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**Road vehicles — M10 × 1 spark-plugs  
with flat seating and their cylinder head  
 housings**

*Véhicules routiers — Bougies d'allumage M10 × 1 à siège plat et leurs  
logements dans la culasse*

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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.

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.

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International Standard ISO 2704 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 1, *Ignition equipment*.

This fifth edition cancels and replaces the fourth edition (ISO 2704:1993), of which it constitutes a technical revision. <https://www.iso.org/standard/39999-1.html>

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# Road vehicles — M10 × 1 spark-plugs with flat seating and their cylinder head housings

## 1 Scope

This International Standard specifies the main characteristics of M10 × 1 spark-plugs with flat seating with normal or long reach and their cylinder head housings, for use with spark-ignition engines.

## 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 68-1:—<sup>1)</sup>, *ISO general-purpose screw threads — Basic profile — Part 1: Metric screw threads.*

ISO 261:—<sup>2)</sup>, *ISO general-purpose metric screw threads — General plan.*

ISO 965-1:—<sup>3)</sup>, *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

ISO 965-3:—<sup>4)</sup>, *ISO general-purpose metric screw threads — Tolerances — Part 3: Deviations for constructional threads.*

ISO 14508:1997, *Road vehicles — Spark-plugs — Terminals.*

## 3 Requirements

### 3.1 Terminals

The spark-plug terminal shall be either the solid post or the threaded type as specified in ISO 14508. A spark-plug with threaded terminal on which a nut is applied shall respect the dimensions specified for spark-plugs with solid post terminals (see figure 1).

1) To be published. (Revision of ISO 68:1973)

2) To be published. (Revision of ISO 261:1973)

3) To be published. (Revision of ISO 965-1:1980)

4) To be published. (Revision of ISO 965-3:1980)

### 3.2 Dimensions and threads (see figures 1 to 3)

#### 3.2.1 Spark-plug reach

Spark-plug reach shall be in accordance with table 1.

**Table 1**

Dimensions in millimetres

Type of reach	$A$ $\pm 0,2$	$B$ max.	$Y$ $\pm 0,3$
Normal reach	12,7	19	11,7
Long reach	19	27	18

#### 3.2.2 Gasket

When the spark-plugs have been tightened with a torque of 15 N·m, on threads that are clean, smooth and dry, the gaskets shall be 1 mm to 1,6 mm thick. If the gasket thicknesses are different, a corresponding adjustment to dimensions  $A$ ,  $B$  and  $Y$  shall be made.

Non-captive gaskets may be used in special cases.

#### 3.2.3 Threads for spark-plugs and cylinder heads

##### 3.2.3.1 General requirements

The threads of  $M10 \times 1$  spark-plugs and the corresponding tapped holes in the cylinder head shall be in accordance with ISO 68-1, ISO 261, ISO 965-1 and ISO 965-3. Their limiting dimensions and their tolerance classes are specified in 3.2.3.2 and 3.2.3.3 respectively.

##### 3.2.3.2 Limiting dimensions

The limiting dimensions are given in table 2.

**Table 2**

Dimensions in millimetres

Dimension		Plug thread (on finished plug)	Tapped hole in cylinder head
Major diameter	max.	9,974	not specified
	min.	9,794	10
Pitch diameter	max.	9,324	9,5
	min.	9,212	9,35
Minor diameter	max.	8,747	9,153
	min.	8,563 <sup>1)</sup>	8,917

1) With a root radius  $\geq 0,1$  mm (0,1  $P$ ).

### 3.2.3.3 Tolerance classes

The thread tolerance classes of finished M10 × 1 spark-plugs and of the corresponding tapped holes in the cylinder head shall be as follows:

- 6g for spark-plugs (see note 1);
- 6H for tapped holes in the cylinder head.

#### NOTES

1 In order that spark-plugs complying with this International Standard can be fitted in existing cylinder heads even in extreme cases, the value for the maximum truncation of the minor diameter of the spark-plug base has been slightly reduced with respect to the ISO value.

This maximum value of the minor diameter is calculated from a distance of  $H/6$  for the maximum truncation instead of the value given by the formula in ISO 965-1:—, clause 11, according to the formula given below:

$$\begin{aligned} \text{Minor diameter, maximum} &= d_1 - e_s - 2(H/4 - H/6) \\ &= 8,917 - 0,026 - 0,144 \\ &= 8,917 - 0,170 = 8,747 \end{aligned}$$

The value for the basic profile remains the same as for the ISO thread ( $8,917 - 0,026 = 8,891$ ).

2 The initial clearance  $e = 0,026$  mm between the pitch diameters of the thread and of the tapped hole is intended to prevent the possibility of seizure, as a result of combustion deposits on the bare threads, when removing the spark-plugs.

This clearance is also intended to enable spark-plugs with threads in accordance with this International Standard to be fitted in existing tapped holes.

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### 3.3 Other dimensions of spark-plugs and their cylinder head housings

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The other dimensions shall be as indicated in figures 1 to 4.

Dimensions 52,5 mm on spark-plugs with solid post terminal and 49,5 mm on spark-plugs with threaded terminal shall be measured when the spark-plugs have been tightened according to 3.2.2.

