BS ISO 17447-1:2015

BSI Standards Publication

Road Vehicles — Glow-plugs with conical seating and their cylinder head housing

Part 1: Basic characteristics and dimensions for metal-sheath-type glow-plugs

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National foreword

This British Standard is the UK implementation of ISO 17447-1:2015. Together with BS ISO 17747-2:2015 and BS ISO 17747-3:2015, it supersedes BS AU 262-1:1995, BS AU 262-2:1995 and BS ISO 7578:2008 which are withdrawn. Together with BS ISO 6550-3:2013, BS ISO 17747-2:2015 and BS ISO 17747-3:2015, it supersedes BS ISO 6550-3:2009 which is withdrawn. Together with BS ISO 6550-4:2014, BS ISO 17747-2:2015 and BS ISO 17747-3:2015, it supersedes BS ISO 6550-4:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/22, Engines for road vehicles.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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BS ISO 17447-1:2015

INTERNATIONAL STANDARD

ISO 17447-1

First edition
2015-05-15

Road Vehicles — Glow-plugs with conical seating and their cylinder head housing —

Part 1: Basic characteristics and dimensions for metal-sheath-type glow-plugs

Véhicules routiers — Bougies de préchauffage à fourreau et à siège conique et leur logement dans la culasse —

Partie 1: Caractéristiques de base et dimensions des bougies de préchauffage à fourreau de type métallique

Reference number
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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 32, *Electrical and electronic components and general system aspects.*

ISO 17447 consists of the following parts, under the general title *Road Vehicles — Glow-plugs with conical seating and their cylinder head housing*:

— *Part 1: Basic characteristics and dimensions for metal-sheath-type glow-plugs*

— *Part 2: Basic characteristics and dimensions for ceramic-sheath-type glow-plugs*

— *Part 3: Tests and requirements*

Introduction

The purpose of this International Standard is to provide a compact and concise specification on glow-plugs and their cylinder head housings, which is to replace the existing single standards on each type of glow-plugs.

It is intended to specify the main properties, the design requirements, and the dimensions of most of the existing types of glow-plugs and their cylinder head housings. It is to enable the user to work with one comprehensive document valid for most types of glow-plugs instead of a number of standards, each of them specified for one type only.

This part of ISO 17447 covers basic characteristics and dimensions for metal-sheath-type glow-plugs. ISO 17447-2 covers basic characteristics and dimensions for ceramic-sheath-type glow-plugs. Tests and requirements are defined in ISO 17447-3.

It is intended to withdraw the following standards on glow-plugs and their cylinder head housing as soon as this part of ISO 17447 is published:

ISO 6550-1, ISO 6550-2, ISO 6550-3, ISO 6550-4, ISO 7578.

INTERNATIONAL STANDARD **ISO 17447-1:2015(E)**

Road Vehicles — Glow-plugs with conical seating and their cylinder head housing —

Part 1: Basic characteristics and dimensions for metal-sheath-type glow-plugs

1 Scope

This part of ISO 17447 specifies the main properties and dimensions of metal-sheath-type glow-plugs, including the terminals and the dimensions of their cylinder head housings, for use with diesel (compression ignition) engines.

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 965-1:2013, *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 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1
nominal voltage
voltage as marked on the housing of the glow-plug

Note 1 to entry: The nominal voltage of the glow-plug is generally not identical to the supply voltage of the vehicle's electrical system.

3.2
test voltage
voltage(s) applied to the glow-plug under test

4 Dimensions and tolerances

4.1 Threads-dimension limits and tolerances

The threads of glow-plugs and the corresponding tapped holes in cylinder heads shall be in accordance with ISO 68-1, ISO 261, ISO 965-1, and ISO 965-3.

The tolerance class 6g shall be used for glow-plug threads. For existing designs, tolerance class 6e is also permitted. New designs shall be to tolerance class 6g.

The thread in the corresponding tapped holes in the cylinder heads shall have tolerance class 6H.

The threads, dimension limits, and tolerances of glow-plugs and the corresponding tapped holes in the cylinder head are given in Tables 1 and 2.

Table 1 — Dimension limits

Dimensions in millimetres

Thread size	Tolerance class	Dimension	Major diameter		Pitch diameter		Minor diameter	
			max	min	max	min	max	min
M14 × 1,25	6e	**Plug thread** (on finished plug)	13,937	13,725	13,125	12,993	12,404	12,181[a]
	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[a]
	6H	**Tapped hole in the cylinder head**	Not specified	12,000	11,368	11,188	10,912	10,647
M10 × 1,25	6g	**Plug thread** (on finished plug)	9,972	9,760	9,160	9,042	8,439	8,251[a]
	6H	**Tapped hole in the cylinder head**	Not specified	10,000	9,348	9,188	8,912	8,647
M10 × 1	6g	**Plug thread** (on finished plug)	9,974	9,794	9,324	9,212	8,747	8,563[b]
	6H	**Tapped hole in the cylinder head**	Not specified	10,000	9,500	9,350	9,153	8,917
M8 × 1	6g	**Plug thread** (on finished plug)	7,974	7,794	7,324	7,212	6,747	6,596[b]
	6H	**Tapped hole in the cylinder head**	Not specified	8,000	7,500	7,350	7,153	6,917

