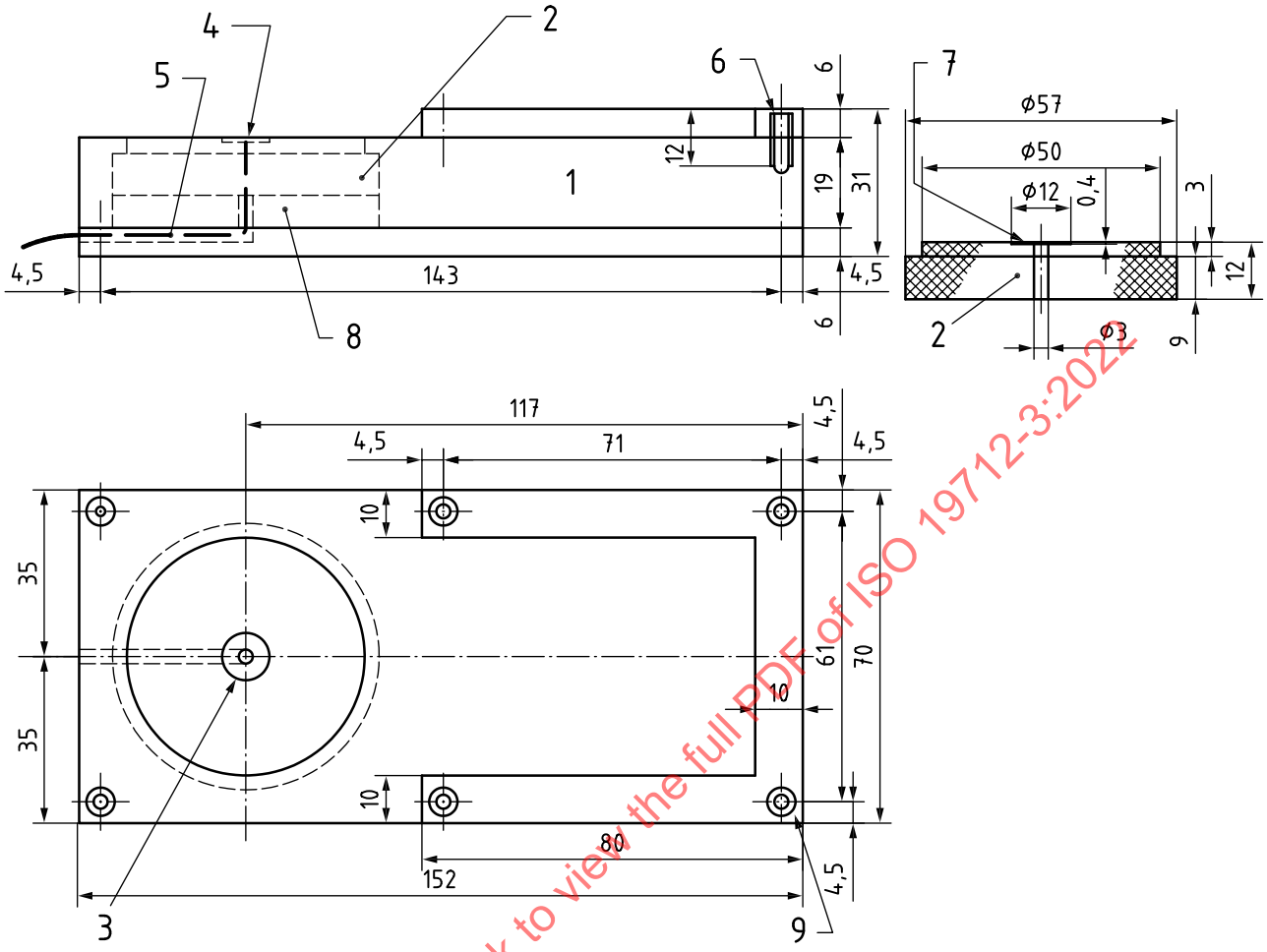
Key

1 heating-element support
2 heating element
3 silver-soldered connection
4 two screws F/90, Ø 4/18 mm
5 two knurled nuts, thickness 3 mm, fine threaded pitch 0,75 mm, Ø int. 27 mm, Ø ext. 39 mm
6 tube, Ø 20/27 mm, length 17 mm, externally threaded, fine threaded pitch 0,75 mm
7 nut HM4
8 earthing terminal
9 four nuts HM4
10 four washers M4
11 electrical resistance coil soldered to the threaded tube at three points on the circumference
12 four screws R 4/12

