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Road vehicles — Spark-plugs and their cylinder head housings — Basic characteristics and dimensions

Véhicules routiers — Bougies d'allumage et leur logement dans la culasse — Caractéristiques élémentaires et dimensions

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 1, *Ignition equipment*.

This second edition cancels and replaces the first edition (ISO 28741:2009), which has been technically revised. It also incorporates the Technical Corrigendum ISO 28741:2009/Cor1:2009.

Introduction

The purpose of this International Standard is to provide a compact and concise specification on spark-plugs and their cylinder head housings, which replaces the large number of existing individual International Standards on each type of spark-plug.

It is intended to specify the main properties, the design requirements, and the dimensions of most of the existing types of spark-plugs and their cylinder head housings. In this way, the user can work with one comprehensive International Standard valid for most types of spark-plugs, instead of a number of International Standards, each of which is specified for one type only.

The testing of spark-plugs is covered in ISO 11565.

Road vehicles — Spark-plugs and their cylinder head housings — Basic characteristics and dimensions

1 Scope

This International Standard specifies the main properties and dimensions of spark-plugs, including the terminals and the dimensions of their cylinder head housings, for use with spark-ignition engines.

This International Standard does not cover screened and waterproof spark-plugs (see ISO 3412, ISO 3895, and ISO 3896).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

ISO 4095, *Aerospace — Bihexagonal drives — Wrenching configuration — Metric series*

ISO 6518-1, *Road vehicles — Ignition systems — Part 1: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6518-1 and the following apply.

3.1
installed height
l
distance from the contact point of the cylinder head to the top of the spark-plug terminal, including the compressed gasket thickness with the spark-plug installed at the specified installation torque

Note 1 to entry: For conical seating, the contact point is defined from the gauge point of the seat.

3.2
spark-plug thread size
nominal size of the spark-plug thread used to interface between the spark-plug and the cylinder head thread

Note 1 to entry: These are standard metric threads, with the exception of the M14 × 1,25 thread.

3.3
hexagon/bi-hexagon
feature of the spark-plug shell that is used to install the spark-plug into the cylinder head, interfacing with the installation socket while the spark-plug is installed into the cylinder head

Note 1 to entry: A bi-hexagon is a 12-point installation feature, which requires that a 12-point socket wrench be used to install the spark-plug.

3.4
conical seating
conical section of the spark-plug shell on some spark-plug types, which is used for the seal interface between the spark-plug and the cylinder head

Note 1 to entry: There is typically no gasket used between the conical mating surfaces.

3.5
flat seating
flat surface of some spark-plug types which is perpendicular to the spark-plug axis and is used for the seal interface between the spark-plug and the cylinder head

Note 1 to entry: This seal typically uses a gasket between the flat seat of the spark-plug and the mating flat surface of the cylinder head.

3.6
insulator diameter
e
nominal diameter of the insulator in a defined region of the insulator between the top of the shell and the terminal of the spark-plug, which interfaces with a corresponding region of the high-voltage boot of the ignition lead or ignition coil

Note 1 to entry: The fit is the key to suppression of high-voltage leakage around the spark-plug insulator (flashover).

3.7
high-voltage terminal
part of the spark-plug that is used as the contact point between the high-voltage ignition source and the spark-plug

Note 1 to entry: The connection between the high-voltage ignition source and the spark-plug terminal can be made with a threaded fastener, with a snap clip that interfaces with the solid terminal or by spring-loaded mechanical contact.

3.8
installation tightening torque
rotational force applied to the spark-plug hexagon to ensure proper seating and sealing of the spark-plug to the cylinder head

Note 1 to entry: The value of the correct installation tightening torque can vary from conditions that affect the friction between the spark-plug threads and the cylinder head threads. These include cylinder head material, spark-plug shell plating, thread lubrication, and contamination from combustion deposits. It is advisable to ensure that spark-plugs are not over-torqued during installation, as this can damage spark-plug integrity and can result in engine damage. Spark-plugs with smaller thread sizes require a lower installation tightening torque.

3.9
spark-plug reach
a
distance from the spark-plug seating surface (flat seat) or from the gauge diameter (conical seat) to the point on the shell designed to be aligned with the combustion chamber surface on the cylinder head with the spark-plug properly installed

Note 1 to entry: It is advisable to design the spark-plug reach and the cylinder head housing in such a way that they match, so as to ensure correct fit of the spark-plug into the combustion chamber.

3.10
spark-plug projection
b-a
distance that any part of the spark-plug projects past the spark-plug reach into the combustion chamber

Note 1 to entry: It is important to consider this dimension for possible interference with the engine piston at top dead centre.

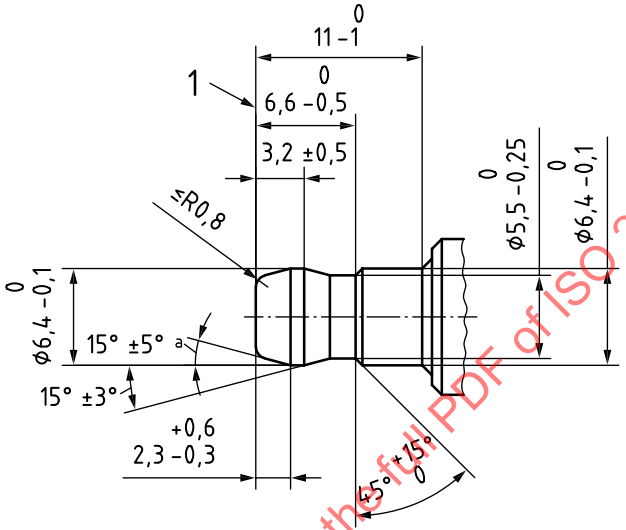
4 Terminals

4.1 Solid post terminal dimensions

The dimensions of solid post terminals shall be in accordance with Figures 1 and 2.

Nuts for use with threaded terminals shall have the same external dimensions as those of the solid post terminal, and shall have internal threads to 6H tolerance prior to assembly on the threaded terminals.

Dimensions in millimetres



Key

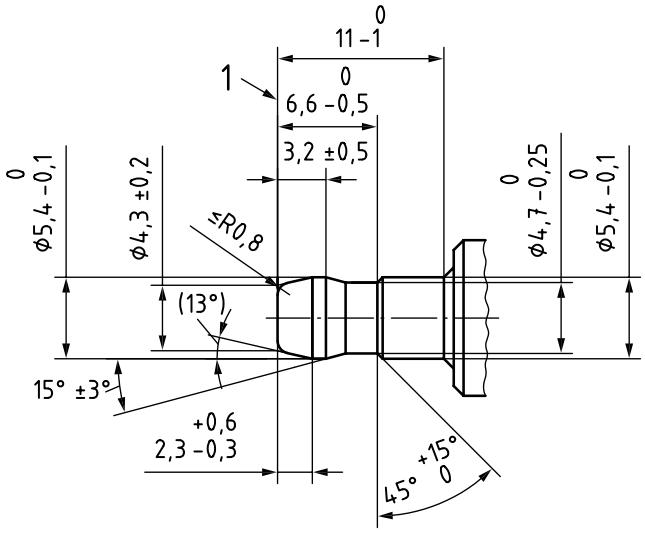
1 reference plane

a For existing products, values between 7° and 30° are allowed.

