INTERNATIONAL STANDARD

ISO 3470

Second edition
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Passenger cars — Windscreen demisting systems — Test method

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

Reference number
ISO 3470:1989(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3470 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

This second edition cancels and replaces the first edition (ISO 3470:1976), of which it constitutes a technical revision and expansion.

Annex A of this International Standard is for information only.

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Introduction

This International Standard is one of a series of four dealing with the testing of defrosting (ISO 3468), washing (ISO 3469), demisting (ISO 3470) and wiping (ISO 9619), for the windscreen of passenger cars. (See annex A.)

The testing of demisting, defrosting, and washing and wiping systems and equipment for the rear-windows of passenger cars is similarly dealt with in ISO 5897, ISO 5898 and ISO 6255 respectively.

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Passenger cars — Windscreen demisting systems — Test method

1 Scope

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

It is not necessary for the tests 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 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 demisting;

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

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

NOTE 1 It may be possible to carry out tests of a similar nature on front windscreens and rear-windows simultaneously.

The tests are conducted at a temperature of −3 °C ± 1 °C, since this is the practical minimum temperature at which mist as defined in 3.1 can normally occur.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1176:—[1], *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.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 mist: Film of condensate on interior glazed surface.

3.2 demisting: Elimination of mist from the windscreen by the operation of the windscreen demisting system.

3.3 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.

3.4 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 vehicle being at its complete vehicle kerb mass as specified in ISO 1176 plus 150 kg to represent the driver and passenger in the front seats. Road load takes account of transmission friction, rolling friction and air resistance.

1) To be published. (Revision of ISO 1176:1974.)

4 Test method

4.1 Performance requirements

When tested in accordance with the following procedure, the demisting system shall be capable of demisting specified percentages of specified areas after a stated time interval 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 a temperature of −3 °C ± 1 °C can be maintained throughout the test.

4.2.2 Steam generator, (see figure 1) with the following characteristics:

a) the water container shall have a capacity of at least 2,25 l;

b) the heat loss at boiling point shall not exceed 75 W at an ambient temperature of −3 °C ± 1 °C ;

c) the fan shall operate at capacity of 0,07 m³/min to 0,1 m³/min at 50 Pa static pressure;

d) a device to regulate the steam output by controlling the input wattage to the heating element.

The steam generator shall also meet the requirements of table 1.

The generator shall be calibrated at −3 °C ± 1 °C to give readings for each 70 g/h ± 5 g/h output up to a maximum of n times this figure, where n is the number of seating positions designated by the vehicle manufacturer.

The generator is calibrated by weighing with water before and after 1 h of operation at the prescribed ambient temperature. A minimum of four points covering the range of seating positions shall be obtained. The heat input to achieve the above shall be made by using a regulating device as indicated in 4.2.2 d). The calibration shall be presented in the form of a graph or table of steam output against input wattage.

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 4.3.5.

4.3.2 Thoroughly degrease the outer and inner glazed surfaces using an appropriate degreasing agent. When dry, apply a solution of 3 % to 10 % 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.

Table 1 — Dimensions and characteristics of steam generator

Dimensions in millimetres

Component	Dimensions	Material
Nozzle	a) length: 100 b) inside diameter: 15	Brass
Dispersion chamber	a) length: 115 b) inside diameter: 75 c) six holes of ø 6,3 evenly spaced 25 mm above the bottom of the dispersion chamber interior	Brass tube of 0,38 wall thickness