Materials: Electrically insulating laminate, screws and threaded tube.

Figure 3 — Electric heater for cigarette test (see 9.2.2.1, 9.2.2.2 and 9.2.2.3)

Dimensions in millimetres



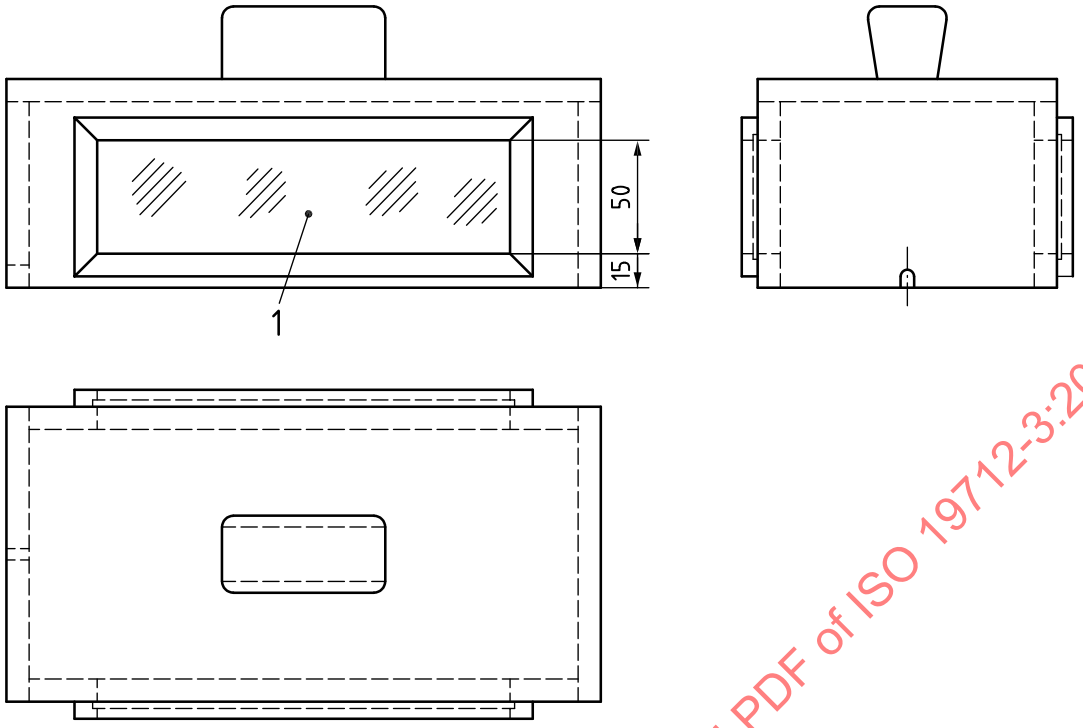
Key

1 calibration block
2 disc support (material: diatomaceous earth or similar insulating material)
3 stainless-steel disc, Ø 12,5 mm, thickness 0,4 mm, central hole Ø 1 mm
4 iron-constantan thermocouple silver-soldered in a hole (Ø 1 mm) in the stainless-steel disc
5 duct, Ø 3 mm
6 holes, Ø 3,5 mm
7 circular depression
8 electrically insulating laminate washer, Ø ext. 57 mm, Ø int. 3 mm, thickness 7 mm
9 eight screws F/90, Ø 3/10 mm

Material: Electrically insulating laminate.

