INTERNATIONAL STANDARD

**ISO 8470**

Second edition
2001-04-01

# Road vehicles — M14 × 1,25 spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings

*Véhicules routiers — Bougies d'allumage M14 × 1,25 à siège plat et à hexagone de 16 mm et leurs logements dans la culasse*



Reference number
ISO 8470:2001(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

## 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 8470 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 1, *Ignition equipment*.

This second edition cancels and replaces the first edition (ISO 8470:1990), which has been technically revised.

Annex A forms a normative part of this International Standard.

# Road vehicles — M14 × 1,25 spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings

## 1 Scope

This International Standard specifies the main characteristics of M14 × 1,25 spark-plugs with flat seating and a hexagon smaller than the seating diameter, and their cylinder head housings, for use with spark-ignition engines.

## 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 68-1:1988, *ISO general-purpose screw threads — Basic profile — Part 1: Metric screw threads*.

ISO 261:1988, *ISO general-purpose metric screw threads — General plan*.



ISO 965-1:1998, *ISO general-purpose metric screw threads — Tolerances — Part 1: Principles and basic data*.

ISO 965-3:1998, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional threads*.

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

## 3 Terminals

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

## 4 Dimensions and threads

### 4.1 Spark-plug reach

The spark-plug reach shall be according to Table 1 (see Figure 1).

**Table 1 — Spark-plug reach**

Dimensions in millimetres

| Type of reach | $A$ ± 0,2 | $B$ max. | $Y$ ± 0,3 |
|---|---|---|---|
| **Normal** | 12,7 | 21 | 11,7 |
| **Long** | 19 | 27 | 18 |
| **Extra-long** | 26,5 | 34,5 | 25,5 |

## 4.2 Gasket

When the spark-plugs have been tightened with a torque of 30 N·m, on threads that are clean, smooth and dry, the gaskets shall be 1,3 mm to 2 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.

## 4.3 Threads for spark-plugs and cylinder heads

### 4.3.1 General



The threads of M14 × 1,25 spark-plugs and the corresponding tapped holes in the cylinder head shall conform to ISO 68-1, ISO 261, ISO 965-1 and ISO 965-3.



Their limiting dimensions and tolerance classes are specified in 4.3.2 and 4.3.3.



### 4.3.2 Limiting dimensions

The limiting dimensions are given in Table 2.

**Table 2 — Limiting dimensions**

Dimensions in millimetres

| Dimension | | Plug thread (on finished plug) | Tapped hole in cylinder head |
|---|---|---|---|
| Major diameter | max. | 13,937 | not specified |
| | min. | 13,725 | 14 |
| Pitch diameter | max. | 13,125 | 13,368 |
| | min. | 12,993 | 13,188 |
| Minor diameter | max. | 12,404 | 12,912 |
| | min. | 12,181[a] | 12,647 |

[a] With a root radius $\geqslant$ 0,125 mm (0,1 $P$).

### 4.3.3 Tolerance classes

The thread tolerance classes of finished M14 × 1,25 spark-plugs and of the corresponding tapped holes in the cylinder head are

— 6e for spark-plugs, and

— 6H for tapped holes in the cylinder head.

NOTE 1 In order that spark-plugs complying with this International Standard may be fitted in existing cylinder heads, and also 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 clause 11 of ISO 965-1:1998), according to the formula:

$$\text{Minor diameter, maximum} = d_1 - es - 2(H/4 - H/6)$$

$$= (12{,}647 - 0{,}063 - 0{,}180)\ \text{mm}$$

$$= (12{,}647 - 0{,}243)\ \text{mm} = 12{,}404\ \text{mm}$$

The value for the basic profile remains the same as for the ISO thread: (12,647 – 0,063) mm = 12,584 mm.

NOTE 2 The initial clearance, $e$ = 0,063 mm, between the pitch diameters of the thread and of the tapped hole, is intended to prevent the possibility of seizure resulting from combustion deposits on the bare threads when the spark-plugs are removed. This clearance is also intended to enable spark-plugs with threads in accordance with this International Standard to be fitted in existing tapped holes.



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

The other dimensions shall be as indicated in Figures 1 to 3 and Figure A.1.



Dimensions of 52,5 mm on spark-plugs with a solid post terminal and 49,5 mm on those with a threaded terminal shall be measured when the spark-plugs have been tightened according to 4.2.