Figure 1 — Solid post terminal

The measurement of the minimum diameter of 6,3 mm shall be taken at any or all points around the post circumference. A ring gauge shall be used for measuring the maximum diameter of 6,4 mm.

Dimensions in millimetres



Key

1 reference plane

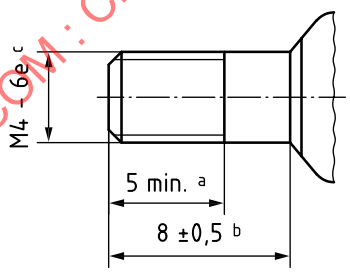
Figure 2 — Solid post terminal for M10 × 1 bi-hex 12 mm spark-plugs

The measurement of the minimum diameter of 5,3 mm shall be taken at any or all points around the post circumference. A ring gauge shall be used for measuring the maximum diameter of 5,4 mm.

4.2 Threaded terminal dimensions

The dimensions of threaded terminals shall be in accordance with Figure 3.

Dimensions in millimetres



Key

a Length of usable thread.

b Cylindrical part.

c Depending on manufacturing process, tolerance class 7e is acceptable on finished product.

Figure 3 — Threaded terminal

5 Dimensions, threads, and related items

5.1 Spark-plug reach

The spark-plug reach shall be in accordance with Table 5 or 7 (see also Figures 4 to 15).

The following basic types of spark-plug reach are defined:

— Short: S

— Medium: M

— Long: L

— Extended long: EL

— Extra long: XL

— Extended extra long: EXL

5.2 Gasket

When unused spark-plugs with flat seating have been tightened once with a torque, as specified in Clause 7 and Table 3, on threads that are clean, smooth, and dry, the gasket thickness shall be as specified in Table 3. Non-captive gaskets may be used in special cases.

5.3 Threads, limiting dimensions, and tolerances

The threads of spark-plugs and the corresponding tapped holes in the cylinder heads shall conform to ISO 68-1, ISO 261, ISO 965-1, and ISO 965-3. Their limiting dimensions, minor diameters, basic profiles, and initial clearances are specified in Tables 1 and 2, respectively.

Table 1 — Limiting dimensions

Dimensions in millimetres

Thread size	Tolerance class	Dimension	Major diameter		Pitch diameter		Minor diameter	
			max.	min.	max.	min.	max.	min.
M18 × 1,5	6e	Plug thread (on finished plug)	17,933	17,697	16,959	16,819	16,092	15,845[a]
	6H	Tapped hole in the cylinder head	not specified	18,000	17,216	17,026	16,676	16,376
M14 × 1,25	6e	Plug thread (on finished plug)	13,937	13,725	13,125	12,993	12,404	12,181[b]
	6H	Tapped hole in the cylinder head	not specified	14,000	13,368	13,188	12,912	12,647
M12 × 1,25	6e	Plug thread (on finished plug)	11,937	11,725	11,125	10,993	10,404	10,181[b]
	6H	Tapped hole in the cylinder head	not specified	12,000	11,368	11,188	10,912	10,647
M10 × 1	6g	Plug thread (on finished plug)	9,974	9,794	9,324	9,212	8,747	8,563[c]
	6H	Tapped hole in the cylinder head	not specified	10,000	9,500	9,350	9,153	8,917

[a] With a root radius ≥ 0,150 mm (0,1 *P*).

[b] With a root radius ≥ 0,125 mm (0,1 *P*).

[c] With a root radius ≥ 0,1 mm (0,1 *P*).

Table 2 — Minor diameters, basic profiles, and initial clearances for threads used

Dimensions in millimetres

Thread size	Minor diameter[a] d_{3max}	Fundamental deviation[b] es
M18 × 1,5 – 6e	d_{3max} = (16,376 – 0,067 – 0, 217) = 16,092	0,067
M14 × 1,25 – 6e	d_{3max} = (12,647 – 0,063 – 0,180) = 12,404	0,063
M12 × 1,25 – 6e	d_{3max} = (10,647 – 0,063 – 0,180) = 10,404	0,063
M10 × 1 – 6g	d_{3max} = (8,917 – 0,026 – 0,144) = 8,747	0,026

[a] The maximum value of the minor diameter, d_{3max}, is calculated according to ISO 965-1:1998, Clause 11 with a truncation of H/6, in accordance with the following equation: $d_{3max} = D_1 - es - 2(H/4 - H/6)$.

[b] The fundamental deviation (term used in ISO 965-1 instead of "initial clearance"), es, 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.

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

The other dimensions of spark-plugs and their cylinder head housings shall be as indicated in Figures 4 to 17, Tables 5 to 10, and Figures A.1, A.2, and C.1.

The installed height, l, shall be measured when the spark-plug has been tightened, as specified in Table 3 or 4.

The contour of the insulator is optional; however, between the reference planes defined by the dimensions c and d, its diameter shall be e, as specified in Table 5 or 7.

The non-ribbed insulator design is preferred because it provides superior protection to dielectric tracking between the spark-plug insulator and the cover.

The lengths of the cylinder head housing, Z and Z' (see Figures 16, 17, A.2, and C.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.

Alternative cylinder head housing with a combination of conical and flat seating is possible (see Annex C).

7 Installation tightening torque

The installation tightening torque values in Tables 3 and 4 apply to new spark-plugs without lubricant on the threads (production-related remains of lubricants are permitted). If threads are lubricated, the torque value in the table shall be reduced by approximately one-third to avoid overstressing.

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

The torque values for measuring the gasket thickness and the installed height are also given in Table 3.

Table 3 — Tightening torque for spark-plugs with flat seating

Thread size *n*	Cast-iron seating Torque Nm	Aluminum alloy seating Torque Nm	Measurement of gasket thickness and installed height		
			Torque Nm	Gasket thickness mm	Installed height *l*
M14 × 1,25	20 to 40	20 to 30	30	1,0 to 2,0	see Table 5
M12 × 1,25	15 to 25	15 to 25	25	0,8 to 1,6	
M10 × 1	10 to 15	10 to 15	15	0,7 to 1,6	

