

BS ISO 17447-3:2015



BSI Standards Publication

# Road Vehicles — Glow-plugs with conical seating and their cylinder head housing

Part 3: Tests and requirements

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### National foreword

This British Standard is the UK implementation of ISO 17447-3:2015. Together with BS ISO 17747-1:2015 and BS ISO 17747-2:2015, it supersedes BS AU 262-1:1995, BS AU 262-2:1995 and BS ISO 7578:2008 which are withdrawn. Together with BS ISO 6550-3:2013, BS ISO 17747-1:2015 and BS ISO 17747-2:2015, it supersedes BS ISO 6550-3:2009 which is withdrawn. Together with BS ISO 6550-4:2014, BS ISO 17747-1:2015 and BS ISO 17747-2:2015, it supersedes BS ISO 6550-4:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/22, Engines for road vehicles.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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**Road Vehicles — Glow-plugs with  
conical seating and their cylinder  
head housing —**

Part 3:  
**Tests and requirements**

*Véhicules routiers — Bougies de préchauffage à fourreau et conique  
et leur logement dans la culasse —*

*Partie 3: Essais et exigences*



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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.

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](http://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 32, *Electrical and electronic components and general system aspects*.

ISO 17447 consists of the following parts, under the general title *Road Vehicles — Glow-plugs with conical seating and their cylinder head housing*:

- *Part 1: Basic characteristics and dimensions for metal-sheath-type glow-plugs*
- *Part 2: Basic characteristics and dimensions for ceramic-sheath-type glow-plugs*
- *Part 3: Tests and requirements*

## Introduction

The purpose of this International Standard is to provide a compact and concise specification on glow-plugs and their cylinder head housings, which is to replace the existing single standards on each type of glow-plugs.

It is intended to specify the main properties, the design requirements, and the dimensions of most of the existing types of glow-plugs and their cylinder head housings. It is to enable the user to work with one comprehensive document valid for most types of glow-plugs instead of a number of standards, each of them specified for one type only.

ISO 17447-1 covers basic characteristics and dimensions for metal-sheath-type glow-plugs. ISO 17447-2 covers basic characteristics and dimensions for ceramic-sheath-type glow-plugs. Tests and requirements are defined in this part of ISO 17447.

It is intended to withdraw the following standards on glow-plugs and their cylinder head housing as soon as this part of ISO 17447 is published:

ISO 6550-1, ISO 6550-2, ISO 6550-3, ISO 6550-4, ISO 7578.





# Road Vehicles — Glow-plugs with conical seating and their cylinder head housing —

## Part 3: Tests and requirements

### 1 Scope

This part of ISO 17447 specifies general requirements and test methods for sheath-type glow-plugs. Detailed test condition(s) and/or requirement(s) are agreed between the glow-plug manufacturers and the engine manufacturer. It is applicable to glow-plugs conforming to ISO 17447-1 and ISO 17447-2, used in diesel (compression ignition) engines.

### 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.

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

### 3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

#### 3.1

##### **nominal voltage**

voltage as marked on the housing of the glow-plug

Note 1 to entry: The nominal voltage of the glow-plug is generally not identical to the supply voltage of the vehicle's electrical system.

#### 3.2

##### **test voltage**

voltage(s) applied to the glow-plug under test

### 4 Tests and general requirements

#### 4.1 General

Detailed test condition(s) and/or requirement(s) are agreed between the glow-plug manufacturers and the engine manufacturer.

If not otherwise specified, all tests shall be carried out at room temperature (RT) ( $23 \pm 5$ ) °C.

#### 4.2 Gas tightness

##### 4.2.1 Test

Mount the sample on a test assembly with the tightening torque as specified in ISO 17447-1 and ISO 17447-2.

Subject the sample to a pressure of 4 MPa (40 bar)<sup>1)</sup> above ambient air pressure on the sheath end for a duration of 15 s. Use air, nitrogen, carbon dioxide, or any other detection gas.