The contour of the insulator is optional; however, between the reference planes defined for spark-plugs with solid post terminals by the dimensions 29 mm and 33 mm, and for spark-plugs with threaded terminals by the dimensions 26 mm and 30 mm, its largest diameter shall be  $10,5 \text{ mm} \pm 0,3 \text{ mm}$ .

The  $Z$  length of the spark-plug housing in the cylinder head shall be sufficient to ensure that the end of the spark-plug thread does not project into the combustion chamber at any point when the gasket is tightened to maximum compression.

Details not specified are left to the manufacturer's choice.

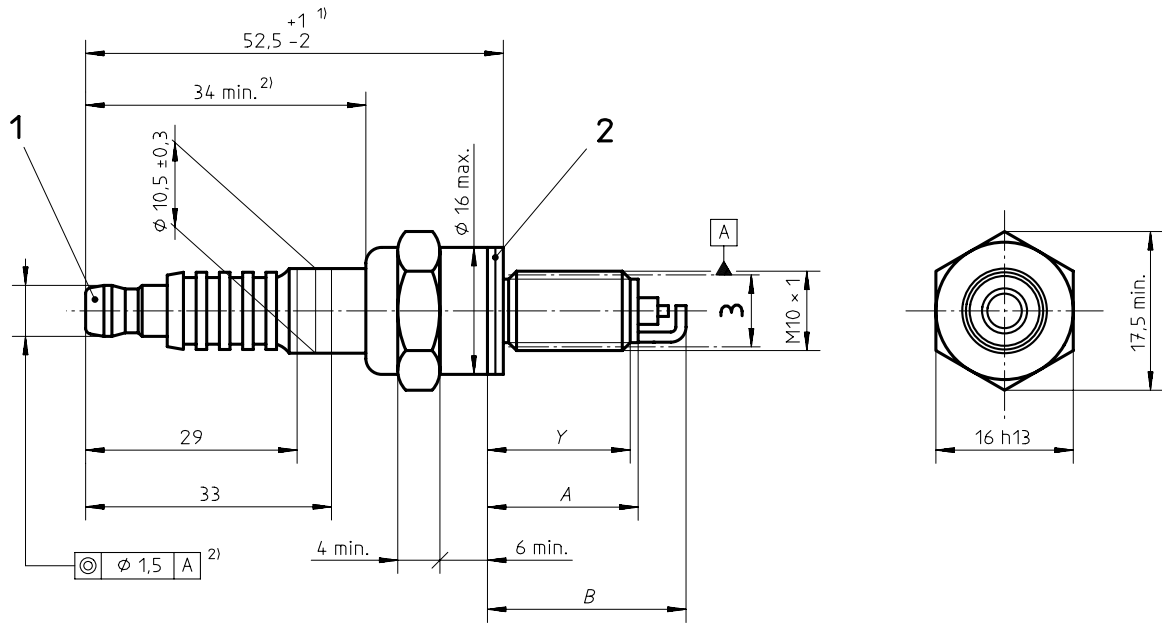
### 3.4 Installation tightening torque

The installation torque values apply to new spark-plugs without lubricant on the threads. If threads are lubricated, the torque value shall be reduced by approximately one-third to avoid overstressing.

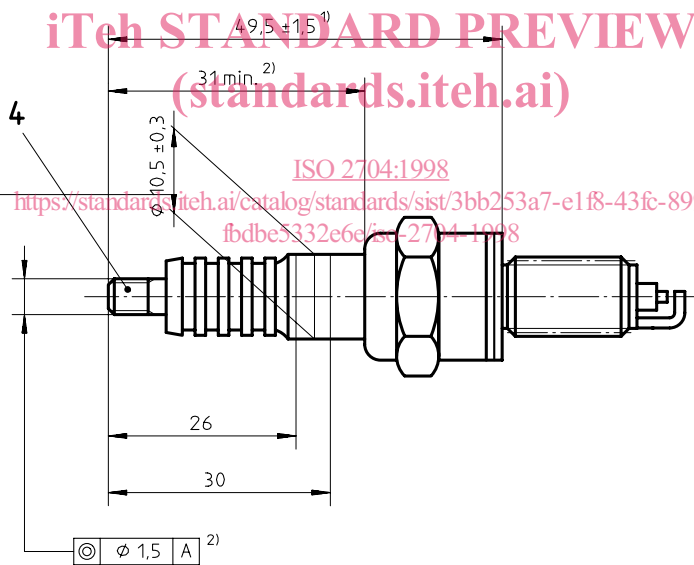
Spark-plugs shall be tightened with a torque of 10 N·m to 15 N·m in aluminium and cast iron cylinder heads.

NOTE — Engine manufacturers may specify a different torque for the first spark-plug installation.