Figure 4 — Calibration block for cigarette test (see 9.2.2.4)

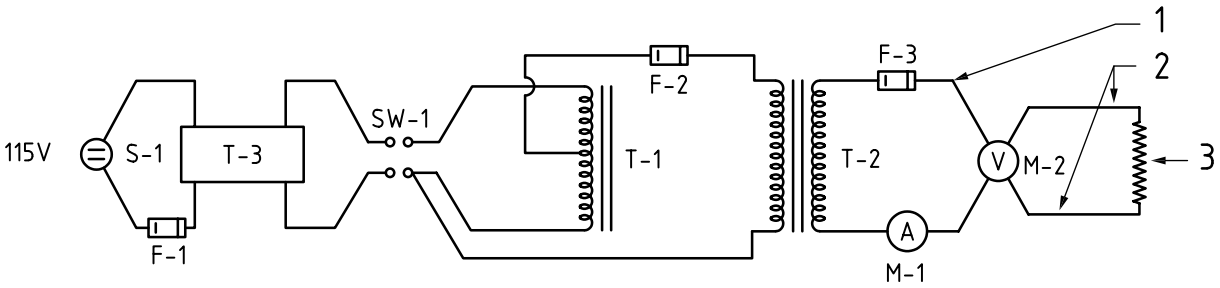
Dimensions in millimetres



Key

1 two glass-covered observation windows facing each other — size (nominal) 180 mm × 50 mm

Figure 5 — Apparatus cover for cigarette test (see 9.2.2.5)



List of items

Symbol	Function	Description
F-1	Line fuse Line fuse mounting	5 A
F-2	Control fuse Control fuse mounting	1 A Extractor post
F-3	Power fuse Power fuse mounting	10 A Extractor post
M-1	Ammeter	0 A to 10 A alternating current
M-2	Voltmeter	0 V to 6 V alternating current
S-1	Line connector	Male connector
SW-1	Line switch	DPST toggle switch
T-1	Autotransformer	Primary: 115 V; secondary: 0,130 V; 5 A
T-2	Power transformer	Primary: 115 V; secondary: 5,25 V; 22 A
T-3	Voltage stabilizer	100 V·A: 115 V output ± 1 %

Key

1 5 mm^2 wire
2 5 mm^2 heater cord
3 resistor heating element

Figure 6 — Wiring diagram of control circuit for cigarette test (see 9.2.2.8)

9.2.3 Test specimens

Prepare three specimens each measuring (230 ± 5) mm × (230 ± 5) mm × the thickness of the shaped product under test.

9.2.4 Procedure

9.2.4.1 Calibration

The bottom of the heating element shall be flat.

Adjust the heating element so that the distance between its lower side and the disc is (8 ± 0,1) mm (without including the edging ring).

Stand the heating-element support (9.2.2.1) on its end and adjust the power input to approximately 20 W.

Allow to heat for 30 min.

Blacken the stainless-steel disc with the flame from the burning paraffin-saturated wick to produce a uniform coating of carbon. The insulating support shall be kept clean.

Place the heating-element support on the calibration block so that the heating element covers the disc.

Cover the assembly to exclude draughts.

Allow the heating element to warm the disc for 10 min in order to produce a final temperature of approximately 285 °C.

It is not necessary to record the intermediate temperatures. If the final temperature is not 285 °C, adjust the power input. Lift up the heating-element support without disconnecting the power supply and stand it in the vertical position.

Keep the calibration block under the cover until the disc cools to (40 ± 0,5) °C, then replace the heating-element support on the calibration block and cover immediately.

Start the stopwatch when the heating-element support and the calibration block touch. Measure and record the temperature at 1 min intervals for a period of 10 min.

