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Passenger cars — Windscreen defrosting and demisting systems — Test method

Voitures particulières — Dispositif de dégivrage et de désembuage du pare-brise — Méthode d'essai

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 17, *Visibility*.

This third edition cancels and replaces ISO 3468:1989 and ISO 3470:1989, which have been technically revised.

Introduction

It is not necessary for the tests specified in Clauses 4 and 5 to be repeated on types of power-driven vehicles which do not differ from one another in respect of the following essential features, which affect defrosting/demisting performance:

a) shape, size, and surface characteristics of the windscreen;

b) characteristics of each system designated by the vehicle manufacturer as contributing to windscreen defrosting/demisting;

c) number of seats as designated by the vehicle manufacturer.

It can be possible to carry out tests of a similar nature on front windscreens and rear-windows simultaneously.

Passenger cars — Windscreen defrosting and demisting systems — Test method

1 Scope

This International Standard specifies the test method for passenger car (ISO 3833:1977, 3.1.1) windscreen defrosting and demisting systems, when these are fitted.

This International Standard does not specify reference areas or levels of performance.

The test condition of −18 °C ± 3 °C specified for defrosting systems will meet the majority of cold climatic requirements.

The tests for demisting systems are conducted at a temperature of −3°C ± 1°C, since this is the practical minimum temperature at which mist, as defined in 3.7, can normally occur.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1176:1990, *Road vehicles — Masses — Vocabulary and codes*

ISO 3833:1977, *Road vehicles — Types — Terms and definitions*

ISO 6549:1980, *Road vehicles — Procedure for H-point determination*[1)]

3 Terms and definitions

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

3.1
defrosted area
area of the outer glazed surface of the windscreen having a dry surface or covered with melted or partially melted (wet) frost, excluding any area of the windscreen covered with dry frost

3.2
defrosting
elimination of frost and/or ice covering the outer glazed surface of the windscreen by the operation of the windscreen defrosting and/or windscreen wiping and washing systems

3.3
windscreen defrosting system
device, or combination of devices, intended by the vehicle manufacturer to eliminate frost or ice from the glazed surfaces of the windscreen and thus restore visibility, together with the necessary accessories and controls

3.4
windscreen wiping system
device for wiping the windscreen outer glazed surface, together with the necessary accessories and controls

1) From 2021-06-01, ISO 20176 will cancel and replace ISO 6549:1999.

3.5
windscreen washing system
device for storing washer solution and applying it to the windscreen outer glazed surface together with the necessary controls

3.6
road load
power output, as indicated by the vehicle manufacturer, required to move the vehicle on a flat road at a specified speed through still air at 20 °C, with a standard barometric pressure of 1 013 mbar; the mass of the vehicle being equal to the complete vehicle kerb mass, in accordance with ISO 1176 (ISO-M06) plus 150 kg, i.e. representing the driver and passenger on the front seats

Note 1 to entry: Road load takes account of transmission friction, rolling friction, and air resistance.

3.7
mist
film of condensate on interior glazed surface

3.8
demisting
elimination of mist from the windscreen by the operation of the windscreen demisting system

3.9
windscreen demisting system
device, or combination of devices, intended by the vehicle manufacturer to remove mist from the windscreen and thus restore visibility, together with the necessary accessories and controls

4 Test method for defrosting systems

4.1 Performance requirements

When tested in accordance with the following procedure, and at the temperature specified, the defrosting system shall be capable of defrosting specified percentages of specified areas after stated time intervals from the start of the test.

4.2 Test equipment

4.2.1 Cold chamber, large enough to contain the complete vehicle and capable of ensuring that temperatures of either −8 °C ± 2 °C or −18 °C ± 3 °C can be maintained throughout the test.

4.2.2 Spray gun, capable of applying liquid to the outer glazed surface of the windscreen and having the following characteristics:

— nozzle diameter: 1,7 mm;

— operating pressure: 350 kPa ± 20 kPa;[2)]

— nominal flow rate: 395 ml/min;

— projection cone diameter at 200 mm from nozzle: 300 mm.

4.3 Test preparation

4.3.1 Carry out all necessary vehicle preparation, e.g. cleaning and marking (if required) of the windscreen and installation of necessary instrumentation to ensure a satisfactory test and to record the test conditions, prior to the temperature stabilization in 4.3.4.

2) 1 kPa = 10^{-2} bar

4.3.2 Thoroughly degrease the outer and inner glazed surfaces using an appropriate degreasing agent. When dry, apply a 3 % to 10 % solution of ammonia in water, allow to dry, and, finally, wipe with a dry cotton cloth or paper towel that contains no additives.

4.3.3 Ensure that the chamber (4.2.1) is at or below the specified test temperature before the start of the stabilizing period.

4.3.4 In the case of an electric vehicle or a plug-in hybrid electric vehicle, the high voltage battery should be fully charged prior to soaking.

4.3.5 Place the vehicle in the chamber (4.2.1). Maintain the temperature in the chamber throughout the soak and test periods at either

a) −18 °C ± 3 °C, full temperature range, or

b) −8 °C ± 2 °C, restricted temperature range.

4.3.6 Keep the vehicle, with the engine stopped, at the specified test temperature for a period of 10 h. This period can be shortened if instruments are available to check that the engine coolant, lubricant, and vehicle internal air have stabilized at the specified test temperature.

4.4 Test condition

4.4.1 Measure the chamber temperature at the same height as the middle of the windscreen at a location, such that the temperature is not significantly affected by heat from the vehicle under test or by cold air entering the chamber.

4.4.2 Measure the horizontal component of the air velocity; cooling the chamber immediately prior to the test, at a point located on the longitudinal centreline of the vehicle, 300 mm ahead of the base of the windscreen, at a level half-way between the windscreen top and bottom. The velocity of this component shall be as low as possible and in any case less than 8 km/h.

4.5 Test procedure

4.5.1 Set the vehicle defrosting system controls (see 3.3) for maximum defrost as recommended by the vehicle manufacturer.

4.5.2 After the temperature stabilization in 4.3.5, create an even coating of frost of 0,044 g/cm^2 over the entire outer glazing surface of the windscreen by means of the spray gun (4.2.2).

4.5.3 The engine bonnet (hood), doors, windows, and vents, except the air intakes and outlets of the defrosting and ventilating system, shall be closed, except that one or two windows can be open with a total distance of 25 mm depending on the mode of operation as indicated by the vehicle manufacturer.

4.5.4 After the frost coating has been formed, an additional period of between 30 min and 40 min shall elapse before the start of the recorded test period.

4.5.5 After the period specified in 4.5.4 has elapsed, one or two observers can enter the vehicle; start the engine. An external power source can be used to start it but shall then be disconnected. The test period commences when the engine has been started and is running under its own power. Bring the defrosting system into operation as prescribed by the vehicle manufacturer, with the vehicle in the condition specified by the manufacturer for satisfactory operation at low temperature. The defroster blower can be turned on at any time.