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(JAPIA/JSA)

**Internal combustion engines—
Spark-plugs**

ICS 27.020; 43.060.50

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Auto Parts Industries Association (JAPIA)/ Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 8031** : 1995 is replaced with this Standard.

This revision has been made based on **ISO 1919** : 1998 *Road vehicles—M14×1.25 spark-plugs with flat seating and their cylinder head housings* and Corrigendum 1 : 1999, **ISO 2344** : 1998 *Road vehicles—M14×1.25 spark-plugs with conical seating and their cylinder head housings*, **ISO 2346** : 2001 *Road vehicles—M14×1.25 compact spark-plugs with flat seating and 19 mm hexagon and their cylinder head housing*, **ISO 2704** : 1998 *Road vehicles—M10×1 spark-plugs with flat seating and their cylinder head housings*, **ISO 2705** : 1999 *Road vehicles—M12×1.25 spark-plugs with flat seating and their cylinder head housings*, **ISO 8470** : 2001 *Road vehicles—M14×1.25 spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings*, **ISO 11565** : 1998 *Road vehicles—Spark-plugs—Test methods and requirements*, **ISO 14508** : 1997 *Road vehicles—Spark-plugs—Terminals*, **ISO 16246** : 2005 *Road vehicles—M12×1.25 spark-plugs with flat seating and 14 mm hexagon and their cylinder head housing* and **ISO/DIS 19812** : 2004 *Road vehicles—M10×1 compact spark-plugs with flat seating and 16 mm hexagon and their cylinder head housing* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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the original JIS is to be the final authority.

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Internal combustion engines— Spark-plugs

Introduction This Japanese Industrial Standard has been prepared based on the fifth edition of **ISO 1919** *Road vehicles—M14×1.25 spark-plugs with flat seating and their cylinder head housings* published in 1998 and Corrigendum 1:1999, the seventh edition of **ISO 2344** *Road vehicles—M14×1.25 spark-plugs with conical seating and their cylinder head housings* published in 1998, the fifth edition of **ISO 2346** *Road vehicles—M14×1.25 compact spark-plugs with flat seating and 19 mm hexagon and their cylinder head housing* published in 2001, the fifth edition of **ISO 2704** *Road vehicles—M10×1 spark-plugs with flat seating and their cylinder head housings* published in 1998, the fifth edition of **ISO 2705** *Road vehicles—M12×1.25 spark-plugs with flat seating and their cylinder head housings* published in 1999, the second edition of **ISO 8470** *Road vehicles—M14×1.25 spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings* published in 2001, the first edition of **ISO 11565** *Road vehicles—Spark-plugs—Test methods and requirements* published in 1998, the first edition of **ISO 14508** *Road vehicles—Spark-plugs—Terminals* published in 1997, the first edition of **ISO 16246** *Road vehicles—M12×1.25 spark-plugs with flat seating and 14 mm hexagon and their cylinder head housing* published in 2005 and **ISO/DIS 19812** *Road vehicles—M10×1 compact spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings* published in 2004, with some modifications of the technical contents. Whereas the original International Standards specify each type of spark-plugs separately, this Standard, for the sake of users' convenience, covers different types of spark-plugs comprehensively.

The portions given continuous sidelines or dotted underlines are the matters in which the contents of the original International Standard have been modified. A list of modifications with explanations is given in Annex 2 (informative).

1 Scope This Standard specifies the spark-plugs (hereafter referred to as “plugs”) used for the internal combustion engines. The plugs for aircraft are excluded.

NOTE : The International Standards corresponding to this Standard are as follows.

