INTERNATIONAL STANDARD

ISO 2705

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

Véhicules routiers — Bougies d'allumage M12 × 1,25 à siège plat et leur logement dans la culasse

Reference number
ISO 2705:1991(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 2705 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Sub-Committee SC 1, *Ignition equipment*.

This fourth edition cancels and replaces the third edition (ISO 2705:1982), of which it constitutes a technical revision (see, in particular, clause 1).

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

1 Scope

This International Standard specifies the main characteristics of M12 × 1,25 spark-plugs with flat seating with normal or long reach and their cylinder head housing, for use with spark-ignition engines.

Users are advised that the modifications to dimension *B* for the long reach type and to the hexagon size from the third edition (ISO 2705:1982) may affect interchangeability.

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. A spark-plug with a threaded terminal fitted with a nut shall conform to the dimensions specified for spark-plugs with a solid post terminal. See figure 1.

3.2 Dimensions and threads

See figures 1 and 2.

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	*A* ± 0,2	*B* max.	*Y* ± 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 25 N·m, on threads that are clean, smooth and dry, the gasket 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

3.2.3.1 Spark-plug and cylinder head

The threads M12 × 1,25 of the 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 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 specified in table 2.

Table 2

Dimensions in millimetres

Dimension		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[1)]	10,647

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

3.2.3.3 Tolerance classes

The thread tolerance classes of M12 × 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 the 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:

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

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

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 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-plug and housing in cylinder head[1)]

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.

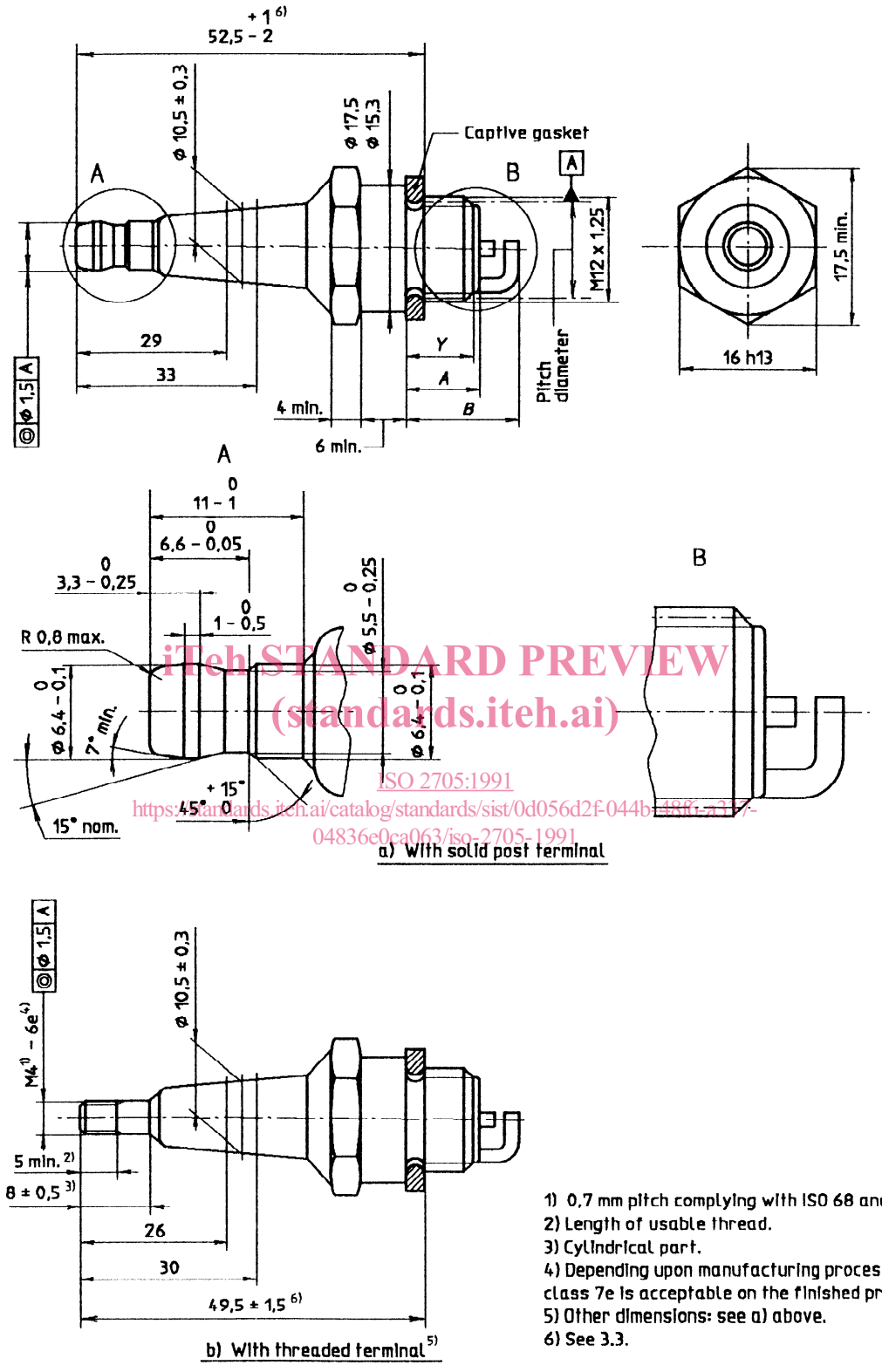
The contour of the insulator is optional; however, between the reference planes defined for spark-plugs with solid post terminal by the dimensions 29 mm and 33 mm and for spark-plugs with threaded terminal by the dimensions 26 mm and 30 mm, its largest diameter shall be 10,5 mm ± 0,3 mm.