Table 4 — Tightening torque for spark-plugs with conical seating

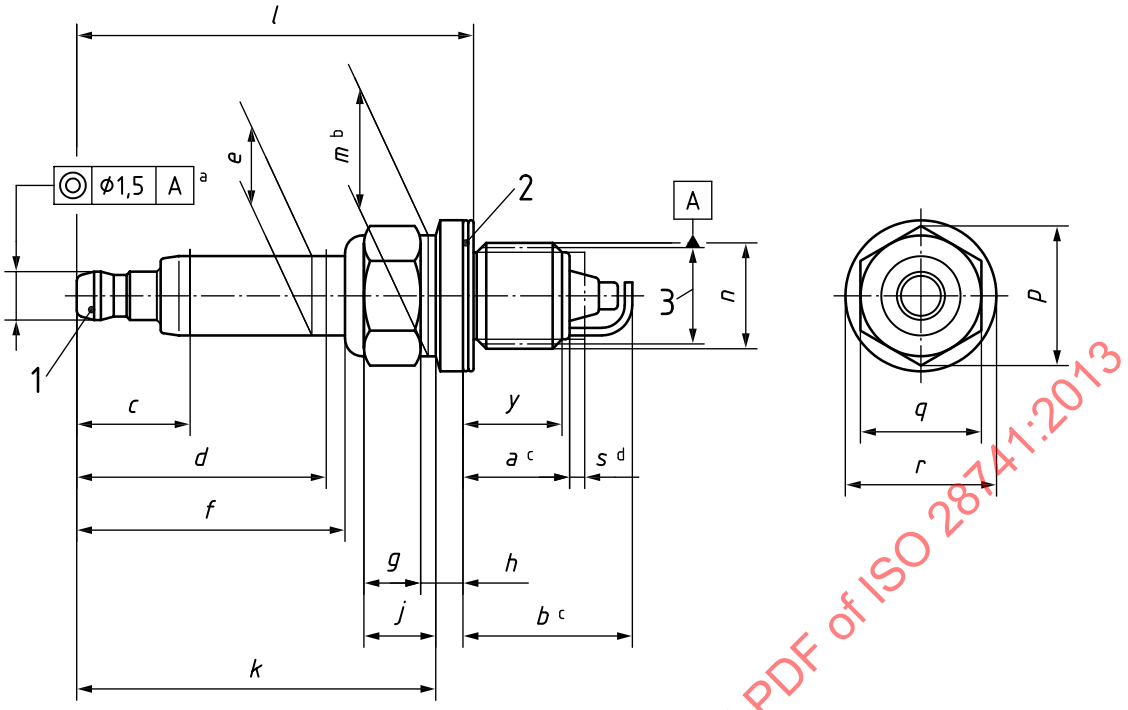
Thread size *n*	Cast-iron seating Torque Nm	Aluminum alloy seating Torque Nm	Measurement of installed height	
			Torque Nm	Installed height *l*
M18 × 1,5	20 to 30	not specified	30	see Table 7
M14 × 1,25	10 to 20	10 to 20	20	
M12 × 1,25	10 to 20	10 to 15	15 (for Al alloy seating), 20 (for cast-iron seating)	

8 Spark-plug dimensions

8.1 Spark-plugs with flat seating

Figures 4 to 11 show the design principle for spark-plugs with flat seating. The dimensions indicated in these figures are defined in Tables 5 and 6.

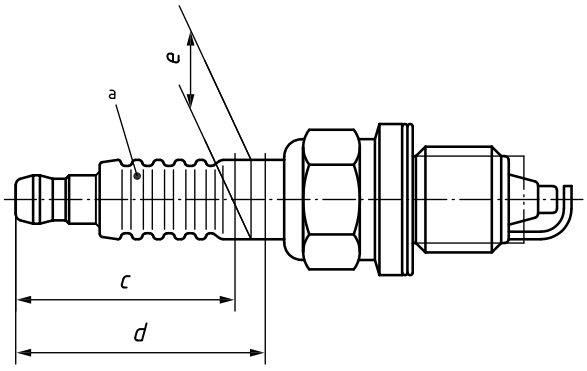
Dimensions in millimetres



Key

1 solid post terminal
2 captive gasket
3 pitch diameter
a This coaxiality does not apply to M14 × 1,25 spark-plugs with 20,8 mm hexagon, to all compact types of spark-plugs, and to spark-plugs with 12,7 mm reach.
b Optional.
c Dimension *b*-*a* is the spark-plug projection, which is the maximum protrusion of any part of the spark-plug into the combustion chamber.
d Dimension *s* is the protrusion of the metal shell into the combustion chamber.

Figure 4 — Spark-plug with solid post terminal, non-ribbed insulator, and hexagon

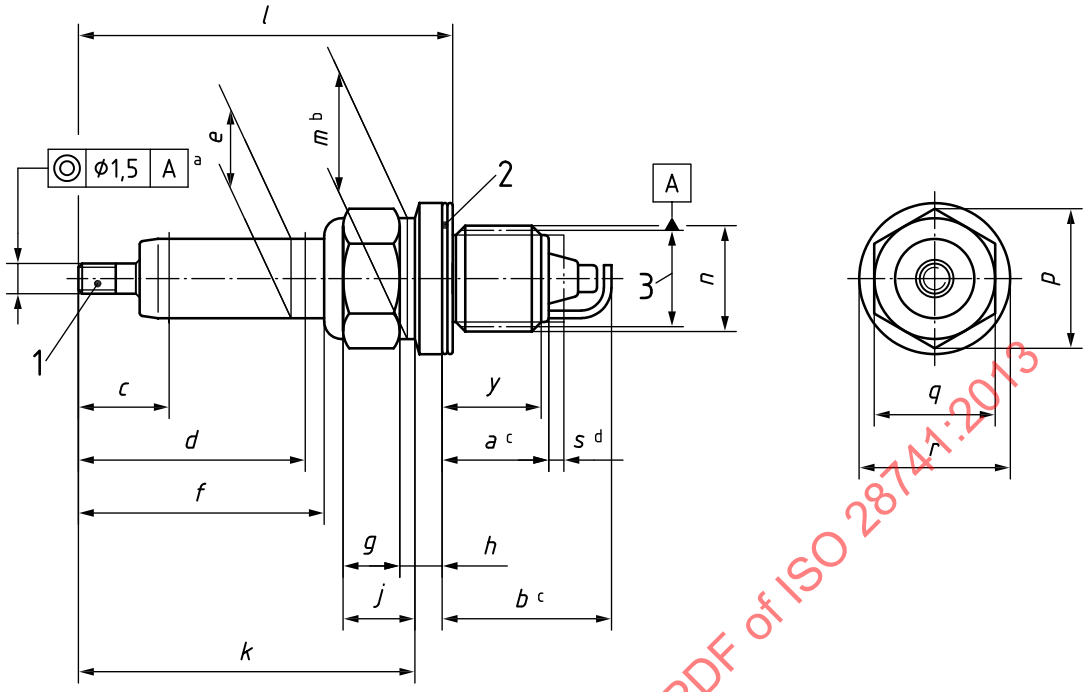


Key

a Number and shape of ribs are optional.