#### 4.2.2 Requirement

The measured total leakage shall not exceed 2 cm<sup>3</sup>/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.

### 4.3 Thermal characteristic

#### 4.3.1 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 RT. The time for oxidation shall be as agreed between the glow-plug manufacturer and the engine manufacturer, e.g. three times the duration of the glow cycle.

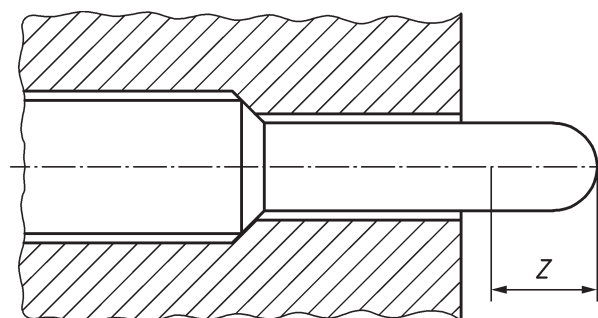
#### 4.3.2 Test

Carry out the test using a test installation in accordance with [Figure 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 in accordance with a specific application, this shall be by agreement between the glow-plug manufacturer and the engine manufacturer.

Carry out the test at the test voltage(s) of the glow-plug as specified in the description of the glow plug system.

Temperature measurements shall be made without direct contact.



#### Key

Z measuring zone

**Figure 1 — Test installation**

#### 4.3.3 Requirement

The hottest point of standard warm-up sheath-type glow-plugs shall be within the measuring zone, Z, as shown in [Figure 1](#). Z shall have a maximum length of 8 mm.

The temperature/time characteristic of the glow-plug shall be agreed between the glow-plug manufacturer and the engine manufacturer.

1) 1 bar = 0,1 MPa = 10<sup>5</sup> Pa; 1 MPa = 1 N/mm<sup>2</sup>.

#### 4.4 Electrical resistance at room temperature

##### 4.4.1 Test

Use a suitable measuring device which does not distort the resistance (e.g. four-pole measuring device).

##### 4.4.2 Requirement

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

#### 4.5 Current characteristic

##### 4.5.1 Test

Use the test installation as specified in [4.3.2](#). Record the current characteristic by measuring the initial current, its gradient, and the current at thermal equilibrium.

##### 4.5.2 Requirement

The recorded characteristics shall be as agreed between the glow-plug manufacturer and the engine manufacturer.

#### 4.6 Higher voltage

##### 4.6.1 Test

Use the test installation as specified in [4.3.2](#). Apply a test voltage of 130 % of the nominal voltage of the glow-plug for the duration  $(15 \pm 1)$  s.

##### 4.6.2 Requirement

After the test, the glow-plug shall still meet the requirements of [4.3](#), [4.4](#), and [4.5](#).

#### 4.7 Vibration (sinusoidal)

##### 4.7.1 Test

The glow-plug, mounted as provided for and tightened as specified, shall be subjected to a vibration test of type Fc in accordance with the test method in IEC 60068-2-6, using the parameters given in [Table 1](#).

**Table 1 — Values for vibration test**

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

#### **4.7.2 Requirement**

After the test specified in [4.7.1](#), the glow-plug shall show no visual damage and shall meet the requirements mutually agreed between the glow-plug manufacturer and the engine manufacturer.

### **4.8 Endurance**

#### **4.8.1 Test**

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

- number of cycles;
- voltage characteristic;
- installation (i.e. in accordance with [4.3.2](#) or in a simulated cylinder head);
- environmental condition (e.g. air speed and temperature);
- cooling;
- cycle start temperature.

#### **4.8.2 Requirement**

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

### **4.9 Marking and labelling**

The glow-plug shall be permanently marked with at least the following:

- the nominal voltage of the glow-plug;
- the manufacturer's name, trademark, or symbol.







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## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

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