



BSI Standards Publication

Interior air of road vehicles

Part 12: Test methods for the determination of fogging characteristics of trim materials made from polyvinyl chloride (PVC) or polyurethane in the interior of automobiles

National foreword

This British Standard is the UK implementation of ISO 12219-12:2025.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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**Interior air of road vehicles —
Part 12:
Test methods for the determination
of fogging characteristics of trim
materials made from polyvinyl
chloride (PVC) or polyurethane in
the interior of automobiles**

Air intérieur des véhicules routiers —

*Partie 12: Méthodes d'essai pour la détermination des
caractéristiques d'embuage des matériaux de garnissage en
polyvinylchlorure (PVC) ou en polyuréthane dans l'habitacle
automobile*

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Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Apparatus and materials	2
6 Sample preparation	5
7 Conditioning	6
8 Procedure	6
8.1 Cleaning	6
8.1.1 General	6
8.1.2 Cleaning with a dishwasher	6
8.1.3 Manual cleaning	6
8.1.4 Polishing of glass surface	6
8.2 Reference tests	6
8.3 Placement of test specimens	7
8.4 Measurements prior to the fogging test	7
8.5 Fogging test	7
8.5.1 Set-up	7
8.5.2 Determination of the fogging value, F	8
8.5.3 Determination of the mass of condensable constituents, G	8
9 Expression of results	9
9.1 Fogging value	9
9.2 Mass of condensable constituents	9
10 Test report	9
Annex A (informative) Comparison of air chamber and oil bath test results	11
Annex B (informative) Confirmation of fogging test bath accuracy by DIDP	13
Annex C (informative) Effect of polishing glass plate surface	14
Bibliography	16

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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A list of all parts in the ISO 12219 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.

Interior air of road vehicles —

Part 12:

Test methods for the determination of fogging characteristics of trim materials made from polyvinyl chloride (PVC) or polyurethane in the interior of automobiles

1 Scope

This document specifies test methods which are intended to determine the fogging characteristics of polyvinyl chloride (PVC) or polyurethane textiles that are used as trim materials in the interior of motor vehicles.

The methods can also be applied to fluid, paste, powdered or solid raw materials which are the basis for such trim materials or from which the materials are manufactured. The methods can also be applied to other materials and finished products.

The procedures are applicable to the measurement of fog condensate on glass surfaces within the limits of the test conditions. These tests do not 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).

NOTE In such cases, the gravimetric method is used.

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 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/>

4 Principle

A test specimen 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 shall be 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 Apparatus and materials

5.1 Thermostatically controlled bath or chamber, typically 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 $\pm 1,0$ °C throughout the bath or chamber.

To keep the temperature constant, the agitation of the bath or chamber should be carried out at a slow uniform speed.

The bath or chamber shall be designed so that, after placing the beakers (5.5) 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. The oil bath shall be equipped with a device indicating the distance between the fluid and the lower surface of the glass plate (5.3). This distance shall be (60 ± 2) mm. When using an air chamber, the beaker shall be placed so that the entire beaker up to the rim is placed inside the chamber to be heated.

See [Annex A](#) for comparison of data obtained from an oil bath and air chamber with correct positioning of the beakers to give similar results.

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

5.3 Float-glass plates, of residential or windshield window quality, for condensation of the fogging, thickness $(3 \pm 0,3)$ mm, either square with minimum dimensions of $(110 \text{ mm} \times 110 \text{ mm})$ 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 tin surface. The non-tin surface is the test surface that faces the test specimen during the test.

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.

5.4 Cooling plates, designed to be placed on the glass plate (5.3) 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 (5.5) 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.

5.5 Flat-bottomed beakers, of heat-resistant glass, minimum mass 400 g, with the dimensions shown in [Figure 1](#).