Figure 5 — Spark-plug with solid post terminal, ribbed insulator, and hexagon

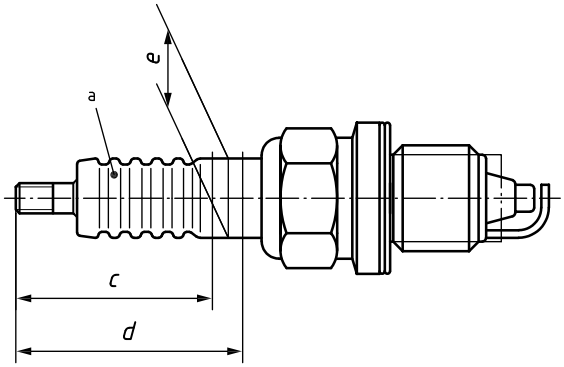
Dimensions in millimetres



Key

1 threaded terminal
2 captive gasket
3 pitch diameter
a This coaxiality does not apply to M14 × 1,25 spark-plugs with 20,8 mm hexagon, to all compact types of spark-plugs, and to spark-plugs with 12,7 mm reach.
b Optional.
c Dimension *b*-*a* is the spark-plug projection, which is the maximum protrusion of any part of the spark-plug into the combustion chamber.
d Dimension *s* is the protrusion of the metal shell into the combustion chamber.

Figure 6 — Spark-plug with threaded terminal, non-ribbed insulator, and hexagon

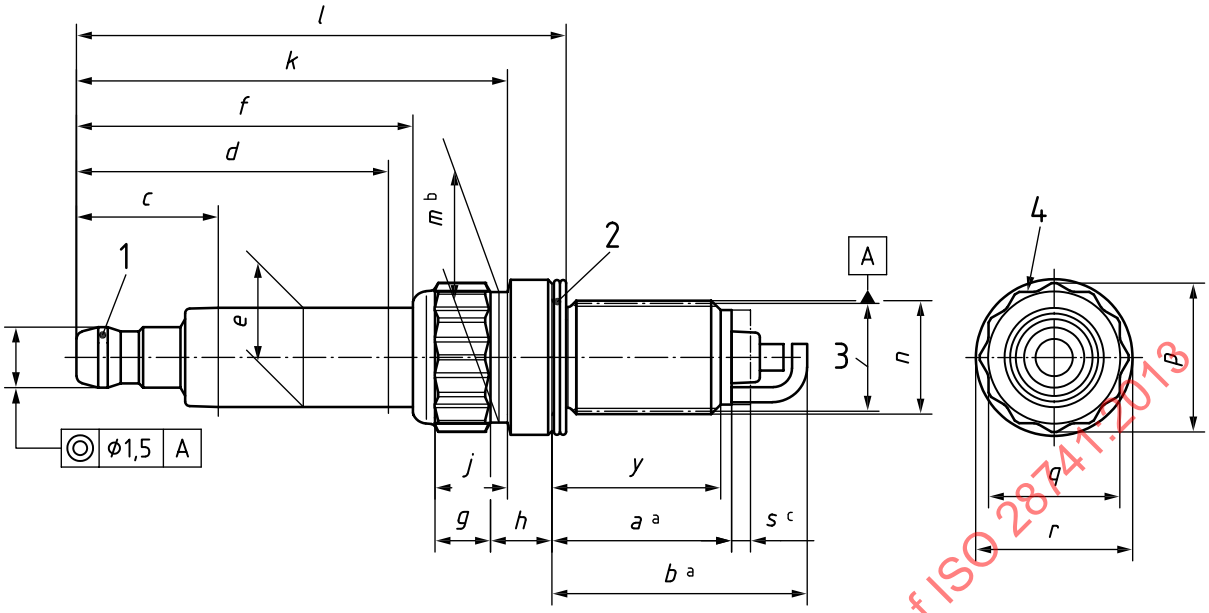


Key

a Number and shape of ribs are optional.

Figure 7 — Spark-plug with threaded terminal, ribbed insulator, and hexagon

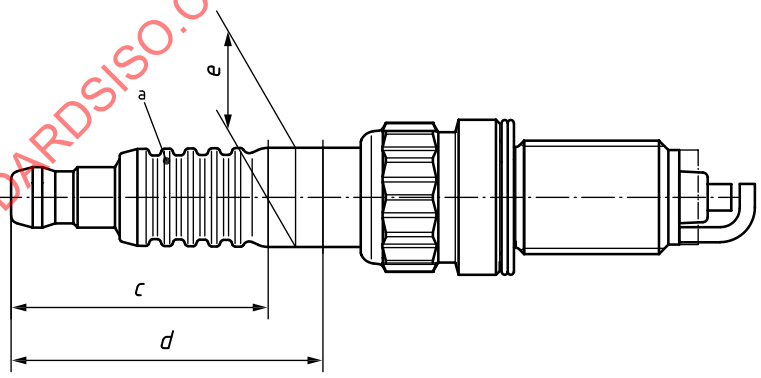
Dimensions in millimetres



Key

1 solid post terminal
2 captive gasket
3 pitch diameter
4 bi-hexagon in accordance with ISO 4095 (except for tolerance of *p*)
a Dimension *b*-*a* is the spark-plug projection, which is the maximum protrusion of any part of the spark-plug into the combustion chamber.
b Optional.
c Dimension *s* is the protrusion of the metal shell into the combustion chamber.

Figure 8 — Spark-plug with solid post terminal, non-ribbed insulator, and bi-hexagon

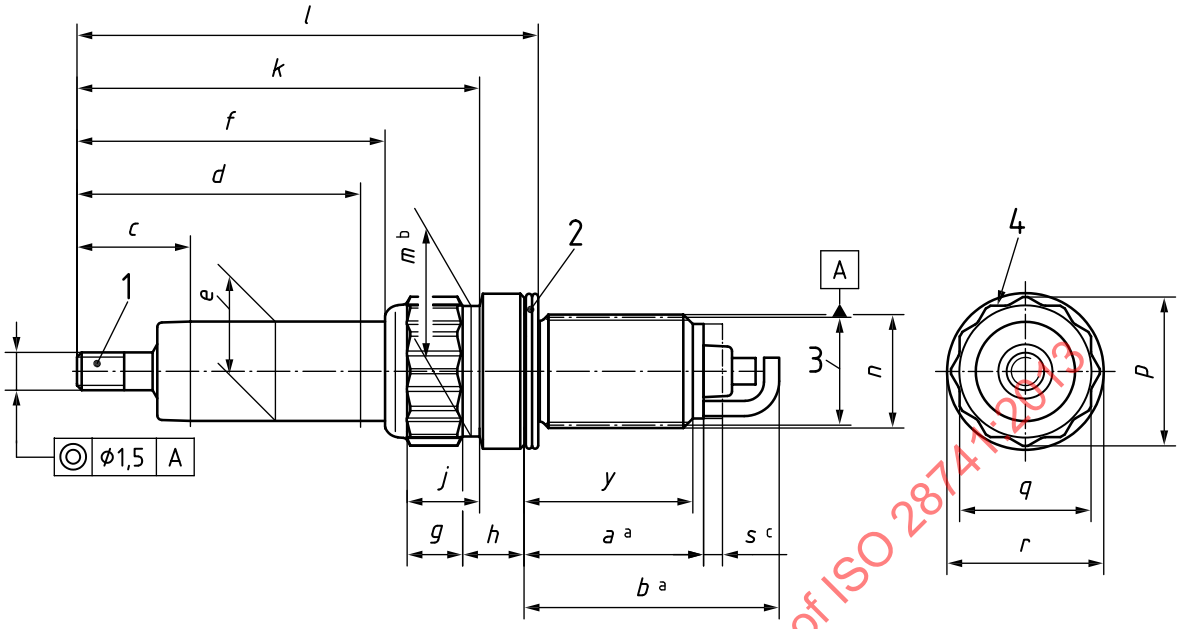


Key

a Number and shape of ribs are optional.

