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Road vehicles — Rear-window defrosting system for passenger cars — Test method

*Véhicules routiers — Dispositif de dégivrage de la lunette arrière des voitures particulières —
Méthode d'essai*

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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.

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 5898 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Road vehicles — Rear-window defrosting system for passenger cars — Test method

0 Introduction

This International Standard is one of a series of three covering demisting, defrosting, and washing and wiping systems for the rear-window of passenger cars:

ISO 5897, *Road vehicles — Rear-window demisting system for passenger cars — Test method.*

ISO 5898, *Road vehicles — Rear-window defrosting system for passenger cars — Test method.*

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

Tests on defrosting, washer and demisting systems for the windscreen of passenger cars are covered respectively in the following International Standards:

ISO 3468, *Road vehicles — Windscreen defrosting systems for passenger cars — Test method.*

ISO 3469, *Road vehicles — Windscreen washer systems for passenger cars — Test methods.*

ISO 3470, *Road vehicles — Windscreen demisting equipment for passenger cars — Test method.*

This International Standard does not specify reference areas or levels of performance, since at the time it was prepared there was insufficient data available.

It should be noted that it may be possible to carry out tests of a similar nature on windscreen and rear-window simultaneously.

The test condition of -18 ± 3 °C specified in this International Standard will meet the majority of cold climate requirements. However there may be instances where lower temperatures are encountered; such conditions may be dealt with in a further document.

1 Scope and field of application

This International Standard specifies a test method for passenger car (term defined in ISO 3833) rear-window defrosting systems, when these are fitted.

The test method is intended to apply to types of power-driven vehicles which do not differ from one another in respect of the following essential features which affect defrosting performance :

a) shape, size and surface characteristics of the rear-window;

b) characteristics of each system designated by the vehicle manufacturer as contributing to the defrosting of the rear-window.

2 References

ISO 1176, *Road vehicles — Weights — Vocabulary.*

ISO 3833, *Road vehicles — Types — Terms and definitions.*

ISO 4130, *Road vehicles — Three-dimensional reference system and fiducial marks — Definitions.*

3 Definitions

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

3.1 defrosted area: Area of the outer glazed surface of the rear-window having a dry surface or covered with melted or partially-melted (wet) frost. It excludes any area of the rear-window covered with dry frost.

3.2 defrosting: Elimination of frost and/or ice covering the outer glazed surface of the rear-window by the operation of the rear-window defrosting and/or wiping systems.

3.3 rear-window defrosting system: Device, or combination of devices, intended by the vehicle manufacturer to eliminate frost or ice from the rear-window and thus restore visibility, together with the necessary accessories and controls.

3.4 rear-window wiping system: Device for wiping the rear-window outer glazed surface, together with the necessary accessories and controls.

3.5 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 kerb weight as specified in ISO 1176 plus 150 kg, i.e. representing the driver and passenger on the front seats. Road load takes account of transmission friction, rolling friction and air resistance.

4 Verification of performance of rear-window defrosting system

4.1 Test requirements

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

If the vehicle fails the test at the first attempt, a second attempt may be made on the same vehicle at the discretion of the vehicle manufacturer, and the arithmetical average of the defrosted areas obtained at the two attempts shall be taken as the result.

4.2 Test equipment

4.2.1 Environmental chamber large enough to contain the complete vehicle and capable of ensuring that temperatures of either $-18 \pm 3 \text{ }^\circ\text{C}$ or $-8 \pm 2 \text{ }^\circ\text{C}$ can be maintained throughout the test.

4.2.2 Spray-gun capable of applying liquid to the outer glazed surface of the rear-window and having the characteristics given in the table.

Table — Spray-gun characteristics

Characteristic	Specifications	
	at $-18 \pm 3 \text{ }^\circ\text{C}$	at $-8 \pm 2 \text{ }^\circ\text{C}$
Nozzle diameter	1,7 mm	
Operating pressure	$350 \pm 20 \text{ kPa}^1)$	(To be established)
Nominal flow rate	395 ml/min	
Projection cone diameter at 200 mm from nozzle	300 mm	

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

4.3 Test preparation

4.3.1 All necessary vehicle preparation, for example cleaning and marking, if required, of the rear-window and installation of instrumentation necessary to ensure a satisfactory test and to record the defrosting test conditions, shall be carried out prior to the temperature stabilization referred to in 4.3.4 a) and b).

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

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

4.3.4 Place the vehicle in the environmental chamber. Maintain the temperature in the chamber throughout the stabilization and test periods at either :

- a) $-18 \pm 3 \text{ }^\circ\text{C}$, full temperature range; or
- b) $-8 \pm 2 \text{ }^\circ\text{C}$, restricted temperature range.