The calibration curve shall be within the following limits:

Time (min)	**Temperature** (°C)
0	40 ± 0,5
1	215 ± 3
2	251 ± 3
3	265 ± 3
4	274 ± 3
5	279 ± 3
6	282 ± 3
7	284 ± 3
8	285 ± 3
9	286 ± 3
10	287 ± 3

During the calibration, the current shall not fluctuate. If necessary, adjustment shall be made and further calibration carried out until the desired curve is obtained [each time allowing the calibration block to cool to (40 ± 0,5) °C].

When the calibration curve is obtained, proceed with the test.

9.2.4.2 Test

Position the heater on the specimen so that the resistance coil is at least 40 mm from the nearest edge, start the timer at the same time, and cover the assembly with the enclosure within 2 s.

Continue the test until the specimen fails or for 10 min. Failure is defined for this purpose as blistering, charring, permanent discolouration or crazing. If failure occurs in less than 10 min, record the time of failure.

The test shall be invalid if:

a) the heating element is moved during the test or is not positioned (8 ± 0,1) mm above the surface of the specimen;

b) the power input to the heating element does not remain constant at the level of the last calibration;

c) the cover is removed at any time during the test.

Repeat the test on additional specimens to obtain three valid results.

The calibration of the heating element shall be checked at least once per hour, and at any time that irregular results or an unsteady power input are observed.

9.2.5 Expression of results

Report the result as the average of the three times to failure, in seconds.

If one or two tests are discontinued without failure, their results shall be taken as 600 s for the purpose of calculating the average. If all three tests are discontinued without failure, the result shall be recorded as “no failure in 600 s”.

9.2.6 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) the average time to failure, or a statement that failure did not occur in 600 s;

d) the type of failure, for example blistering, crazing;

e) any deviation from the specified procedure;

f) the date of the test.

10 Resistance to dry heat

10.1 Method A

10.1.1 Principle

The shaped product under test is subjected to dry heat by contact with a vessel of defined heat capacity, initially at 180 °C but cooling during the 20 min of contact. Resistance to the test conditions is assessed by visual examination.

The test is intended to determine the suitability of shaped products for use in applications where contact with moderately hot utensils is to be expected.

10.1.2 Materials

10.1.2.1 Glycerol tristearate, or any other material of similar specific heat which will produce the same result. To minimize health and safety risks, metal blocks can be used if it can be shown that similar results will be obtained. The same glycerol tristearate or other material can normally be used for at least 20 tests, but if it has been heated to a temperature above 200 °C, or in cases of dispute, fresh material shall be used.

10.1.3 Apparatus

10.1.3.1 Cylindrical aluminium-alloy heating vessel, without a lid, the bottom of which has been machined flat. The vessel shall have an external diameter of (100 ± 1,5) mm and an overall height of (70 ± 1,5) mm, and have a safety rim round the top. The thickness of the wall and bottom shall be (2,5 ± 0,5) mm. An example of a suitable vessel is shown in Figure 2.

10.1.3.2 Heat source, for heating the vessel (10.1.3.1) uniformly.

10.1.3.3 Heat-insulating board, made of suitable inorganic material, measuring approximately 150 mm × 150 mm and approximately 2,5 mm thick.

10.1.3.4 Thermometer, range −5 °C to + 250 °C.

10.1.3.5 Fixed frame, to hold the specimen flat.

10.1.3.6 Stirrer.

10.1.4 Test specimen

The specimen shall have a flat area of a size sufficient to accommodate the heating vessel (10.1.3.1).

10.1.5 Procedure

Fill the heating vessel (10.1.3.1) with sufficient glycerol tristearate (10.1.2.1) so that at 180 °C the level is about 15 mm from the top. Fix the thermometer (10.1.3.4) centrally in the vessel with its bulb about 6 mm from the bottom. Raise the temperature of the glycerol tristearate to approximately 185 °C, stirring from time to time. Transfer the vessel to the heat-insulating board (10.1.3.3) and allow the temperature to fall to (180 ± 1) °C, stirring continuously.

Immediately place the vessel on the surface of the specimen and allow to stand for 20 min without further stirring.