Figure 9 — Spark-plug with solid post terminal, ribbed insulator, and bi-hexagon

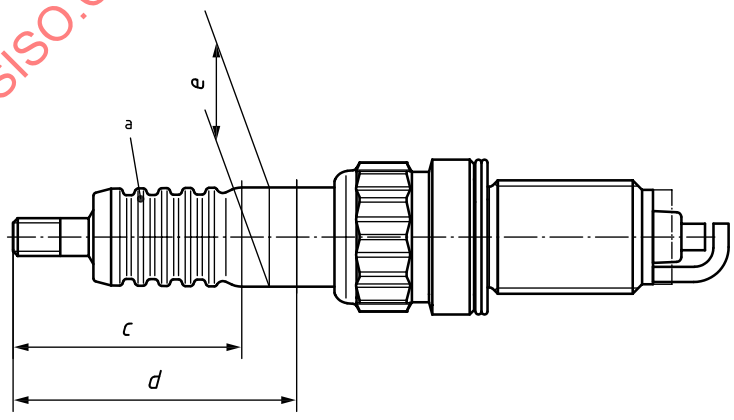
Dimensions in millimetres



Key

1 threaded terminal
2 captive gasket
3 pitch diameter
4 bi-hexagon in accordance with ISO 4095 (except for tolerance of *p*)
a Dimension *b*-*a* is the spark-plug projection, which is the maximum protrusion of any part of the spark-plug into the combustion chamber.
b Optional.
c Dimension *s* is the protrusion of the metal shell into the combustion chamber.

Figure 10 — Spark-plug with threaded terminal, non-ribbed insulator, and bi-hexagon



Key

a Number and shape of ribs are optional.

Figure 11 — Spark-plug with threaded terminal, ribbed insulator, and bi-hexagon

Table 5 — Main dimensions of spark-plugs with flat seating

Dimensions in millimetres

Thread size *n*	Hexagon size *q*	Reach		Further shell dimensions			Installed height *l*		Insulator diameter	International Standard where formerly specified
		Type[a]	*a*[b]	*s*[b]	*y* +0,3 –1,2	*b*	Solid post terminal	Threaded terminal	*e* ±0,3	
M14 × 1,25	20,8	M	12,7	0	11,7	≤ 21	≤ 68	≤ 65	12,2	ISO 1919
		L	19	0	18	≤ 27				
	19	S	9,5	0	9	≤ 16	≤ 48	≤ 45		ISO 2346
	16	L	19	0	18	≤ 27	52,5 $^{+1}_{-2}$	49,5 ± 1,5	10,5	ISO 8470
		EL	19	1,5 to 6	18	≤ 31				
		XL	26,5	0	25,5	≤ 34,5				
		EXL	26,5	1,5 to 6	25,5	≤ 38,5				
M12 × 1,25	16	L	19	0	18	≤ 27	52,5 $^{+1}_{-2}$	49,5 ± 1,5	10,5	ISO 2705
		EL	19	1,5 to 6	18	≤ 31				
		XL	26,5	0	25,5	≤ 34,5				
		EXL	26,5	1,5 to 6	25,5	≤ 38,5				
	14	L	19	0	18	≤ 27			9,0	ISO 16246
		EL	19	1,5 to 6	18	≤ 31				
		XL	26,5	0	25,5	≤ 34,5				
		EXL	26,5	1,5 to 6	25,5	≤ 38,5				
	Bi-hex 14	L	19	0	18	≤ 27			10,5	ISO 22977
		EL	19	1,5 to 6	18	≤ 31				
		XL	26,5	0	25,5	≤ 34,5				
		EXL	26,5	1,5 to 6	25,5	≤ 38,5				
M10 × 1	16	M	12,7	0	11,7	≤ 21	52,5 $^{+1}_{-2}$	49,5 ±1,5	10,5	ISO 2704
		L	19	0	18	≤ 27				
		EL	19	1,5 to 6	18	≤ 31				
		XL	26,5	0	25,5	≤ 34,5				
		EXL	26,5	1,5 to 6	25,5	≤ 38,5				
		S	9,5	0	9	≤ 16	≤ 44,5	≤ 43		ISO 19812
		M	12,7	0	11,7	≤ 19				
	14	L	19	0	18	≤ 27	52,5 $^{+1}_{-2}$	49,5 ±1,5	9,0	(new type)
		XL	26,5	0	25,5	≤ 38,5				
	Bi-hex 12	L	19	0	18	≤ 27			7,5[c]	(new type)
		XL	26,5	0	25,5	≤ 38,5				

[a] See 5.1.

[b] The tolerance of (a + s) is ±0,2.

[c] If agreed between spark-plug and engine manufacturer, an insulator diameter of e = (8,0 ± 0,3) mm is also acceptable.

Table 6 — Further dimensions of spark-plugs with flat seating

Dimensions in millimetres

Thread size n	Hexagon size q	Terminal	Insulator	c	d	f_{min}	g_{min}	h_{min}	j_{min}	k_{min}	Ø m_{max}	Ø r	p_{min}	International Standard where formerly specified
M14 × 1,25	20,8 $^{0}_{-0,4}$	solid post	non-ribbed	15	33	a	4	10	a	a	a	≤ 20,8	23	ISO 1919
			ribbed	29										
		threaded	non-ribbed	12	30									
			ribbed	26										
	19 h13	solid post	non-ribbed	15	24	a	3	3	a	a	a	a	21	ISO 2346
			ribbed	20										
		threaded	non-ribbed	12	21									
			ribbed	17										
	16 h13	solid post	non-ribbed	15	33	34	4		5	44	16	≤ 20	17,5	ISO 8470
			ribbed	29										
		threaded	non-ribbed	12	30	31				41				
			ribbed	26										
M12 × 1,25	16 h13	solid post	non-ribbed	15	33	34	4	6	5	a	a	15,3 to 17,5	17,5	ISO 2705
			ribbed	29										
		threaded	non-ribbed	12	30	31								
			ribbed	26										
	14 h13	solid post	non-ribbed	15	33	34				44	14	≤ 17,5	15,4	ISO 16246
			ribbed	29										
		threaded	non-ribbed	12	30	31				41				
			ribbed	26										
	14 h13 Bi-hex	solid post	non-ribbed	15	33	34				44				ISO 22977
			ribbed	29										
		threaded	non-ribbed	12	30	31				41				
			ribbed	26										

a Value not specified in previous International Standards. To be determined for subsequent editions of this International Standard, as required.

