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Rubber- or plastics-coated fabrics — Determination of fogging characteristics of trim materials in the interior of automobiles

Textiles revêtus de caoutchouc ou de plastique — Détermination des caractéristiques d'embuage des matériaux de garnissage utilisés dans l'habitacle automobile

ICS: 59.080.40; 43.040.60

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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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 04, *Products (other than hoses)*.

This third edition cancels and replaces the second edition (ISO 6452:2007), which has been technically revised.

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

— Air has been added as the thermal-transfer fluid for the test apparatus.

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.

Rubber- or plastics-coated fabrics — Determination of fogging characteristics of trim materials in the interior of automobiles

WARNING — Persons using this document should be familiar with normal laboratory practice. 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 ensure compliance with any national regulatory conditions.

1 Scope

This document specifies a test method which is intended to determine the fogging characteristics of rubber- or plastics-coated fabrics that are used as trim materials in the interior of motor vehicles.

The method may also be applicable to fluid, pasty, powdered or solid raw materials which are the basis for such trim materials or from which the materials are manufactured. The method may also be applicable to other materials and finished products.

The procedure is applicable to the measurement of fog condensate on glass surfaces within the limits of the test conditions. This test will not measure or cannot measure accurately those cases in which:

— the surface tension of the condensate is low, resulting in early coalescing into a thin transparent film;

— the condensate is present in such a large quantity that the droplets coalesce and form a heavy oily/clear film (this heavy film gives false readings).

In such cases, the gravimetric method is preferred.

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 2813, *Paints and varnishes — Determination of gloss value at 20°, 60° and 85°*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Principle

A test piece or portion is heated in a glass beaker. Any volatile constituents are condensed on either a cooled glass plate or a disc of cooled aluminium foil.

The fogging value F is calculated as the quotient, in percent, of the gloss value for the glass plate with fogging condensate and the gloss value of the same glass plate without fogging condensate. The gloss values are measured in accordance with ISO 2813.

The mass of the condensable constituents G is given by the difference between the masses of the aluminium foil disc before and after fogging.

5 Materials

5.1 Thermal-transfer fluid, liquid or air, for the thermostatically controlled bath or chamber (6.1). The fluid shall be temperature-stable and preferably water-soluble for easier cleaning. A suitable fluid is a modified polyhydric aliphatic alcohol or air.

5.2 Glass-cleaning detergent, of a non-alkaline type.

5.3 Reference liquid, diisodecyl phthalate (DIDP)[1)].

6 Apparatus

6.1 Thermostatically controlled bath or chamber, designed to operate at up to 130 °C. Safety devices shall be fitted to prevent overheating. The circulation system, the bath or chamber capacity and the heating system shall be such that the temperature can be kept constant to within ± 0,5 °C throughout the bath or chamber. The agitation of the bath or chamber shall be done at a slow and uniform speed.

NOTE 1 It is very important to keep the temperature correct, as tests have shown that only a 0,5 °C difference can be seen in the test results.

NOTE 2 Some heaters/circulators have a centrifugal pump in the bottom, pumping the liquid at high speed around the bath. The beakers (6.3) will then have the liquid passing them at different speeds and this will cause different temperatures in different beakers.

NOTE 3 Comparison between air chamber and oil bath test results is described in Annex B for reference.

The bath or chamber shall be designed so that, after placing the beakers (6.3) in the bath or chamber, the temperature does not drop more than 5 °C, and the test temperature is regained after no more than 20 min. The minimum distance between the beakers and the walls shall be 30 mm and between the bottom of the bath and the beakers 60 mm.

The bath or the chamber shall be equipped with a device indicating the distance between the fluid and the lower surface of the glass plate (6.6). This distance shall be (60 ± 2) mm.

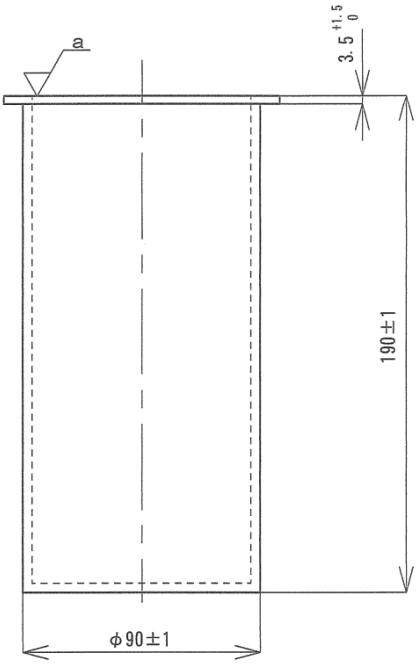
6.2 Cooling plates, designed to be placed on the glass plate (6.6) to keep them cool. The cooling plate shall be hollow and made of corrosion-resistant metal, with the side facing the glass plate made of aluminium. They shall have two cooling-water connections located so that the cooling water flows through the whole of the interior of the plate. The surface in contact with the glass plate shall be flat. When using liquid for thermal transfer fluid, the mass of a cooling plate filled with water shall be at least 1 kg, to overcome the buoyancy of the beaker (6.3) in the bath. The whole of the weight of the cooling plate shall rest on the beaker. A separate cooling plate shall be used for each beaker.