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 mm ± 0,3 mm.

The lengths of the cylinder head housing, $Z$ (see Figures 2 and 3) and $Z'$ (see Figure A.1), 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 spark-plug is tightened to its maximum specified torque.

An alternative cylinder head housing with a combination conical and flat seat is possible (see annex A).

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

## 6 Installation tightening torque

The installation torque values are applicable 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.

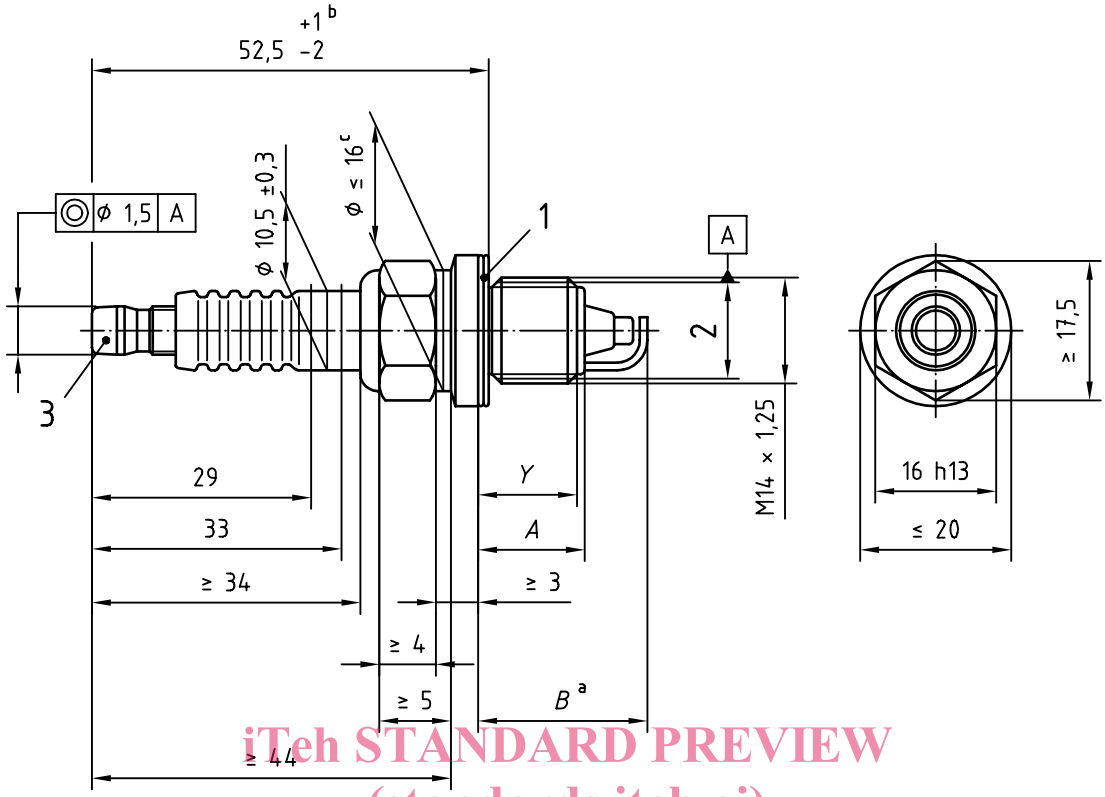
Spark-plugs shall be tightened with a torque of

— 20 N·m to 30 N·m in aluminium cylinder heads, and

— 20 N·m to 40 N·m in cast-iron cylinder heads.

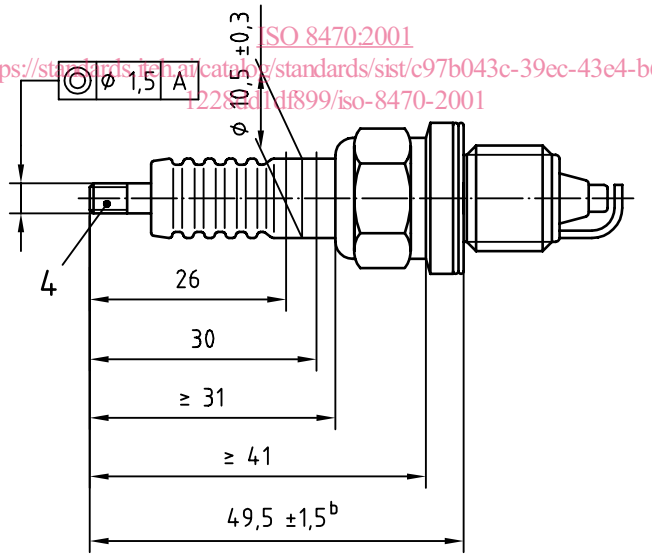
Engine manufacturers may specify a different torque for the first spark-plug installation.