In addition, the symbols which denote the degree of correspondence in the contents between **JIS** and the relevant International Standard are IDT (identical), MOD (modified) and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 1919:1998 *Road vehicles—M14×1.25 spark-plugs with flat seating and their cylinder head housings* and Corrigendum 1:1999 (MOD)

ISO 2344:1998 *Road vehicles—M14×1.25 spark-plugs with conical seating and their cylinder head housings* (MOD)

ISO 2346:2001 *Road vehicles—M14×1.25 compact spark-plugs with flat seating and 19 mm hexagon and their cylinder head housing* (MOD)

ISO 2704:1998 *Road vehicles—M10×1 spark-plugs with flat seating and their cylinder head housings* (MOD)

ISO 2705:1999 *Road vehicles—M12×1.25 spark-plugs with flat seating and their cylinder head housings* (MOD)

ISO 8470:2001 *Road vehicles—M14×1.25 spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings* (MOD)

ISO 11565:1998 *Road vehicles—Spark-plugs—Test methods and requirements* (MOD)

ISO 14508:1997 *Road vehicles—Spark-plugs—Terminals* (MOD)

ISO 16246:2005 *Road vehicles—M12×1.25 spark-plugs with flat seating and 14 mm hexagon and their cylinder head housing* (MOD)

ISO/DIS 19812:2004 *Road vehicles—M10×1 compact spark-plugs with flat seating and 16 mm hexagon and their cylinder head housings* (MOD)

Information : The conventional spark performance test has been replaced with the withstand voltage test in this Standard. The spark performance test is described in Annex 1 as a reference test method.

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0205-1 *ISO general purpose metric screw threads—Part 1: Basic profile*

NOTE : **ISO 68-1** *ISO general purpose screw threads—Basic profile—Part 1: Metric screw threads* is identical with the said standard.

JIS B 0209-3 *ISO general purpose metric screw threads—Tolerances—Part 3: Deviations for constructional screw threads*

NOTE : **ISO 965-3** *ISO general purpose metric screw threads—Tolerances—Part 3: Deviations for constructional screw threads* is identical with the said standard.

JIS C 1302 *Insulation resistance testers*

3 Classification Plugs shall be classified into three classes M14, M12, and M10 according to the designations of plug threads, and further subdivided by the shape, hexagon opposite side distance (hereafter referred to as “hexagon width across flat”) and length of plug threads as shown in table 1.

Table 1 Classification of plugs

Class	Shape	Hexagon width across flat mm	Length of plug thread mm	NOTE	Informative reference figure
M14	General type ⁽¹⁾	20.8	9.5	ISO 1919	Figure 1.1A
			12.7		
			19.0		
		16	12.7	ISO 8470	Figure 1.1B
			19.0		
			26.5		
	Compact type	19	9.5	ISO 2346	Figure 1.2A
	Conical type	16	11.2	ISO 2344	Figure 1.4
			17.5		
			25.0		
M12	General type ⁽¹⁾	18	12.7	—	Figure 1.1A
			19.0		
		16	12.7	ISO 2705	Figure 1.1B
			19.0		
			26.5		
		14	19.0	ISO 16246	Figure 1.1B
			26.5		
M10	General type ⁽¹⁾	16	12.7	ISO 2704	Figure 1.1A
			19.0		Figure 1.1B
	Compact type	16	9.5	ISO/DIS 19812	Figure 1.2B
			12.7		
	Half thread type	16	19.0 ⁽²⁾	—	Figure 1.3

Notes ⁽¹⁾ “General” refers to those with flat seatings.

⁽²⁾ Dimension A in figure 1.3

NOTE : Apart from the classification in the table, plugs of each type can be divided into those with incorporated resistor (referred to as “resistor spark-plug”) and those without resistor.

4 Performance The performance of the plugs, when tested in accordance with clause 7, shall be as given in table 2. However, **h)** in table 2 shall apply to the plugs with filler material between central electrode and insulator. The items **l)** to **n)** of table 2 shall apply to the resistor spark-plugs.