The cooling plate and the associated water thermostat shall be designed so that the mean water temperature is 21 °C and the difference in temperature between the inlet and outlet does not exceed 1 °C.

6.3 Flat-bottomed beakers, of heat-resistant glass, minimum mass 400 g, with the dimensions shown in Figure 1.

1) DIDP reference liquid is obtained from: SP Technical Research Institute of Sweden, Chemistry and Materials Technology, Box 857, SE-501 15 Borås, Sweden, Fax: +46 33 10 33 88, E-mail: info@sp.se. This information is given for the convenience of users of this standard and does not constitute an endorsement by ISO of their products.

Dimensions in millimetres



[a] Ground.

Figure 1 — Glass beaker

6.4 Metal rings, external diameter 80 mm, internal diameter 74 mm, height 10 mm and mass (55 ± 1) g, made of corrosion-protected steel, to keep the test pieces flat.

6.5 Sealing rings, of silicone- or fluoro-rubber, L-shaped or circular in cross-section, inner diameter 90 mm to 95 mm, thickness 2 mm to 4 mm and hardness 50 IRHD to 70 IRHD.

6.6 Float-glass plates, of residential or windshield window quality, for condensation of the fogging, thickness (3 ± 0,2) mm, either square with minimum dimensions of (110 × 110) mm or circular with a diameter of 103 mm. The gloss values of all the plates used shall be the same to within ± 2 % units. The tin and non-tin surfaces of the plate shall be identified and the identification mark shall be placed on the plate.

NOTE The tin and non-tin surface of the glass plate can be identified by viewing the surface in a darkened room under a UV light at 254 nm wavelength. The tin surface will fluoresce when it is exposed to the UV light.

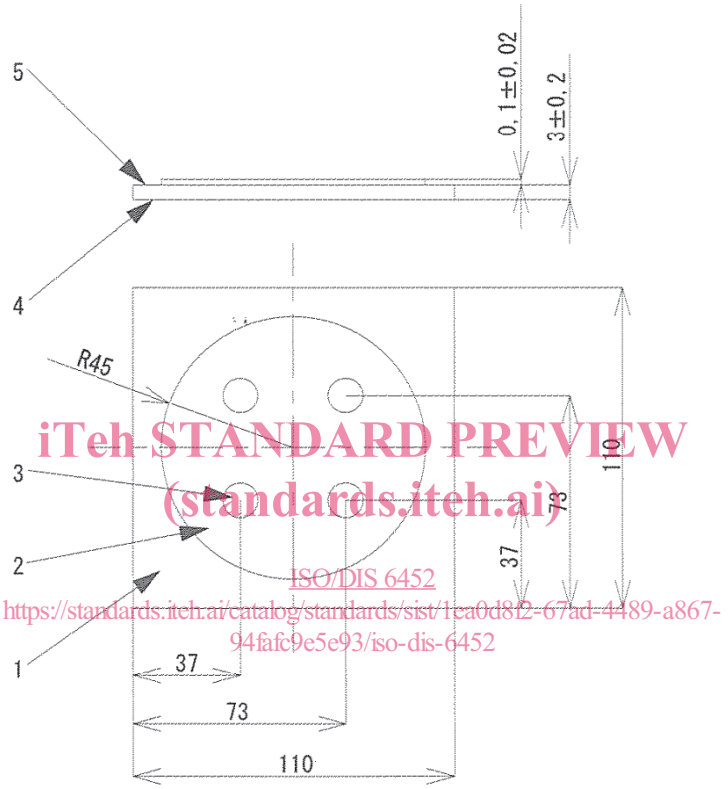
6.7 Filter paper, with a diameter of 110 mm and a mass per unit surface area of 90 g/m^2.

6.8 Aluminium foil discs, thickness 0,03 mm, diameter (103 ± 1) mm. Store the prepared aluminium foil disc in a desiccator (6.14) to avoid condensation and contamination.