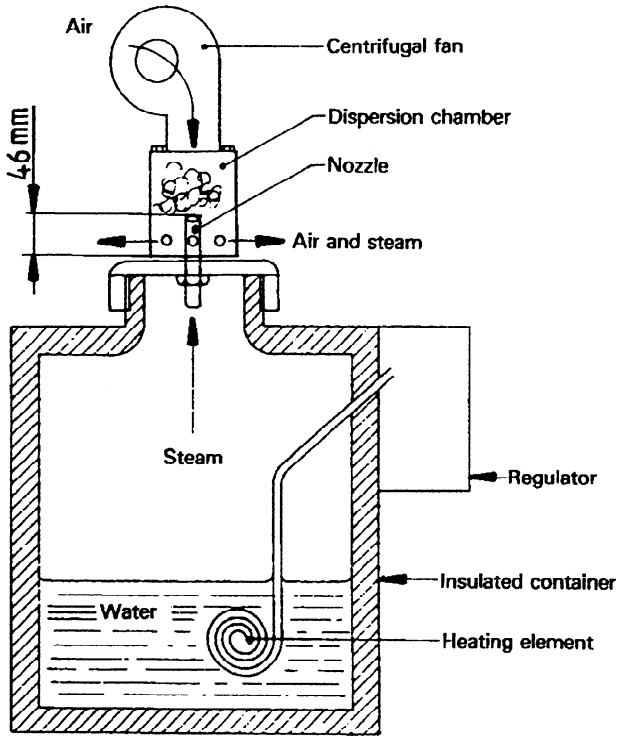

Figure 1 — Typical steam generator

4.3.4 Place the vehicle in the chamber (4.2.1). Maintain the temperature in the chamber at −3 °C ± 1 °C throughout the preparation and soak period.

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

4.4 Test conditions

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.

4.4.3 The engine bonnet (hood), doors, windows and vents, except the air intakes and outlets of the heating and ventilating system, shall be closed during the misting period.

4.4.4 The mist shall be produced by means of the steam generator described in 4.2.2 or by any other means giving an equivalent result.

4.4.5 The steam generator shall be located with its outlets in the median plane of the vehicle at a height of 580 mm ± 80 mm above the R-point of the driver's seat as defined in ISO 6549. It shall normally be placed immediately behind the front seat backrest, with the seatback, if adjustable, set at the angle specified by the vehicle manufacturer. Where the design of the vehicle precludes this location, the generator may be placed in the nearest convenient position to that described above.

4.5 Test procedure

4.5.1 Fill the container of the steam generator (4.2.2) with water. Start the steam generator outside the vehicle, bringing up to boiling as soon as possible. The steam generator, containing at least 1,7 l of water, shall be stabilized to generate 70 g/h ± 5 g/h of steam for each seating position designated by the vehicle manufacturer.

4.5.2 Install the generator (4.2.2) in the vehicle; then set and maintain the level with the power setting reduced to maintain incipient boil. Increase the wattage setting to that determined in 4.5.1 and allow to steam for 5 min, after which time one or two observers shall enter the vehicle. Reduce the generator output by 70 g/h ± 5 g/h for each observer.

4.5.3 Set the vehicle demister controls for maximum demist as indicated by the vehicle manufacturer.

4.5.4 One minute after the observer(s) has (have) entered the vehicle, start the engine in the manner indicated by the vehicle manufacturer. The test period commences when the engine has been started and is running under its own power.

At the discretion of the vehicle manufacturer, one or two windows may be left open a total distance of 25 mm during the demisting period, depending on the mode of operation as indicated by the vehicle manufacturer.

4.5.5 The conditions specified in 4.5.5.1 to 4.5.5.3 shall apply throughout the test period.

4.5.5.1 During the test period, taking account of the individual vehicle characteristics, either

a) the engine speed shall be as indicated by the vehicle manufacturer, but in no case exceeding 50 % of the speed at which it develops maximum power; or,

b) if the vehicle manufacturer so desires, on a chassis dynamometer the engine speed and load shall not exceed the speed and equivalent road load at 40 km/h in the gear and with tyre inflation pressures recommended by the vehicle manufacturer for the road load.

4.5.5.2 If the vehicle battery is used, it shall be fully charged; an external power source may supplement or replace the battery to meet the requirements of 4.5.5.3.

4.5.5.3 The voltage measured between the earth and the point in the common live line that can be identified and contacted nearest to the windscreen demisting system shall be the system's rated voltage (if it differs from the vehicle's rated voltage) or 1,15 × the rated voltage specified for the vehicle ± 5 %.

4.5.6 At the end of the test the demisted pattern shall be recorded (see 4.1).

Annex A
(informative)

Bibliography

[1] ISO 3468:1989, *Passenger cars — Windscreen defrosting systems — Test method.*

[2] ISO 3469:1989, *Passenger cars — Windscreen washer systems — Test methods.*

[3] ISO 5897:1987, *Road vehicles — Rear-window demisting system for passenger cars — Test method.*

[4] ISO 5898:1987, *Road vehicles — Rear-window defrosting system for passenger cars — Test method.*

[5] ISO 6255:1987, *Road vehicles — Rear-window washing and wiping systems for passenger cars — Test methods.*

[6] ISO 9619:—[2], *Road vehicles — Visibility — Passenger car windscreen — Wiping systems — Test method.*

2) To be published.

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