Table 2 Performance of plugs

Item	Performance	Applicable clause
a) Insulation resistance	Insulation resistance shall be 100 MΩ or over.	7.2
b) Withstand voltage	No breakdown shall occur through a plug insulator.	7.3
c) Impact resistance	No abnormality shall occur on any part of the plug. The variation of the resistance value of the resistor spark plug shall be ± 10 % of the resistance value before testing.	7.4
d) Airtightness	Air leakage from inside of the plug shall be 1 ml/min or under.	7.5
e) Thread breaking strength of shell	The thread shall not be broken at the specified value or less given in table 3.	7.6
f) Terminal tear-off resistance	The terminal shall not be torn off by a force of 400 N or less.	7.7
g) Insulator bending resistance	Such abnormalities as cracks shall not be found in any part of the plug under bending moment of 15 Nm.	7.8
h) Thermal resistance	Such abnormalities as cracks shall not be found on any part of the plug.	7.9
i) Thermal shock resistance	Such abnormalities as cracks shall not be found on any part of the plug.	7.10
j) Rapid cooling resistance	Such abnormalities as cracks shall not be found in any part of the plug.	7.11
k) Heat insulation resistance	Heat insulation resistance shall be 10 MΩ or over.	7.12
l) Resistance value of incorporated resistor	Resistance value of resistor spark-plug shall be $5^{+2.5}_{-2.0}$ kΩ for types other than compact and 10^{+6}_{-3} kΩ for compact type.	7.13
m) Loading life of incorporated resistor	Variation of resistance value of resistor spark-plug shall be ± 30 % in respect to the resistance value before testing.	7.14
n) Heating characteristic of incorporated resistor	Variation of resistance value of resistor spark-plug shall be as specified in table 4.	7.15

Table 3 Breaking torque according to classification of plugs

Unit: N·m

Classification of plugs	Breaking torque
M14 General type, compact type	60
M14 Conical type	40
M12	35
M10	25

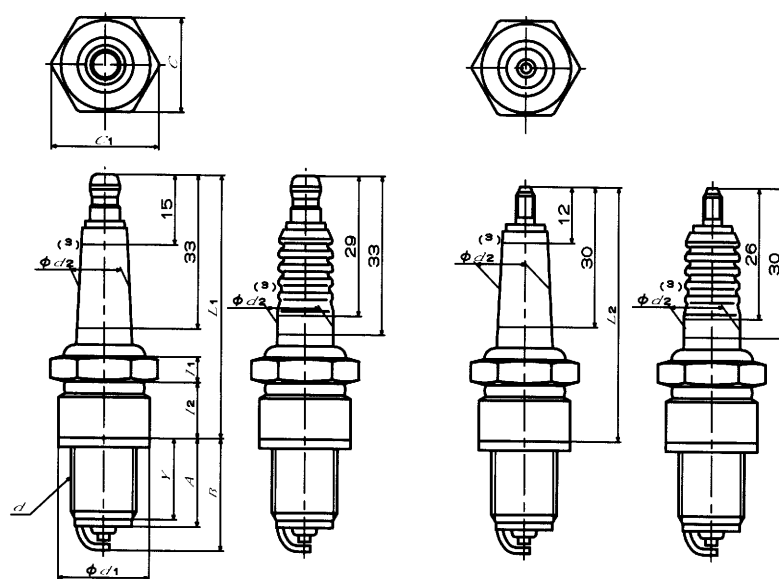
Table 4 Variation rates of resistance value

Unit: %

Test temperature	Variation rates in respect to resistance value before testing	
	Heated condition	Restored condition to ordinary temperature
150 °C	+25 -40	±10
300 °C	—	±25

5 Shapes and dimensions

5.1 External dimensions The external dimensions of the plugs shall be as given in figures 1.1 to 1.4 and table 5. The shapes shown in the figures are only examples.