The Z length (see figure 2) 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 plug is tightened to maximum installation torque.

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

1) After reduction of the hexagon size to 16h13, corresponding reduction of diameter 29 mm to 24 mm in the cylinder head housing is to be considered at the next review of this International Standard.

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) Other dimensions: see a) above.
6) See 3.3.

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

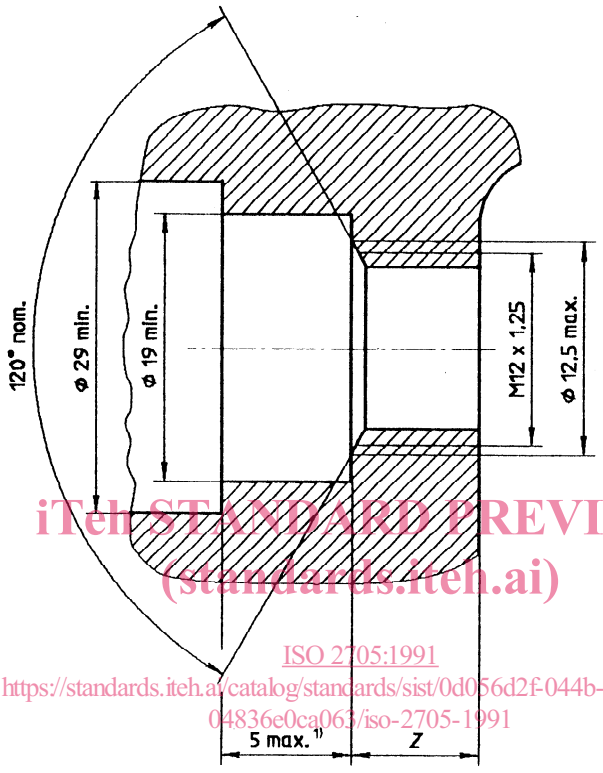
3.4 Installation tightening torque

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 15 N·m to 25 N·m in aluminium and cast iron cylinder heads.

NOTE 3 Engine manufacturers may specify a different torque for the first spark-plug installation.

Dimensions in millimetres



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

Figure 2 — Housing of spark-plug in cylinder head

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Descriptors: road vehicles, motor vehicles, internal combustion engines, controlled ignition engines, ignition systems, spark plugs, specifications, dimensions.

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