Dimensions in millimetres



a) with solid post terminal



b) with threaded terminal<sup>3)</sup>

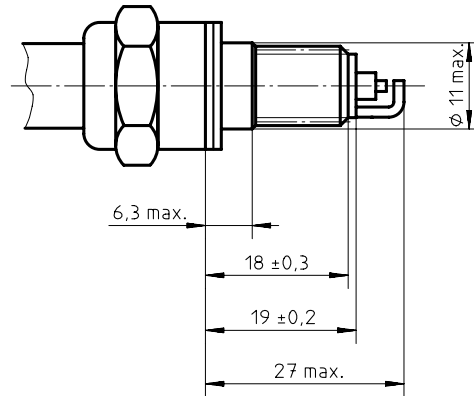
- 1) For normal reach spark-plugs a maximum height without gasket is allowed of
  - 61 mm for spark-plugs with solid post terminal;
  - 58 mm for spark-plugs with threaded terminal.
- 2) For normal reach spark-plugs the coaxiality tolerance and the dimensions 31 mm minimum for spark-plugs with threaded terminal and 34 mm minimum for spark-plugs with solid post terminal do not apply.
- 3) For dimensions not shown see figure 1 a).

**Key**

- |  |  |
|--|--|
| 1 Solid post terminal in accordance with ISO 14508 | 3 Pitch diameter                                 |
| 2 Captive gasket                                   | 4 Threaded terminal in accordance with ISO 14508 |

**Figure 1 — M10 × 1 spark-plugs with flat seating and full thread**

Dimensions in millimetres



NOTE — For dimensions not shown, see figure 1 a).

Figure 2 — M10 × 1 spark-plug with flat seating and half thread

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Dimensions in millimetres

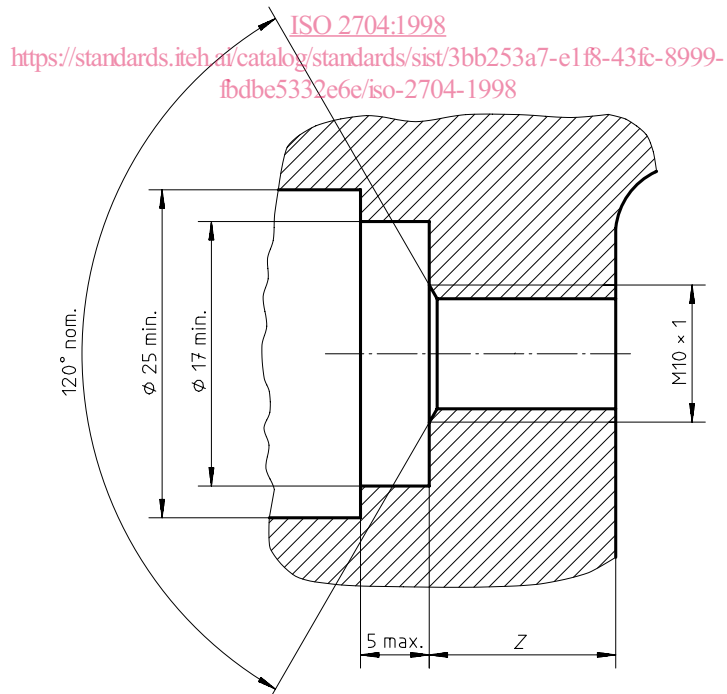


Figure 3 — Housing of spark-plug with full thread in cylinder head

Dimensions in millimetres

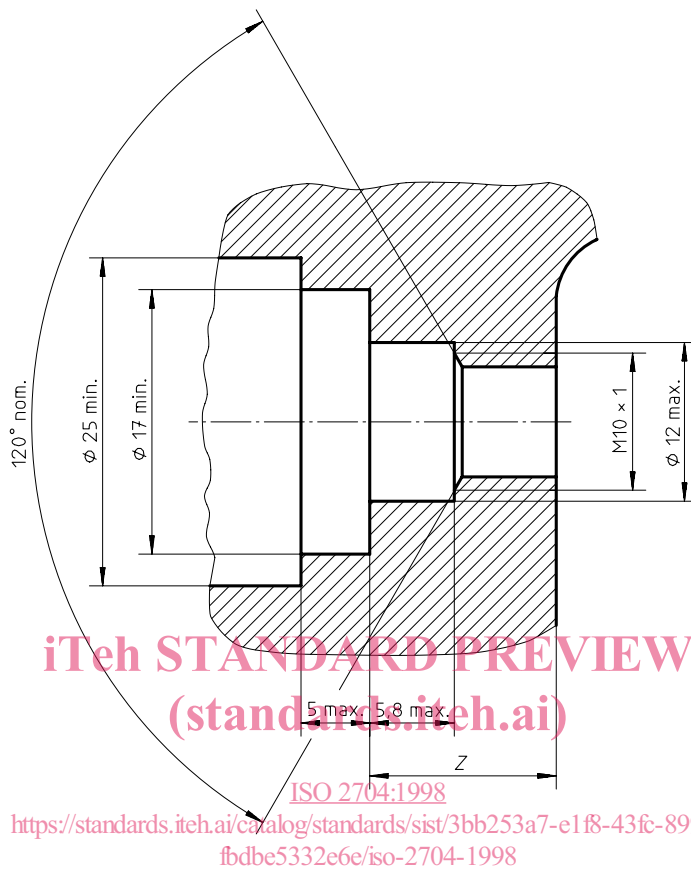


Figure 4 — Housing of spark-plug with half thread in cylinder head



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