
**Road vehicles — M12 × 1,25 spark-plugs
with flat seating and their cylinder head
 housings**

*Véhicules routiers — Bougies d'allumage M12 × 1,25 à siège plat et leurs
logements dans la culasse*

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ISO 2705:1999

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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 2705 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 2705:1991), which has been technically revised.

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Road vehicles — M12 × 1,25 spark-plugs with flat seating and their cylinder head housings

1 Scope

This International Standard specifies the main characteristics of M12 × 1,25 spark-plugs with flat seating with normal, long or extra-long reach 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 68-1:1998, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads.*

ISO 261:1998, *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 screw threads.*

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

3 Requirements

3.1 Terminals

The spark-plug terminal may 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 a)].

3.2 Dimensions and threads (see Figures 1 and 2)

3.2.1 Spark-plug reach

Spark-plug reach shall meet the requirements of Table 1.

Table 1

Dimensions in millimetres

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

3.2.2 Gasket

When the spark-plugs have been tightened with a torque of 25 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

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3.2.3.1 Requirements

The threads of M12 × 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 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

Dimensions		Plug thread (on finished plug)	Tapped hole in cylinder head
Major diameter	max.	11,937	not specified
	min.	11,725	12,000
Pitch diameter	max.	11,125	11,368
	min.	10,993	11,188
Minor diameter	max.	10,404	10,912
	min.	10,181 ^a	10,647

^a With a root radius ≥ 0,125 mm (0,1 P)

3.2.3.3 Tolerance classes

The thread tolerance classes of finished M12 × 1,25 spark-plugs and of the corresponding tapped holes in the cylinder head shall be as follows:

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

NOTE 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 value specified in ISO 965-1.

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 965-1:1998, clause 11, according to the formula given below:

$$\begin{aligned} \text{Minor diameter, maximum} &= d_1 - e_s - 2(H/4 - H/6) \\ &= 10,647 - 0,063 - 0,180 \\ &= 10,647 - 0,243 = 10,404 \end{aligned}$$

The value for the basic profile remains the same as for the ISO thread ($10,647 - 0,063 = 10,584$).

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, 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.

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

The other dimensions shall be as indicated in Figures 1 and 2.

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 maximum 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.

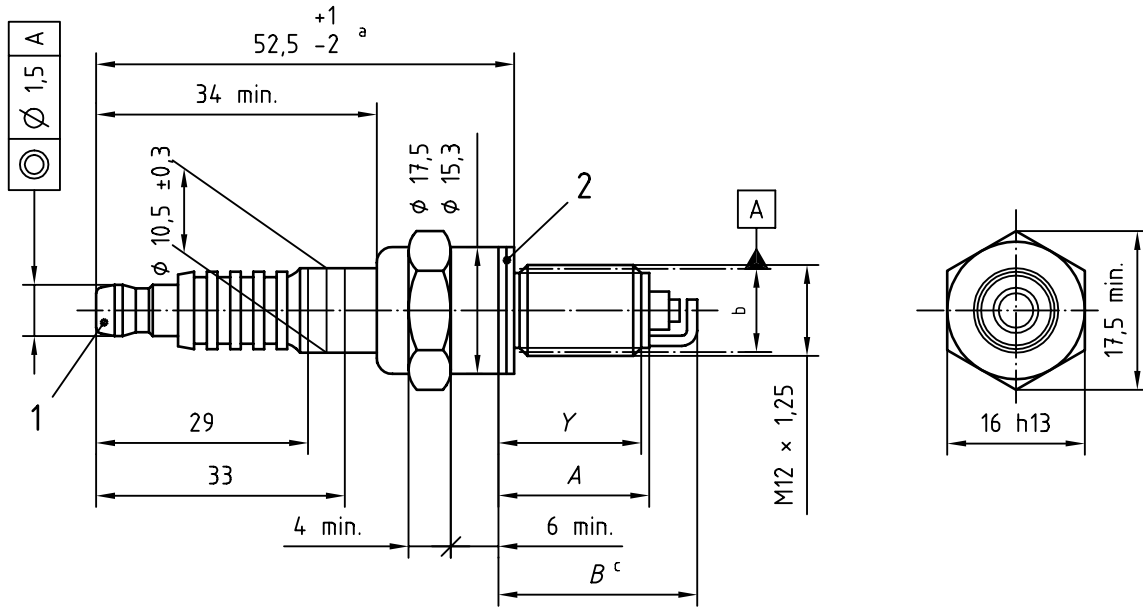
Details not specified are left to the manufacturer's choice.