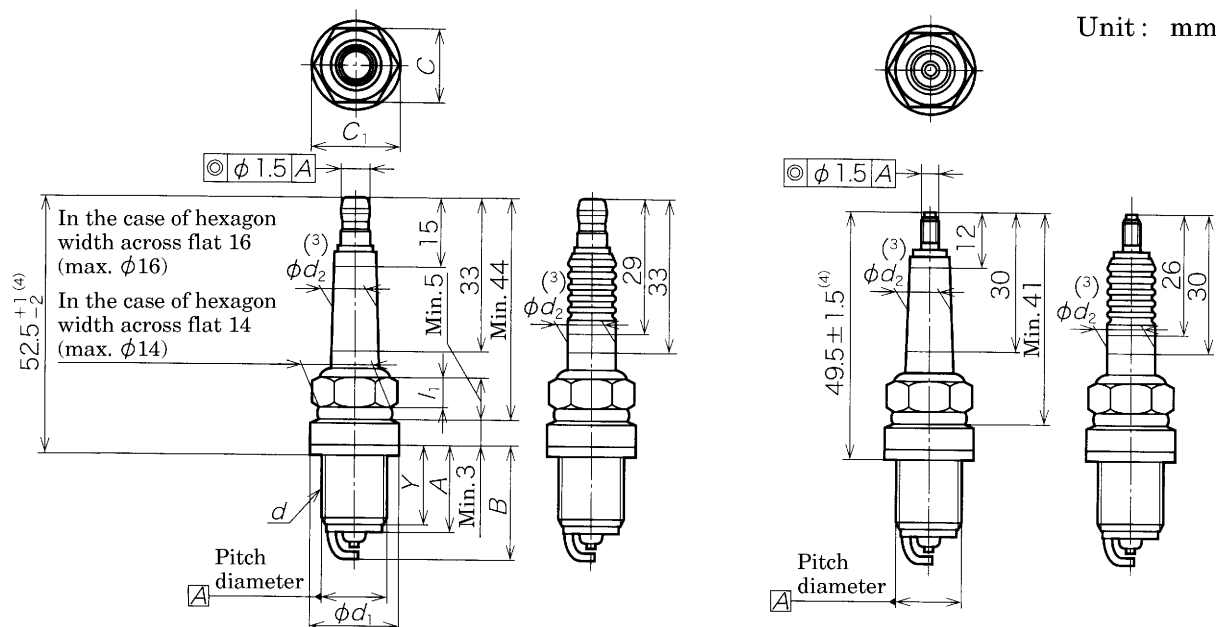
Unit: mm

a) With solid terminal

b) With threaded terminal

Note (3) The dimension ϕd_2 , in the case of the solid terminal, shall be a diameter between 15 mm and 33 mm, from the top end of the terminal, for those without ribs, and between 29 mm and 33 mm for those with ribs. In the case of the threaded terminal, it shall be a diameter between 12 mm and 30 mm, from the top end of the terminal, for those without ribs and between 26 mm and 30 mm for those with ribs.

Figure 1.1A General type (M14 hexagon width across flat 20.8, M12 hexagon width across flat 18, M10 hexagon width across flat 16 and diameter of head of insulator $\phi 10$)



Unit: mm

a) With solid terminal

b) With threaded terminal

Note (4) Dimension after tightened with the torque as specified in table 8.

Figure 1.1B General type (M14 hexagon width across flat 16, M12 hexagon width across flat 16, M12 hexagon width across flat 14, M10 hexagon width across flat 16, and diameter of head of insulator $\phi 10.5$)