At the end of this period, remove the vessel and allow the specimen to cool for a period of 45 min. Examine the specimen for surface disturbance, for example blistering, crazing, discolouration or loss in gloss visible to the naked eye, corrected if necessary, allowing the light to fall on the specimen at various angles of incidence.

10.1.6 Expression of results

Express the result of the examination in accordance with the following rating scale:

Rating 5: No visible change

Rating 4: Slight change in gloss and/or colour, only visible at certain viewing angles

Rating 3: Moderate change in gloss and/or colour

Rating 2: Marked change in gloss and/or colour

Rating 1: Surface damage and/or blistering

10.1.7 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) the effect on the surface of the specimen, expressed in accordance with 10.1.6;

d) any deviation from the method specified;

e) the date of the test.

10.2 Method B

10.2.1 Principle

A standard aluminium-alloy block at a temperature of 180 °C is placed on a flat area of the product under test. After 20 min the block is removed. The test area is wiped dry and the specimen allowed to stand for at least 16 h. It is then examined under specified lighting conditions for signs of damage (discolouration, change in gloss, blistering or other defects). The damage is assessed by reference to a numerical rating scale.

10.2.2 Materials

10.2.2.1 Soft, absorbent cloths.

10.2.3 Apparatus

10.2.3.1 Thermometer, as specified in ISO 1770, capable of insertion to the bottom of the centre bore in the heating block (10.2.3.2), or other suitable means of measuring the temperature of the heating block to an accuracy of 1 °C.

10.2.3.2 Aluminium-alloy heating block, as shown in Figure 7, made of alloy 6060 (previously designated AI MgSi) as specified in ISO 209. The bottom of the block shall be machined flat.

10.2.3.3 Oven, or other suitable means of heating the heating block (10.2.3.2) to a temperature at least 10 °C higher than 180 °C.

10.2.3.4 Heat-insulating board, made of suitable inorganic material, measuring approximately 150 mm × 150 mm (or larger) and approximately 2,5 mm thick.

10.2.3.5 Diffuse light source, providing evenly diffuse light in the test area. This may be either diffuse natural daylight sufficiently bright to give an illumination of at least 2 000 lx or diffuse artificial daylight in a colour-matching booth in accordance with ISO 3668.

10.2.3.6 Viewing cabinet (see Figure 8), with a 60 W frosted bulb so screened that light reaches the test area only from the bulb and that the bulb is not in the direct view of the tester. The angle between the horizontal and a line between the bulb and the area under examination shall be 30° to 60°.

10.2.4 Test specimen

The specimen shall have a flat area of a size sufficient to accommodate the heating block (10.2.3.2).

If necessary, the surface of the test specimen shall be cleaned by wiping with a soft, absorbent cloth (10.2.2.1) moistened with a mild cleansing solution (as specified in ISO 4211:1979, 3.10). The surface shall then be wiped with a clean, soft, absorbent cloth (10.2.2.1) moistened with distilled or deionized water.

10.2.5 Procedure

Place the thermometer or other means of measuring temperature (see 10.2.3.1) in the central bore of the heating block (10.2.3.2).

Using the oven or other heating means (see 10.2.3.3), raise the temperature of the heating block to a temperature at least 10 °C higher than 180 °C.

Wipe the test area with a soft, absorbent cloth (10.2.2.1).

When the heating block is at a temperature at least 10 °C higher than 180 °C, transfer it to the heat-insulating board (10.2.3.4).

When the temperature of the heating block has dropped to 180 °C, immediately place it on the test area.

After 20 min in this position, remove the block and wipe the test area with a soft absorbent cloth.

Allow the specimen to stand at ambient temperature for at least 16 h.

Wipe the test area again with a soft absorbent cloth and examine the specimen using the diffuse light source (see 10.2.3.5) and also in the viewing cabinet (10.2.3.6).