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.

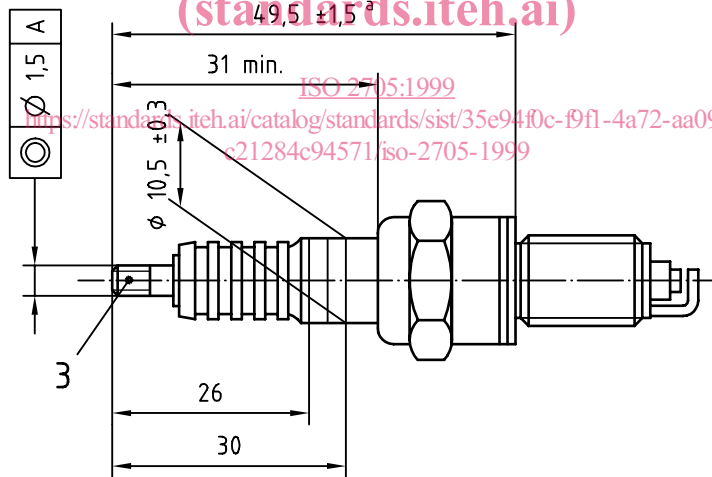
Spark-plugs shall be tightened with a torque of 15 N·m to 25 N·m in aluminium and cast iron cylinder heads.

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



a) with solid post terminal

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

Key

- 1 Solid post terminal ISO 14508
- 2 Captive gasket
- 3 Threaded terminal ISO 14508

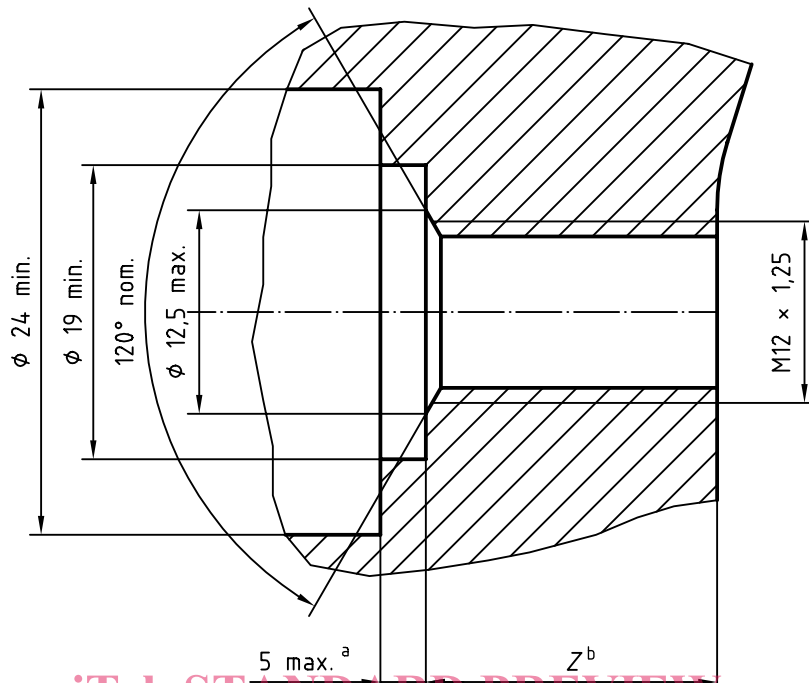
^a See 3.3.

^b Pitch diameter

^c Maximum protrusion of any part of the spark-plug into the combustion chamber, measured from spark-plug seat, not including the gasket.

Figure 1 — M12 × 1,25 spark-plugs with flat seating

Dimensions in millimetres



^a Engine manufacturers are encouraged to use a value of 3 mm max. instead of 5 mm max. for new engine designs.

^b See 3.3.

Figure 2 — Housing of spark-plug in cylinder head

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