Dimensions in millimetres




**a) With solid post terminal**





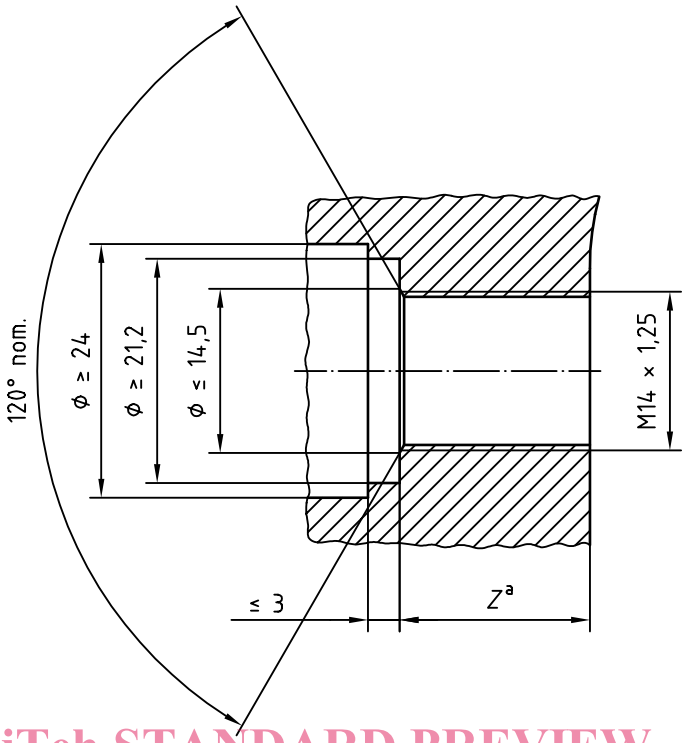

**b) With threaded terminal** [for dimensions not shown, see Figure 1 a)]

**Key**

1 Captive gasket
2 Pitch diameter
3 Solid post terminal (ISO 14508)
4 Threaded terminal (ISO 14508)
a Dimension $B$ is the maximum protrusion of any part of the spark-plug into the combustion chamber, measured from the spark-plug seat, and not including the gasket.
b See clause 5.
c Optional.

**Figure 1 — M14 × 1,25 spark plug with flat seating**

Dimensions in millimetres



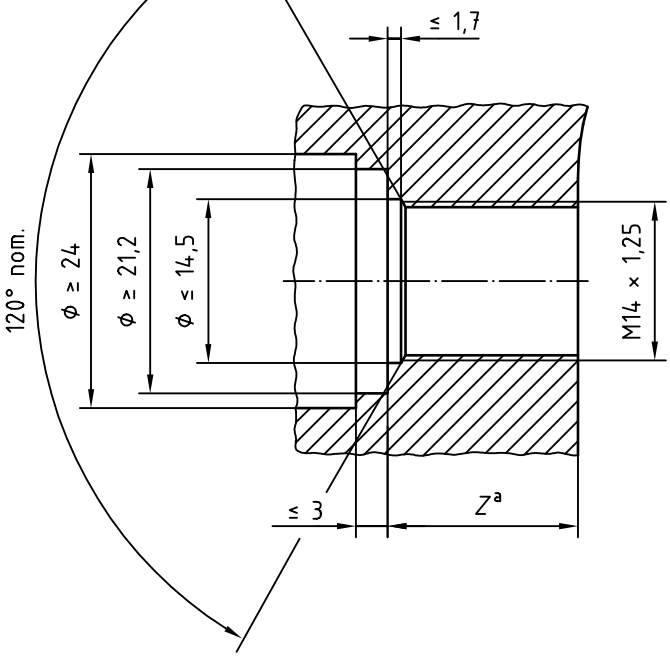



[a] See clause 5.

**Figure 2 — Cylinder head housing**

Dimensions in millimetres






[a] See clause 5.

**Figure 3 — Optional configuration of the cylinder head housing**