Table 6 *(continued)*

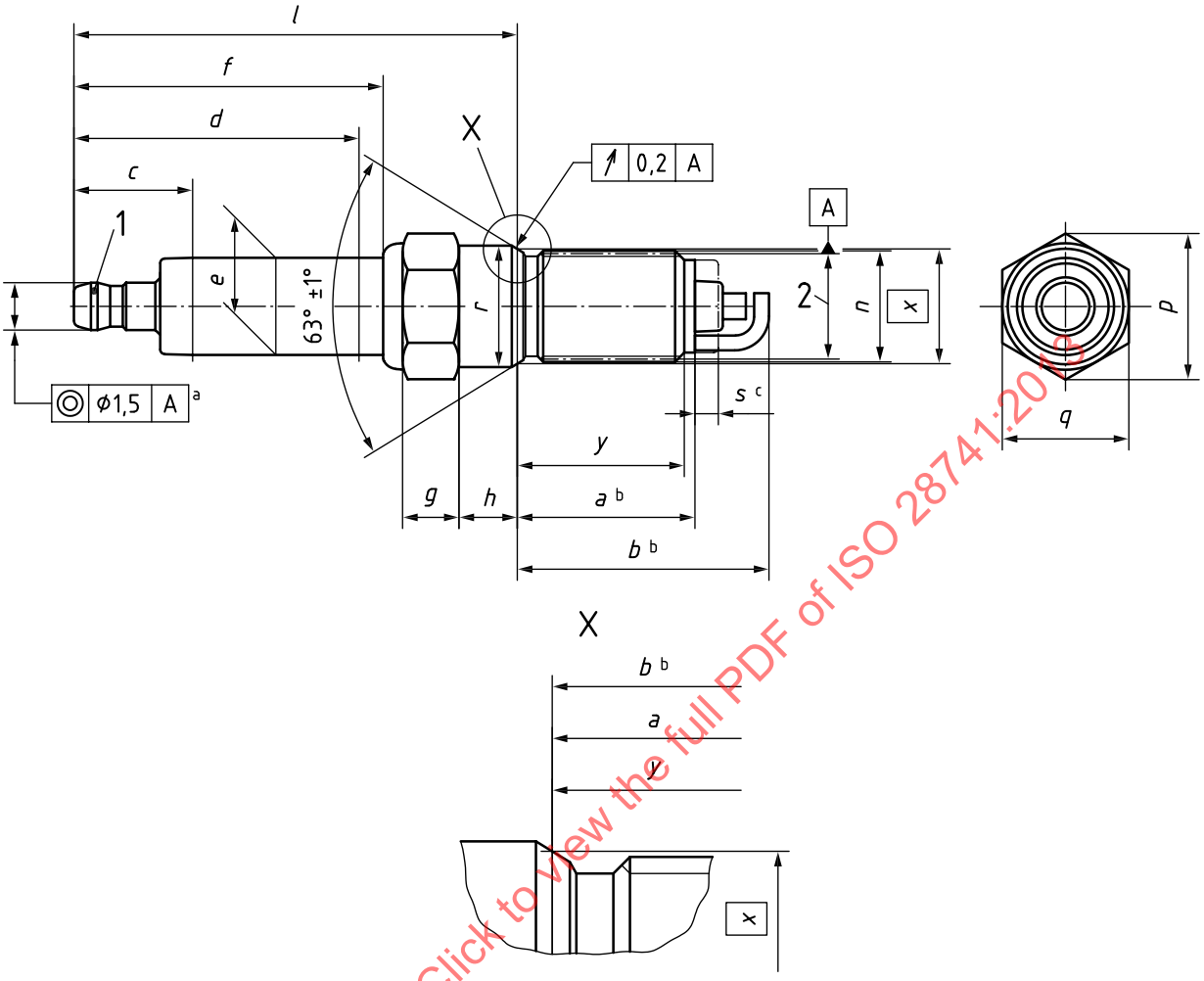
Thread size n	Hexagon size q	Terminal	Insulator	c	d	f_{min}	g_{min}	h_{min}	j_{min}	k_{min}	Ø m_{max}	Ø r	p_{min}	International Standard where formerly specified
M10 × 1	16 h13	solid post	non-ribbed	15	33	34	4	6	a	a	a	≤ 16	17,5	ISO 2704
			ribbed	29										
		threaded	non-ribbed	12	30	31								
			ribbed	26										
		solid post	non-ribbed	12	21	a	3	3	4					ISO 19812
			ribbed	17										
		threaded	non-ribbed	10,5	19,5									
			ribbed	15,5										
	14 h13	solid post	non-ribbed	15	33	34	4	6	5	44	14		15,4	(new type)
			ribbed	29										
		threaded	non-ribbed	12	30	31				41				
			ribbed	26										
	12 h12 Bi-hex	solid post	non-ribbed	15	33	34				44	12		13,3	(new type)
			ribbed	29										
		threaded	non-ribbed	12	30	31				41				
			ribbed	26										

a Value not specified in previous International Standards. To be determined for subsequent editions of this International Standard, as required.

8.2 Spark-plugs with conical seating

Figures 12 to 15 show the design principle for spark-plugs with conical seating. The dimensions indicated in these figures are defined in Tables 7 and 8.

Dimensions in millimetres



Key

1 solid post terminal

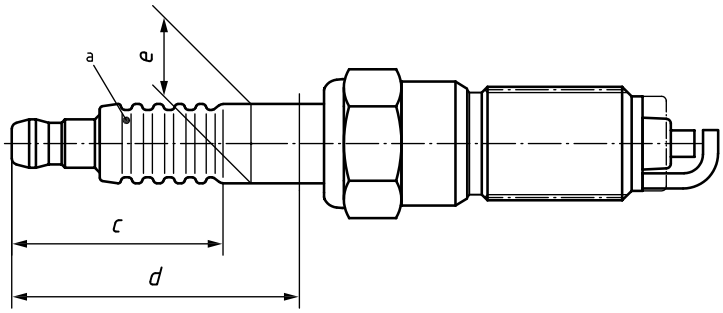
2 pitch diameter

a This coaxiality does not apply to M18 × 1,5 spark-plugs or to any compact types of spark-plugs.

b Dimension *b*-*a* is the spark-plug projection, which is the maximum protrusion of any part of the spark-plug into the combustion chamber.

c Dimension *s* is the protrusion of the metal shell into the combustion chamber.