4.3.5 Maintain the vehicle, with the engine stopped, at the specified test temperature for a period of not less than 10 h. This period may be shortened if instruments are available to check that the engine coolant, lubricant and vehicle internal air are stabilized at the specified test temperature.

4.4 Test conditions

4.4.1 The environmental chamber temperature shall be measured at the height of 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 The horizontal component of the velocity of the air cooling the chamber shall be measured 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 top and bottom of the windscreen. The velocity of this component shall be as low as possible and in any case less than 8 km/h.

4.5 Test method

4.5.1 Set the vehicle defrosting system controls for maximum defrost as recommended by the vehicle manufacturer.

4.5.2 After temperature stabilization [see 4.3.4 a) or b)], form an even coating of frost of 0,044 g/cm² over the entire outer glazed surface of the rear-window by means of the spray-gun (4.2.2).

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

4.5.4 When the frosting-up of the rear-window has been carried out, allow an additional period of not less than 30 min and not more than 40 min to elapse before the start of the recorded test period.

4.5.5 After the period specified in 4.5.4 has elapsed, and with one or two observers in the vehicle, start the engine. An external power source may be used to start the engine but shall then be disconnected. The test period commences when the engine

has been started and is running under its own power. Start the defrosting system by the vehicle manufacturer provided in the conditions specified for satisfactory operation at low temperature.

4.5.6 The conditions set in 4.5.6.1 to 4.5.6.5 shall apply throughout the test period.

4.5.6.1 During the first 5 min of the test period, the engine speed or speeds may be those indicated by the vehicle manufacturer for warming-up after starting in cold weather.

4.5.6.2 During the final 35 min of the test period (or the entire test period if the 5 min warming-up procedure is not followed), run the engine:

- a) either at the engine speed record indicated by the vehicle manufacturer, but in no case exceeding 50 % of the speed at which it develops maximum power;
- b) or, if the vehicle manufacturer so desires, on a chassis dynamometer, where the engine speed and load do not exceed the speed and equivalent road load at 40 km/h, in the gear and with the tyre inflation pressures recommended by the vehicle manufacturer for the road load.

4.5.6.3 The rear-window wipers, if fitted, may be used during the test in accordance with the instructions of the vehicle manufacturer, if they can commence operation without manual assistance.

4.5.6.4 If the vehicle battery is used, it shall be fully charged; an external power source may supplement or replace the vehicle battery to meet the requirements of 4.5.6.5.

4.5.6.5 The voltage measured between earth (ground) and the point in the common live line that can be identified and with which contact can be made that is the nearest to the rear-window defrosting system shall be

$$(1,15 \times \text{rated voltage}) \pm 5 \%$$

4.5.7 At the start of the test, and thereafter at stated intervals, record the defrosting pattern, using one or other of the methods given in 4.5.7.1 and 4.5.7.2.

4.5.7.1 The photographic method given in the annex is the recommended method.

4.5.7.2 The following method may also be used.

Place a piece of heavy, clear tracing paper on the outer glazed surface and trace on it both the rear-window outline and the specified area. Then trace the defrosted area and calculate the percentage of the specified area that was cleared during the test.

NOTE — It is recommended that the cleared area be outlined on the glazed surface before transferring it to the tracing paper.

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Annex

Recommended method of recording area cleared

(This annex does not form an integral part of the Standard.)

A.1 Test preparation

The area to be assessed shall be accurately located and clearly marked on the inside of the rear-window.

A.2 Camera position

Cameras may be placed either inside or outside the vehicle. If inside the vehicle, the camera shall be placed as close as possible to the position of the rear-view mirror viewing the rear-window direct. In either event the optical axis of the camera(s) shall be located at the intersection of the Y and Z planes (see ISO 4130) through the centre of the inside rear-view mirror. The photographic image shall cover at least the area of the rear-window to be assessed. The location of the camera(s) shall be such that the result of the test is not affected.

A.3 Lighting

The rear-window shall be adequately illuminated such that the results of the test are not influenced (for example by radiated heat). Any additional lighting in the test chamber shall not affect the test.

A.4 Frequency of photographing

Photographs shall be taken at specified time intervals during the test.

A.5 Size of picture

The value of the dimension of the major axis of the area to be assessed on the photograph shall be not less than 200 mm. However, when the results obtained are marginal, photographs shall be enlarged sufficiently to enable areas to be determined more accurately.

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