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

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

Table 2 — Minor diameters and fundamental deviations for glow-plug threads

Dimensions in millimetres

Thread size	Minor diameter[a] d_{3max}	Fundamental deviation[b] es
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 × 1,25 – 6g	d_{3max} = (8,647 – 0,028 – 0,180) = 8,439	0,028
M10 × 1 – 6g	d_{3max} = (8,917 – 0,026 – 0,144) = 8,747	0,026
M8 × 1 – 6g	d_{3max} = (6,917 – 0,026 – 0,144) = 6,747	0,026

a The maximum value of the minor diameter, d_{3max}, is calculated according to ISO 965-1:2013, Clause 11 with a truncation of H/6, in accordance with the following formula:

$d_{3max} = D_1 - es - 2(H/4 - H/6)$

b The fundamental deviation, *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 glow-plugs. This clearance is also intended to enable glow-plugs with threads in accordance with this part of ISO 17447 to be fitted in existing tapped holes.

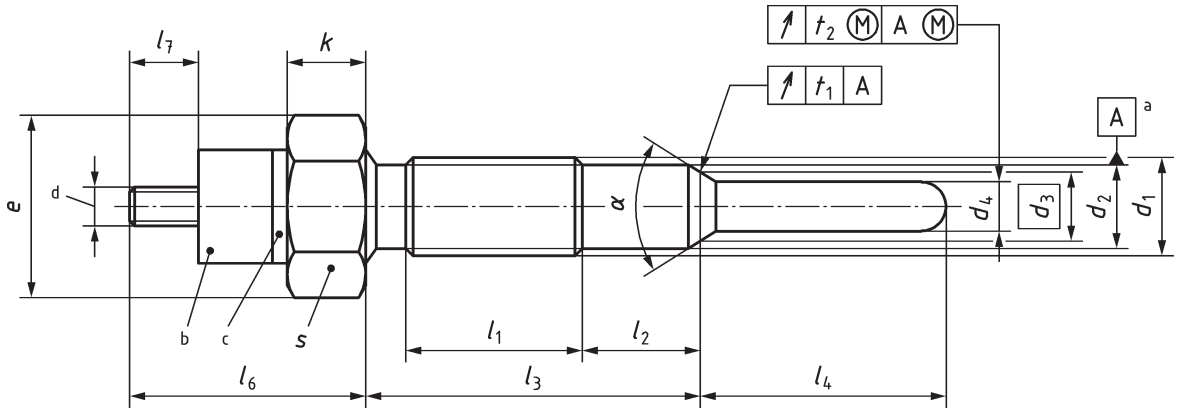
4.2 Glow-plugs

4.2.1 General

Sheath-type glow-plug dimensions and tolerances shall be as given in Figure 1 and Tables 3 and 4.

Type M14 should not be used for new applications.

Dimensions in millimetres



Key

a Major diameter, in accordance with ISO 1101.

b Cylinder or hexagonal nut (only for threaded terminal).

c Insulator.

d M4, M5, or pin terminal (for details, see 4.2.3).

Figure 1 — Glow-plug

NOTE See Tables 3 and 4 for dimensions.

4.2.2 Heating elements

Figures 2 and 3 show additional heating elements.

NOTE For other dimensions, see Figure 1.

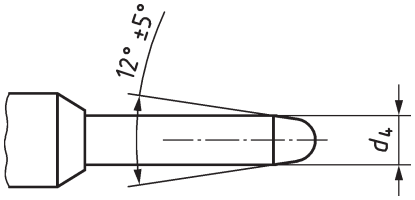


Figure 2 — With cone end diameter

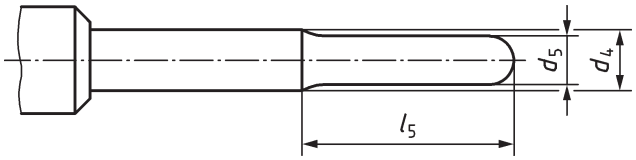
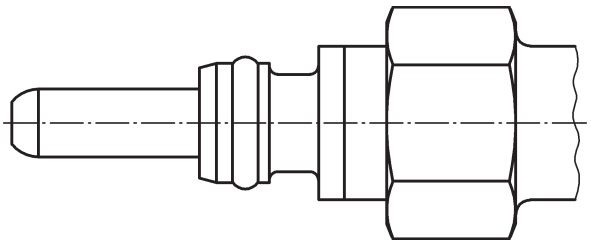