Figure 12 — Spark-plug with solid post terminal and non-ribbed insulator

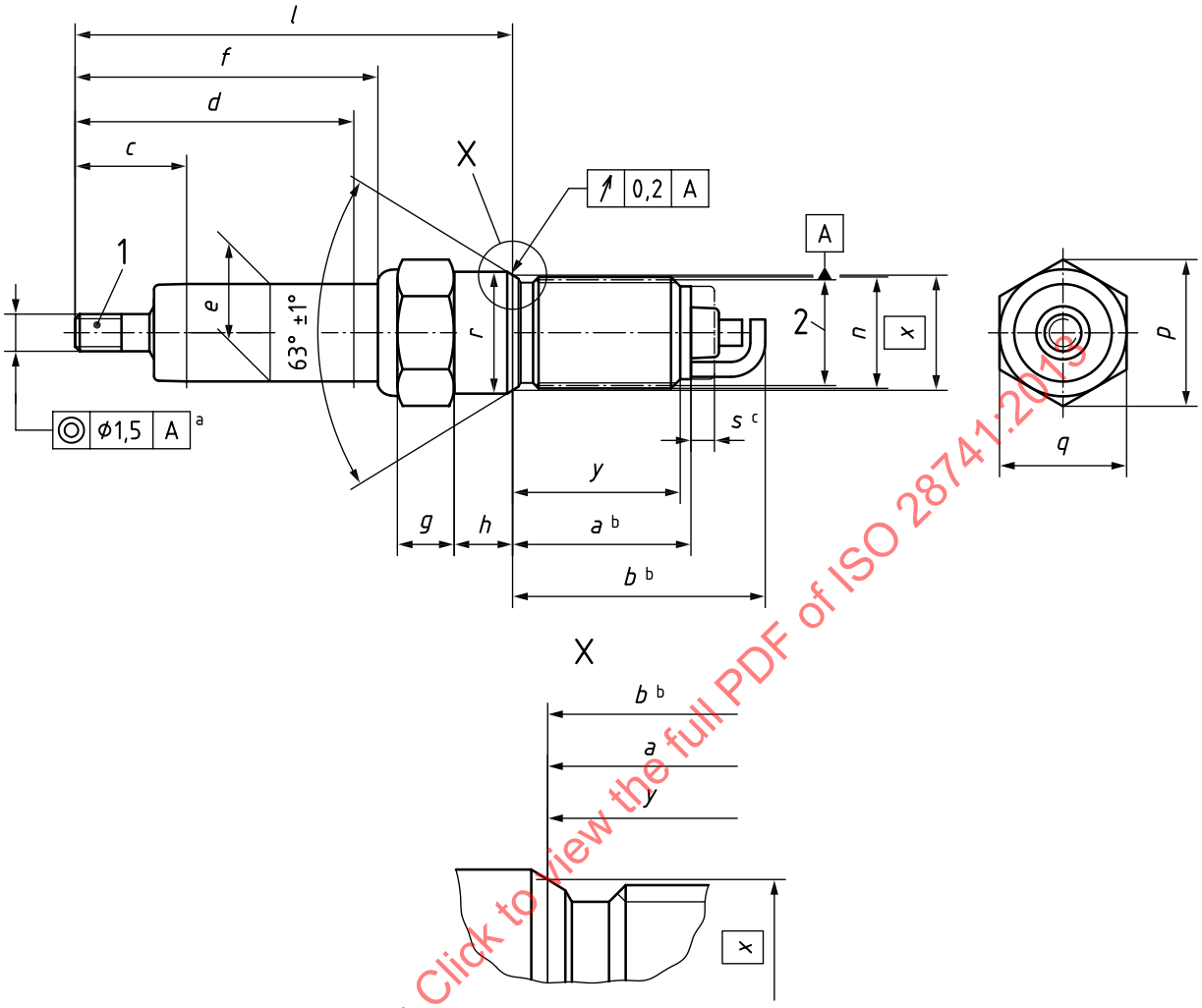


Key

a Number and shape of ribs are optional.

Figure 13 — Spark-plug with solid post terminal and ribbed insulator

Dimensions in millimetres



Key

1 threaded terminal

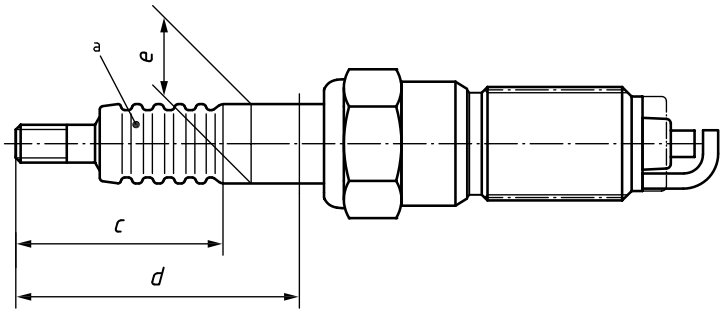
2 pitch diameter

a This coaxiality does not apply to M18 × 1,5 spark-plugs or to any compact types of spark-plugs.

b Dimension *b*-*a* is the spark-plug projection, which is the maximum protrusion of any part of the spark-plug into the combustion chamber.

c Dimension *s* is the protrusion of the metal shell into the combustion chamber.

Figure 14 — Spark-plug with threaded terminal and non-ribbed insulator



Key

a Number and shape of ribs are optional.

Figure 15 — Spark-plug with threaded terminal and ribbed insulator

Table 7 — Main dimensions of spark-plugs with conical seating

Dimensions in millimetres

Thread size *n*	Hexagon size *q*	Reach		Further shell dimensions			Installed height *l*		Insulator diameter *e* ±0,3	International Standard where formerly specified
		Type[a]	*a*[b]	*s*[b]	*y* +0,3 –1,2	*b*	Solid post terminal	Threaded terminal		
M18 × 1,5	20,8		10,9	[c]	9,9	≤ 20	≤ 68	≤ 65	12,2	ISO 2345
M14 × 1,25	16	M	11,2	[c]	10,2	≤ 19	53 $^{+1}_{-2}$	50 ± 1,5	10,5	ISO 2344
		L	17,5	[c]	16,5	≤ 25				
		XL	25	[c]	24	≤ 32,5				
		—	7,8	[c]	7,3	≤ 14	≤ 38	≤ 35	10,5	ISO 2347
M12 × 1,25	14	L	17,5	[c]	16,5	≤ 25	53 $^{+1}_{-2}$	n.a.	9,0	(new type)
		XL	25	[c]	24	≤ 32,5				

[a] See 5.1.

[b] The tolerance of (a + s) is ±0,3.

[c] Value not specified in previous International Standards. To be determined for subsequent editions of this International Standard, as required.

