

# INTERNATIONAL STANDARD

**ISO**  
**8470**

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

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



Reference number  
ISO 8470:1990(E)

## 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.

International Standard ISO 8470 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

Annex A forms an integral part of this International Standard.

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

## 1 Scope

This International Standard specifies the main characteristics of M14 × 1,25 spark-plugs with flat seating with normal or long reach and with a hexagon smaller than the seating diameter and their cylinder head housing, 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 68:1973, *ISO general purpose screw threads — Basic profile.*

ISO 261:1973, *ISO general purpose metric screw threads — General plan.*

ISO 965-1:1980, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data.*

ISO 965-3:1980, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional threads.*

## 3 Requirements

### 3.1 Terminals

The spark-plug terminal may be either the solid post or the threaded type. If nuts are used, they shall have the same external dimensions as those of the solid post terminal. See figures 1a) and 1b).

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

#### 3.2.1 Spark-plug reach

Spark-plug reach shall meet the requirements given in table 1.

Table 1

Dimensions in millimetres

Type of reach	<i>A</i> <sup>1)</sup> ± 0,2	<i>B</i> max.	<i>Y</i> ± 0,3
Normal reach	12,7	21	11,7
Long reach	19	27	18

1) Dimension *A* may be increased for certain spark-plug types.

#### 3.2.2 Gasket

When the spark-plugs have been tightened with a torque of 30 N·m, on threads that are clean, smooth and dry, the gasket 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.

#### 3.2.3 Threads

##### 3.2.3.1 Spark-plug and cylinder head

The threads of M14 × 1,25 spark-plugs and the corresponding tapped holes in the cylinder head shall conform to ISO 68, ISO 261, ISO 965-1 and ISO 965-3. Their dimension limits and their tolerance classes are specified in 3.2.3.1.1 and 3.2.3.1.2 respectively.

3.2.3.1.1 Dimension limits

The dimension limits are given in table 2.

**Table 2**  
Dimensions in millimetres

Dimension		Plug thread (on finished plug)	Tapped hole in cylinder head
Major diameter	max.	13,937	not speci- fied
	min.	13,725	14,000
Pitch diameter	max.	13,125	13,368
	min.	12,993	13,188
Minor diameter	max.	12,404	12,912
	min.	12,181 <sup>1)</sup>	12,647

1) With a root radius  $\geq 0,125$  mm (0,1 P).

3.2.3.1.2 Tolerance classes

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

- 6e 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 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*, according to the formula below, instead of the value given by the formula in ISO 965-1:1980, clause 11:

$$\begin{aligned} \text{Minor diameter, maximum} &= d_1 - e_s - 2(H/4 - H/6) \\ &= 12,647 - 0,063 - 0,180 \\ &= 12,647 - 0,243 = 12,404 \end{aligned}$$

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

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, as a result of com-

bustion 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.

3.2.3.2 Threaded terminal

For spark-plugs with a threaded-type terminal, the thread tolerance class of the terminal [see figure 1b)] is 6e.

NOTE 3 Depending on manufacturing processes, class 7e is acceptable on the finished product.

Nuts for use with threaded post terminals shall have internal threads to 6H tolerance prior to assembly on the threaded post.

3.3 Other dimensions of spark-plug and housing in cylinder head

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

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 terminal by the dimensions 29 mm and 33 mm and for spark-plugs with threaded terminal by the dimensions 26 mm and 30 mm, its largest diameter shall be 10,5 mm  $\pm$  0,3 mm.

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.

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.