Dimensions in millimetres
General tolerance limits ± 0,1 mm

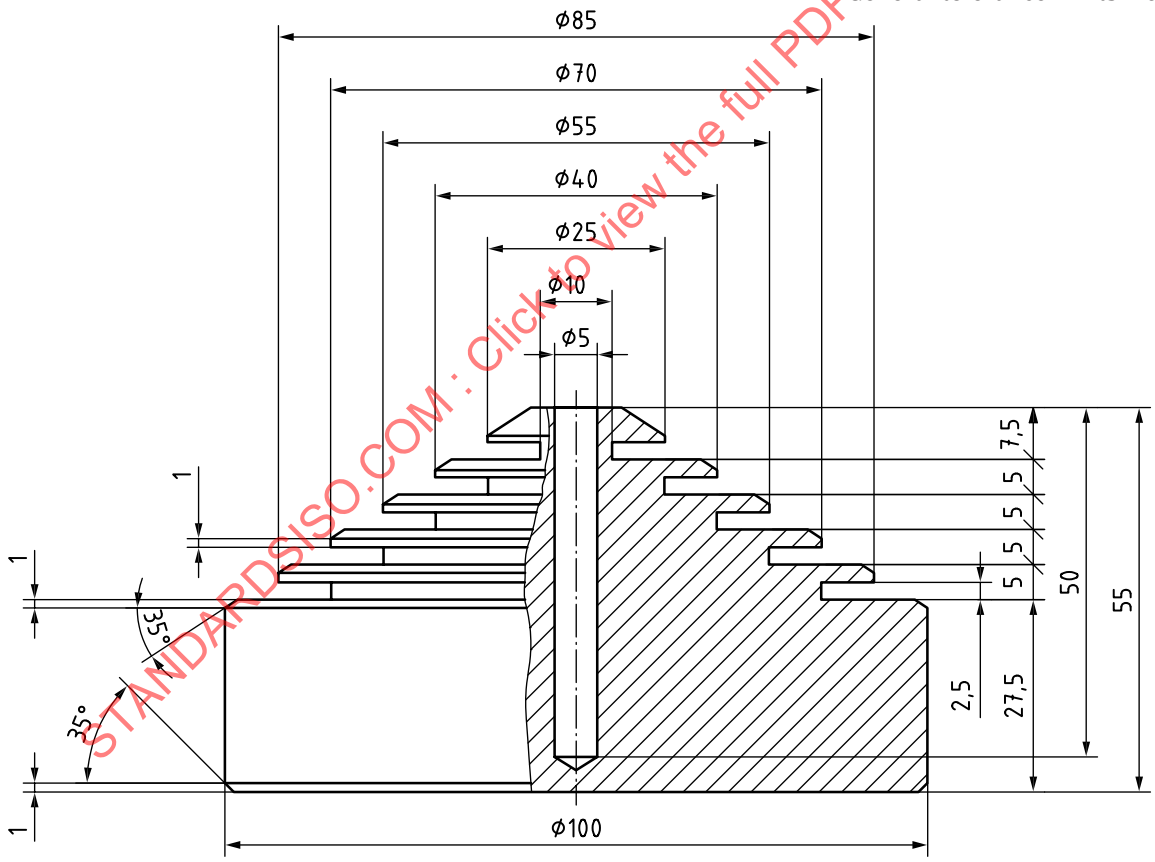
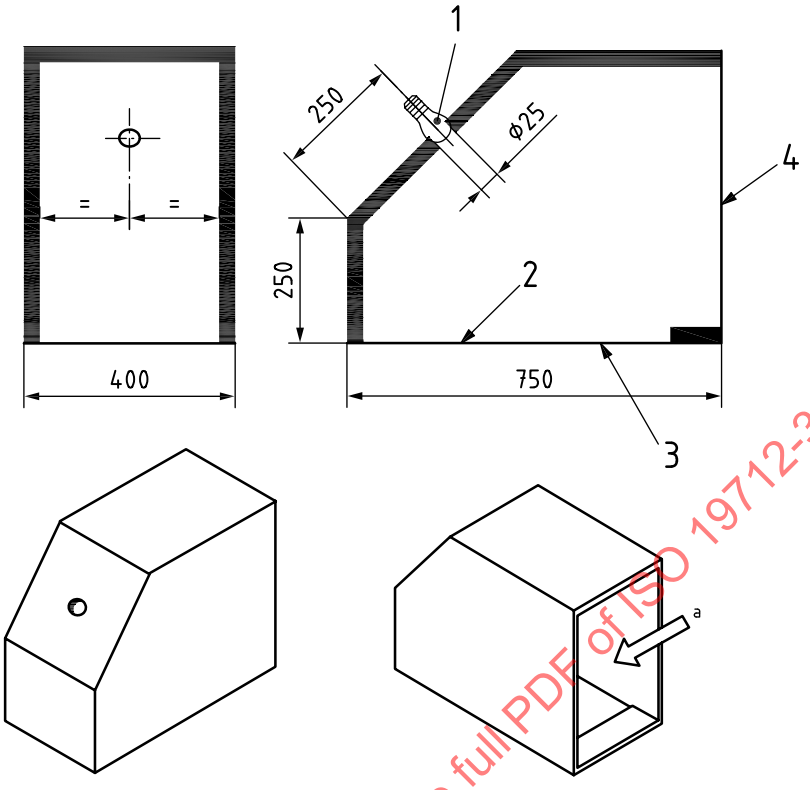