Table 8 — Further dimensions of spark-plugs with conical seating

Dimensions in millimetres

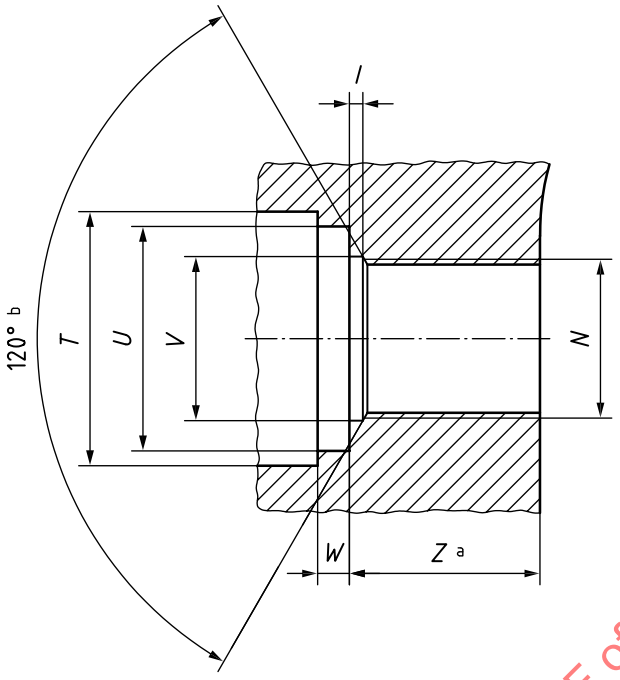
Thread size n	Hexagon size q	Terminal	Insulator	c	d	f_{min}	g_{min}	h_{min}	$\emptyset\, r$	$\emptyset\, x$	p_{min}	International Standard where formerly specified
M18 × 1,5	20,8 $^{0}_{-0,4}$	solid post	non-ribbed	15	33	a	4	12	19,9 to 20,8	19	23	ISO 2345
			ribbed	29								
		threaded	non-ribbed	12	30	a						
			ribbed	26								
M14 × 1,25	16 h13	solid post	non-ribbed	15	33	34	4	8,2	15,5 to 16,0	14,8	17,5	ISO 2344
			ribbed	29								
		threaded	non-ribbed	12	30	31						
			ribbed	26								
		solid post	non-ribbed	15	24	a	3	3				ISO 2347
			ribbed	20								
		threaded	non-ribbed	12	21	a						
			ribbed	17								
M12× 1,25	14 h13	solid post	non-ribbed	15	33	34	4	8,2	13,4 to 14,3	12,8	15,4	(new type)
			ribbed	29								

a Value not specified in previous International Standards. To be determined for subsequent editions of this International Standard, as required.

9 Cylinder head housings

9.1 Cylinder head housing for spark-plugs with flat seating

Figure 16 shows the design principle of the cylinder head housings for spark-plugs with flat seating. The dimensions indicated in Figure 16 are defined in Table 9.



Key

a The Z length of the cylinder head housing 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 maximum torque.

b Nominal.

Figure 16 — Cylinder head housing for flat seating

Table 9 — Cylinder head housing dimensions for flat seating

Dimensions in millimetres

Thread size N	**Hexagon size of spark-plug** q	Ø T_{min}	Ø U_{min}	Ø V_{max}	W_{max}	I_{max}	**International Standard where formerly specified**
M14 × 1,25	20,8	30	22	14,5	9	1,7	ISO 1919
	19				2		ISO 2346
	16	24	21,2		3		ISO 8470[a]
M12 × 1,25	16	24	19	12,5	5		ISO 2705
	14	21					ISO 16246
	Bi-hex 14						ISO 22977
M10 × 1	16	25	17	10,5	5		ISO 2704
					2[b]		ISO 19812
	14	21			5		(new type)
	Bi-hex 12	19					(new type)

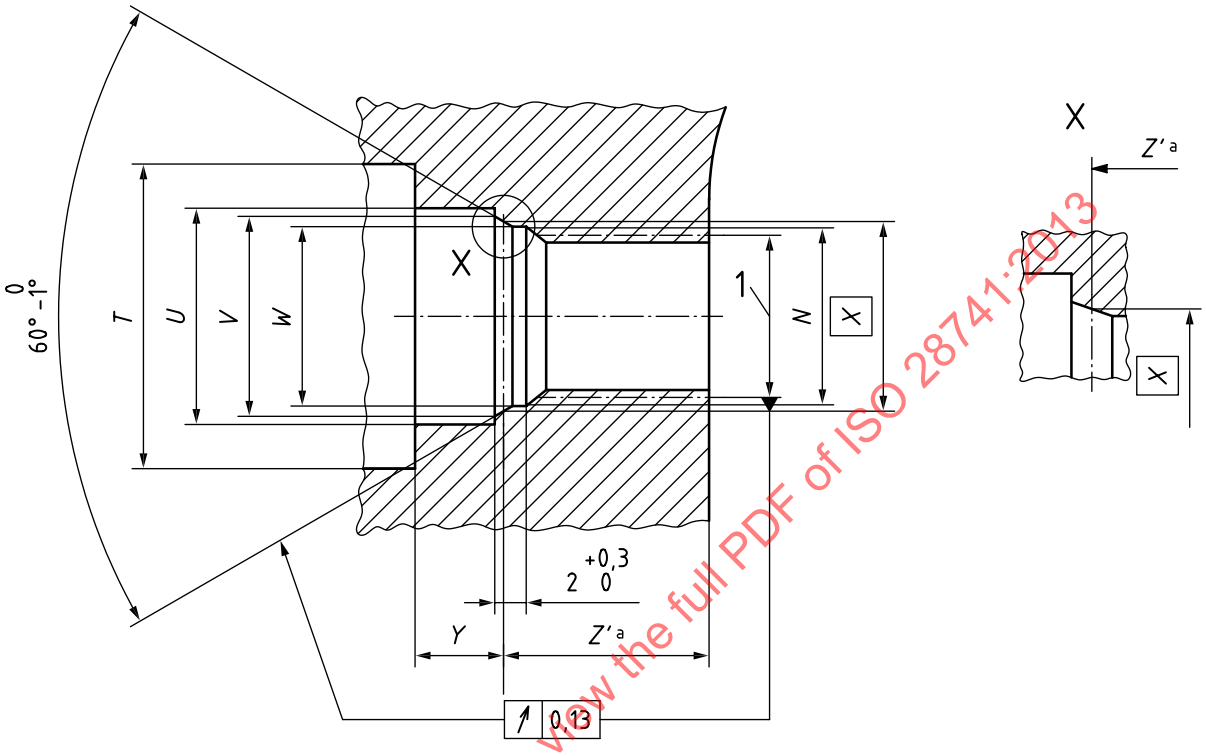
a Combined seat in accordance with Annex C possible.

b Applied only to compact types of spark-plugs.

9.2 Cylinder head housing for spark-plugs with conical seating

Figure 17 shows the design principle of cylinder head housings of spark-plugs with conical seating. The dimensions indicated in Figure 17 are defined in Table 10.

Dimensions in millimetres



Key

1 pitch diameter

a The Z' length of the cylinder head housing 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 maximum torque.

Figure 17 — Cylinder head housing for conical seating

Table 10 — Cylinder head housing dimensions for conical seating

Dimensions in millimetres

Thread size N	**Hexagon size of spark-plug** q	Ø T_{min}	Ø U_{min}	Ø V $^{+0,3}_{0}$	Ø W $^{+0,15}_{0}$	Ø X	Y_{max}	**International Standard where formerly specified**
M18 × 1,5	20,8	31	22	19,5	18,25	19	9	ISO 2345
M14 × 1,25	16	24	17	15,1	14,25	14,8	5,5	ISO 2344[a]
							2[b]	ISO 2347
M12 × 1,25	14	21	15	13,1	12,25	12,8	5,5	(new type)

[a] Combined seat in accordance with Annex C possible.

[b] Applied only to compact types of spark-plugs.