Unit: mm

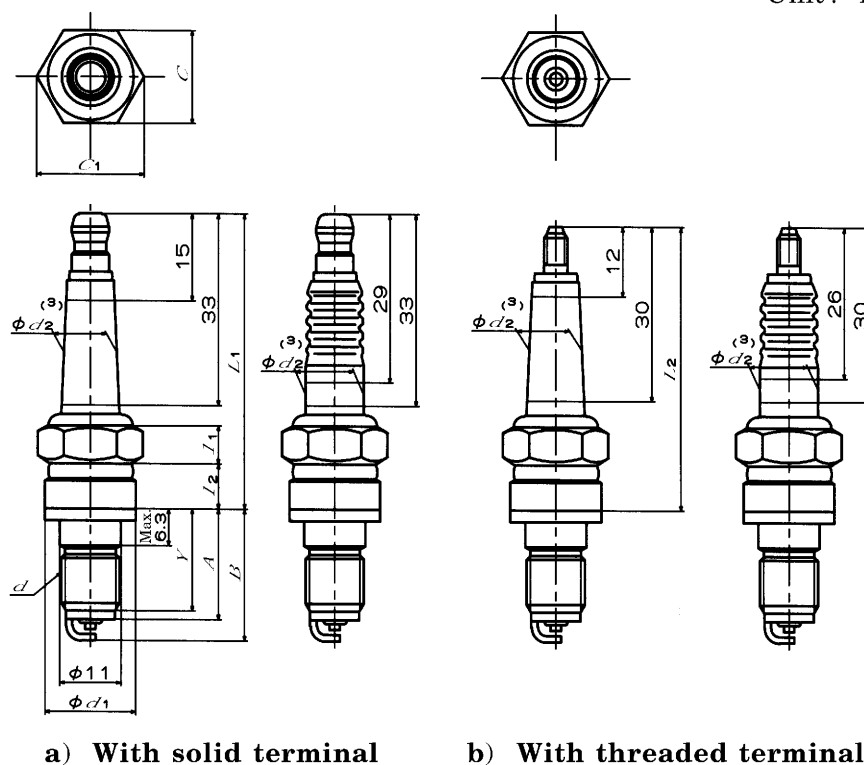


Figure 1.3 Half thread type

Unit: mm

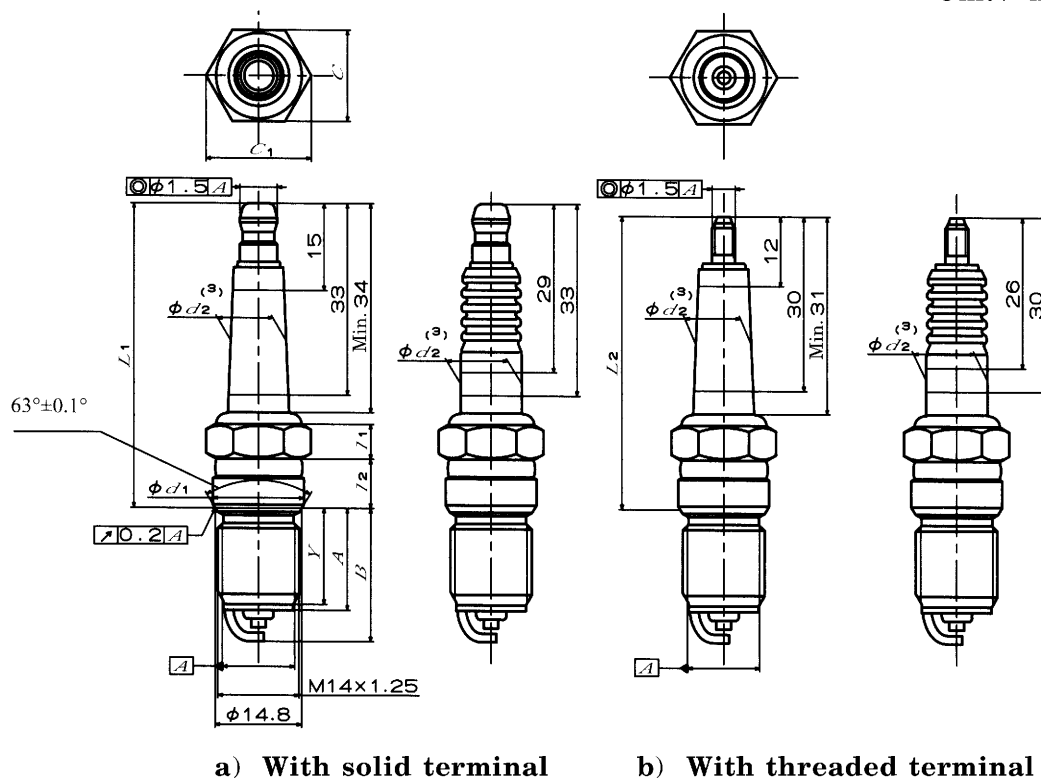


Figure 1.4 Conical type