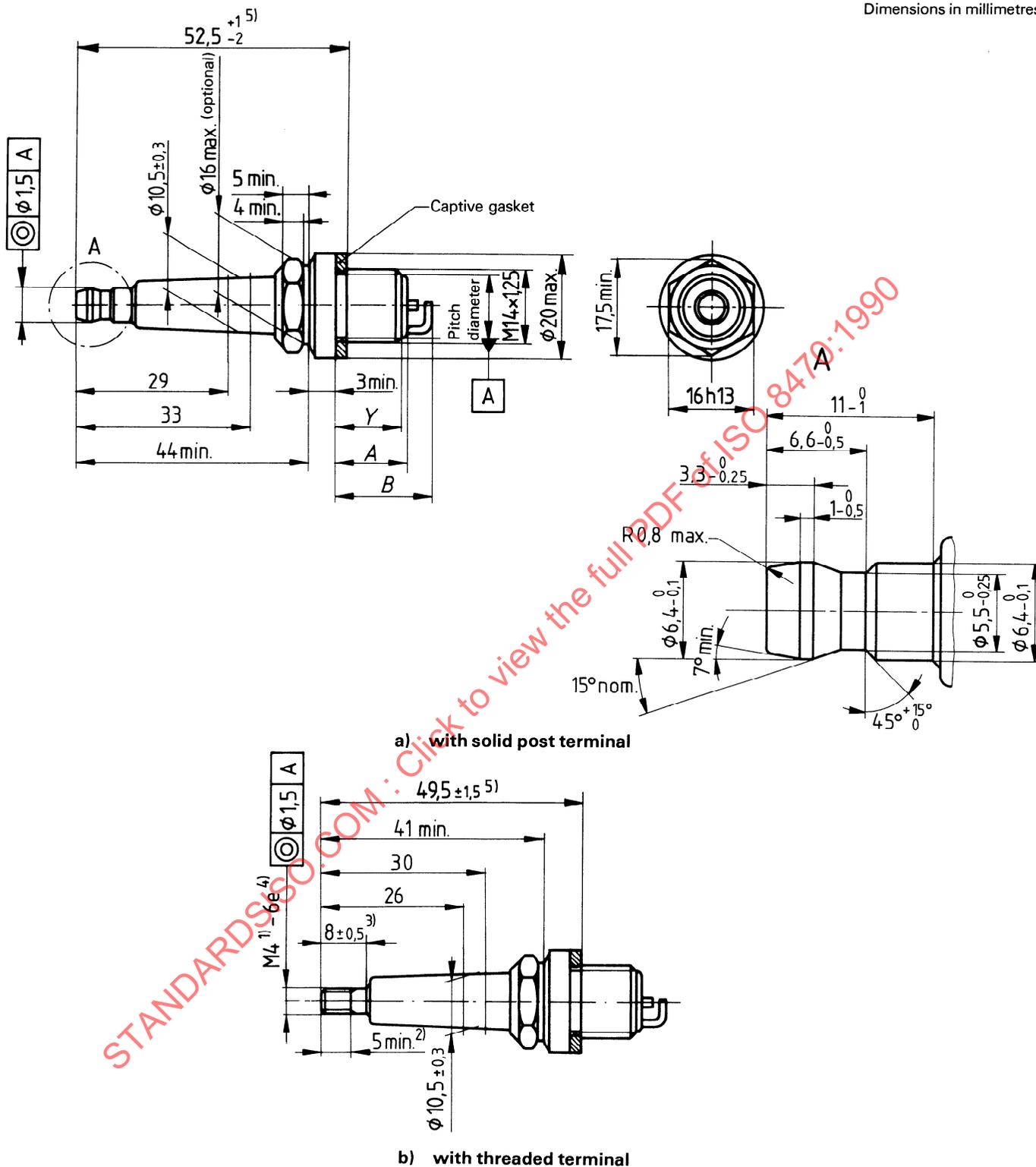
The spark-plugs shall be tightened with a torque of

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

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

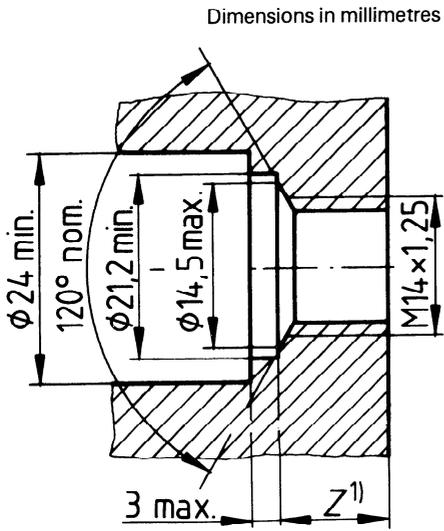
NOTE 4 Engine manufacturers may specify a different torque for the first spark-plug installation.

Dimensions in millimetres



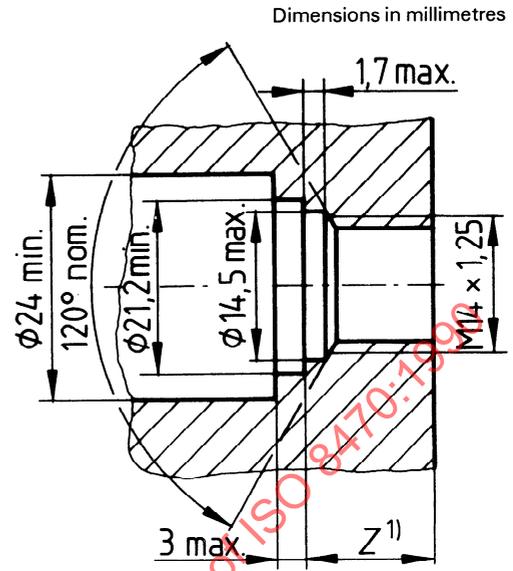
- 1) 0,7 mm pitch complying with ISO 68 and ISO 261.
- 2) Length of usable thread.
- 3) Cylindrical part.
- 4) Depending upon manufacturing processes, class 7e is acceptable on the finished product.
- 5) See 3.3.

Figure 1 — M14 × 1,25 spark-plugs with flat seating and 16 mm hexagon



1) See annex A.

**Figure 2 — Housing of spark-plug in cylinder head**



1) See annex A.

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

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