
**Road vehicles — Sheath-type glow-plugs —
General requirements and test methods**

*Véhicules routiers — Bougies de préchauffage du type à fourreau —
Exigences générales et méthodes 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7578 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 1, *Ignition equipment*.

This third edition cancels and replaces the second edition (ISO 7578:1986), which has been technically revised.

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Road vehicles — Sheath-type glow-plugs — General requirements and test methods

1 Scope

This International Standard specifies general requirements and bench test methods for sheath-type glow-plugs. It is applicable to those sheath-type glow-plugs conforming with ISO 6550-1, ISO 6550-2 and ISO 6550-3, used in diesel (compression ignition) engines of vehicles equipped with 12 V or 24 V nominal voltage supply systems.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6550-1, *Road vehicles — Sheath-type glow-plugs with conical seating and their cylinder head housing — Part 1: M14 x 1,25 glow-plugs*

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ISO 6550-2, *Road vehicles — Sheath-type glow-plugs with conical seating and their cylinder head housing — Part 2: M12 x 1,25 glow-plugs*

ISO 6550-3, *Road vehicles — Sheath-type glow-plugs with conical seating and their cylinder head housing — Part 3: M10 glow-plugs*

IEC 60068-2-6, *Environmental testing — Part 2: Tests — Test Fc: Vibration (sinusoidal)*

3 Test methods and requirements

3.1 General

The tests shall be carried out at an ambient temperature of $(23 \pm 5) ^\circ\text{C}$, unless otherwise specified.

3.2 Gas tightness

3.2.1 Test

Mount the sample on a test device with the tightening torque specified in the relevant part of ISO 6550. Subject the sample to a pressure of 4 MPa [40 bar¹⁾] above ambient air pressure on the sheath end for a duration of 15 s. Use air, nitrogen, carbon dioxide or any other detection gas.

1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm²

NOTE At the time of publication, the pressure value of 4 MPa (40 bar) was under study, the intention being to increase it.

3.2.2 Requirements

The measured total leakage shall not exceed 2 cm³/min. If neither air nor nitrogen is used, the leakage rate shall be converted to that of air using the specific volume of the detection gas.

3.3 Thermal characteristic

3.3.1 Test sample preparation

Before the test, pre-heat the sample to oxidation at the nominal voltage of the glow-plug and then allow it to cool to ambient temperature. The time for oxidation shall be either as agreed between the glow-plug manufacturer and the engine manufacturer, or 3 min.

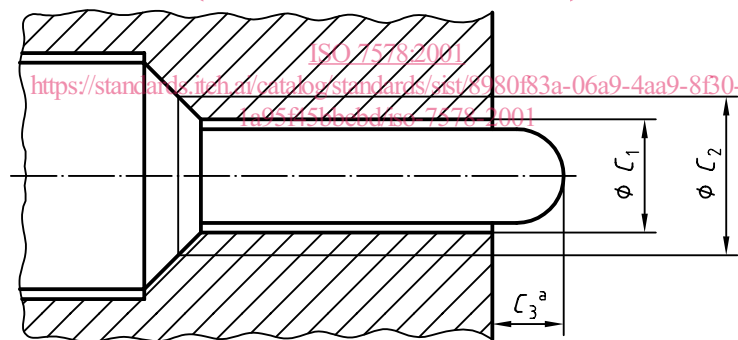
3.3.2 Test

Carry out the test using a test installation in accordance with Figure 1 (see Table 1), equipped with a cooling device by which the temperature can be maintained below 30 °C, measured at the seating of the glow-plug housing.

If the thermal behaviour is measured according to a specific application, this shall be by agreement between the glow-plug manufacturer and the engine manufacturer.

Carry out the test at the nominal voltage of the glow-plug. A tolerance of ±0,1 V is permitted.

Temperature measurements shall be made without direct contact.



^a Measuring zone (see Table 1).

Figure 1 — Test installation

Table 1 — Dimensions of the test installation

Dimensions in millimetres

Glow-plugs	According to International Standards	C ₁ +0,1 0	C ₂	C ₃	
				Type	
				Normal	Fast warm-up
M10 — A1 to A3 and C1 to C4	ISO 6550-3	6	7	8	5
M10 — B1 to B4			6,4		
M12 x 1,25	ISO 6550-2	7	9		
M14 x 1,25			11		

3.3.3 Requirements

3.3.3.1 Normal sheath-type glow-plugs

The hottest point of a normal glow-plug shall be found within the measuring zone, C₃, shown in Figure 1 and given in Table 1 as 8 mm. At this hottest point, the sheath shall have reached a temperature of 850 °C within 20 s and 1 000 °C within 60 s.

3.3.3.2 Fast warm-up sheath-type glow-plugs

The hottest point of a fast warm-up glow-plug shall be found within the measuring zone, C₃, shown in Figure 1 and given in Table 1 as 5 mm. At this hottest point, the sheath shall have reached a temperature of 850 °C within 10 s. During the following 50 s the temperature shall not drop below 800 °C.

3.3.3.3 Systems with electronic control

For systems with electronic control, the glow-plug manufacturer and the engine manufacturer shall agree on system performance.

3.4 Resistance at room temperature

3.4.1 Test

Use a measuring current low enough for the resistance to remain unchanged.

3.4.2 Requirement

Under the condition described in 3.4.1, the minimum resistance shall be 0,05 Ω.

3.5 Current characteristic

3.5.1 Test

Use the test installation specified in 3.3.2. Record the current characteristic by measuring the initial current, its gradient and the current at thermal equilibrium.

3.5.2 Requirement

The values measured shall be as agreed between the glow-plug manufacturer and the engine manufacturer.

3.6 Overvoltage

3.6.1 Test

Use the test installation specified in 3.3.2. Apply a test voltage of 130 % of the nominal voltage of the glow-plug for the appropriate duration according to Table 2.

Table 2 — Test duration for overvoltage

Glow-plug type	Test duration
Normal	15 s
Fast warm-up	3 min

3.6.2 Requirement

After the test performed according to 3.6.1, the glow-plug shall still meet the requirements of 3.3, 3.4 and 3.5.

3.7 Vibration (sinusoidal)

3.7.1 Test method

The glow-plug, mounted as provided for and tightened as specified shall be subjected to a vibration test of type Fc according to IEC 60068-2-6 and Table 3.

Table 3 — Values for vibration test

Frequency	Amplitude	Acceleration
50 Hz to 160 Hz	0,3 mm	—
> 160 Hz to 500 Hz	—	30g (294 m/s ²)
Sweep rate:		1 octave/min
Vibration directions:		glow-plug axis and perpendicular
Duration:		8 h in each direction

3.7.2 Requirement

After the test specified in 3.7.1 the glow-plug shall show no abnormalities and fulfil 3.3, 3.4, 3.5 and 3.6.

3.8 Endurance

3.8.1 Test

The test conditions shall be agreed between the manufacturer of the glow-plug and the engine manufacturer. The agreed conditions shall include, at least, the

- number of cycles,
- voltage characteristic,
- installation (i.e. in accordance with 3.3.2 or in a simulated cylinder head),

- environmental condition (e.g. air speed and temperature),
- cooling, and
- cycle start temperature.

3.8.2 Requirement

The glow-plug manufacturer and the engine manufacturer shall agree on performance.

4 Marking

The glow-plug shall be durably marked with, at least, its nominal voltage.

NOTE The nominal voltage of the glow-plug is generally not identical to the nominal supply voltage of the vehicle electrical system.

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