Figure 7 — Aluminium-alloy block used as heat source

Dimensions in millimetres



Key

1 60 W frosted bulb
2 observation area
3 open bottom
4 open end
[a] Viewing direction.

NOTE Interior surfaces are painted black. All dimensions are approximate.

Figure 8 — Viewing cabinet

10.2.6 Expression of results

Express the result of the examination in accordance with the following rating scale:

Rating 5: No visible change (no damage)

Rating 4: Slight change in gloss visible only when the light source is mirrored in the test area and the light is reflected towards the observer's eye, or a few isolated imperfections just visible

Rating 3: Slight mark(s) visible when viewed from several directions, for example an almost complete disc

Rating 2: Distinct mark(s) or region(s) of slight discolouration or region(s) of slight disturbance of the surface visible

Rating 1: Distinct mark(s) or region(s) of distinct discolouration or region(s) of distinct disturbance of the surface visible

It is recommended that the test area be rated by more than one observer experienced in this type of assessment. In this case, report that rating which is given (or exceeded) by the majority of observers.

If the results obtained with the two light sources differ, report the lower of the two ratings.

10.2.7 Test report

The test report shall include at least the following information:

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

b) the name and type of product tested, plus any other relevant data (whenever possible, the substrate and the finishing system shall be identified);

c) the effect on the surface of the specimen, expressed in accordance with 10.2.6;

d) the result of the test in terms of the stated requirements, if any;

e) any deviation from the method specified;

f) the name and address of the test facility;

g) the date of the test.

10.3 Method C

10.3.1 Test specimen

The specimen shall have a flat area of a size sufficient to accommodate the heating block (10.2.3.2).

10.3.2 Procedure

Heat an aluminium-alloy heating block (10.2.3.2) for (15 ± 0,5) min in the oven (see 10.2.3.3) maintained at (185 ± 5) °C. Place the heating block on the test specimen, allow it to remain there for (10 ± 0,5) min and then remove it.

Allow the specimen to stand at ambient temperature for 4 h and then examine it for surface defects such as cracking, crazing or discolouration.

In cases of dispute, examination of the specimen shall be carried out in accordance with ASTM D 2244.

10.3.3 Performance requirements

There shall be no cracking, crazing or blistering.

Any discolouration shall be removable, using abrasives and polishing compound, to give a surface with approximately the same finish and serviceability as the original surface.

10.3.4 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) the effect on the surface of the specimen, i.e. whether there was any cracking, crazing or blistering;

d) whether any discolouration was removable;

e) any deviation from the method specified;

f) the date of the test.