6.9 Gloss meter, with a 60° incident beam and 60° measurement beam in accordance with ISO 2813.

6.10 Spacer, designed to prevent contact with the condensate on the glass plate during gloss meter measurements, made of a suitable material such as paper or plastic with a circular hole for the measurements. The thickness of the spacer shall be (0,1 ± 0,02) mm (see Figure 2).

Dimensions in millimetres



Key

1 float glass plate
2 spacer
3 circular holes for the measurements
4 tin surface of glass plate
5 non-tin surface of glass plate

Figure 2 — Example of a spacer on top of glass plate

6.11 Dishwasher, preferably connected to a deionized-water supply and capable of being operated at 80 °C.

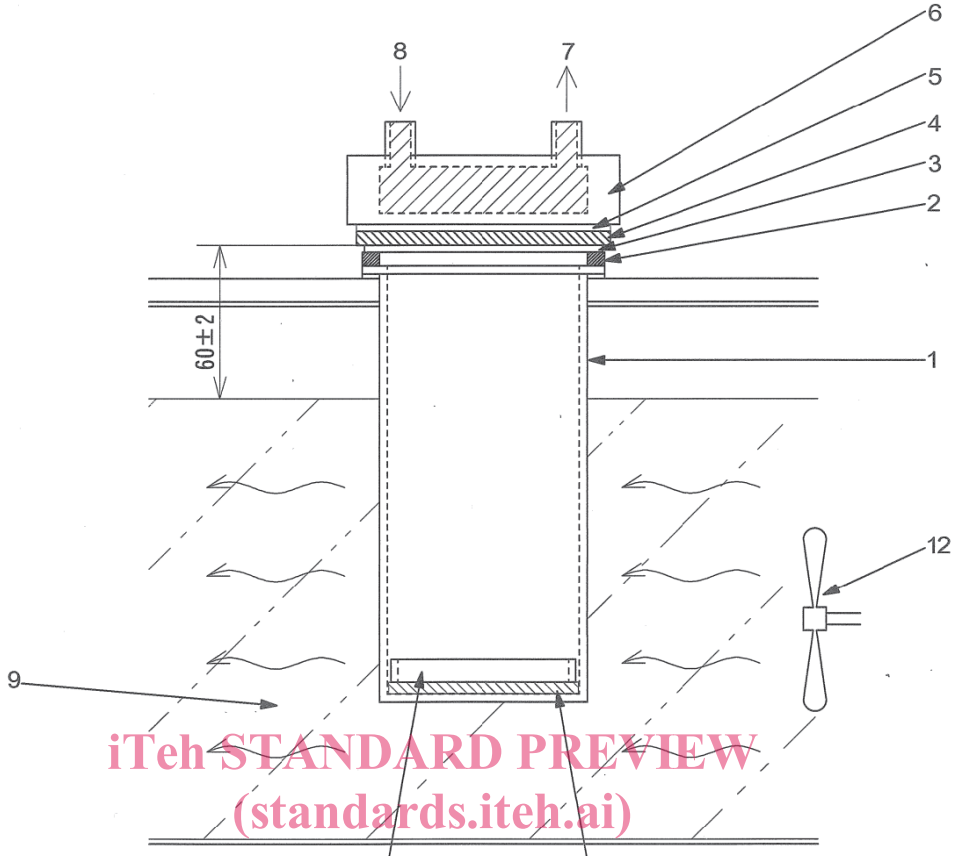
6.12 Balance, with scale divisions of 0,01 mg.

6.13 Polyethylene glove.

6.14 Tongs.

6.15 Desiccator, with suitable drying material.

Dimensions in millimetres



Key

1 beaker
2 sealing ring
3 aluminium foil disc (determination of mass of condensable constituents *G* test only)
4 float glass plate
5 filter paper
6 cooling plate
7 cooling-water outlet
8 cooling-water inlet
9 thermal-transfer fluid (liquid or air)
10 metal ring (If necessary)
11 test piece
12 agitating fan

Figure 3 — Example of a test apparatus

7 Test pieces and test samples

In the case of finished products, cut circular test pieces with a diameter of (80 ± 1) mm from the sample. The thickness of the test pieces can be up to 10 mm. Machine thicker materials on the underside to 10 mm (the underside is the side facing away from the side which is visible in the vehicle). If other test-pieces dimensions are required, these may be as given in the product specification or as agreed between the interested parties.

In the case of powdered, pasty or fluid materials, take a (10 ± 0,1) g test portion of the sample.

Take two test pieces or portions for the determination of the fogging value *F* and another two for the determination of the mass of the condensable constituents *G*.