Figure 3 — With reduced tip end diameter

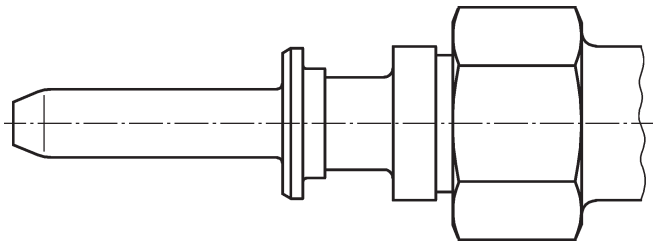
4.2.3 Electrical connection

Figure 4 to 8 show the pin and blade terminals P1 to P5.



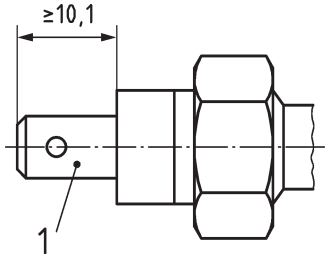
NOTE For details, see Annex A.

Figure 4 — Pin terminal: type P1



NOTE For details, see Annex A.

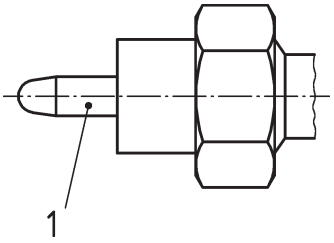
Figure 5 — Pin terminal: type P2



Key

1 tab ISO 8092-1; for M14/M12, size 6,3 or 9,5; for M10, size 6,3

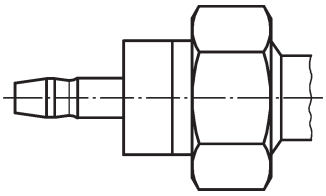
Figure 6 — Blade terminal: type P3



Key

1 pin ISO 8092-4, size 4

Figure 7 — Pin terminal: type P4



NOTE For details, see Annex A.

Figure 8 — Pin terminal: type P5

4.2.4 Dimensions for M14, M12, M10, and M8 glow-plugs

Table 3 — M14 and M12

Glow-plug type	Electrical connection			Thread		Hexagon			Body						Heating element				
	Type	l_6	l_7	d_1	l_1	s	e	k	α ±2°	d_2 −0,2	d_3 ref	t_1	l_2 ±1	l_3 ±1	d_4 0 −0,2	d_5 0 −0,2	l_4 ±1	l_5	t_2
F1	Type P3	≤30	≥12	M14 × 1,25 – 6e	≥11	14 h13	≥15,5	≥4,0	63°	12	11	0,2	6	26	6,1	-	20 to 30	-	0,7
F2	Thread M5	≤25	≥7																
E1	Thread M5			M12 × 1,25 – 6e		12 h13	≥13,3			10	9		3 or 6	20 or 26	5,1 or 6,1				
E2	Type P3	≤30	≥12																
E3	Thread M5	≤25	≥7												5,1	4,1		≥6,5	
E4	Type P3	≤30	≥12																

Table 4 — M10 and M8

Glow-plug type	Electrical connection			Thread		Hexagon			Body						Heating element				
	Type	l_6	l_7	d_1	l_1	s	e	k	α ±2°	d_2 −0,2	d_3 ref	t_1	l_2	l_3	d_4 ±0,2	d_5 ±0,3	l_4	l_5	t_2
D1	Thread M4	≤25	≥7	M10 × 1,25 – 6g	≥22	12,0 h13	≥13,3	≥4,0	123°	8,2 to 8,5	7	0,2	10 to 20 ±1	35 to 45 ±1	5	-	20 to 30 ±1	-	0,7
D2	Type P1	-	-																
C1	Type P3	-	-	M10 × 1 – 6g	≥10	9,6 h14	≥10,7	≥7,0	93°		6,4	0,2	7,0 ± 0,25	20,0 ±0,25		-	28,5 ± 0,5	-	
C2													9,1 ± 0,25	25,9 ±0,25			27,0 ± 0,5		
C3	Type P5																		
C4													7,0 ± 0,25	26,7 ±0,25			28,5 ± 0,5		
B1	Thread M4	≤25	≥7	M10 × 1 – 6g		10,0 h13	≥11		63°		7	0,2	≥7	26 to 95 ±1		-	20 to 35 ±1	-	
B2																4		≥5	0,4
B3																3,6			
B4	Type P1, P2, P4	-	-													-		-	0,7
B5																4		≥5	0,4
B6																3,6			
B7															4	-		-	0,7
B8																3,3		≥5	
B9															4,4	-		-	
B10																3,5		≥5	

Table 4 *(continued)*

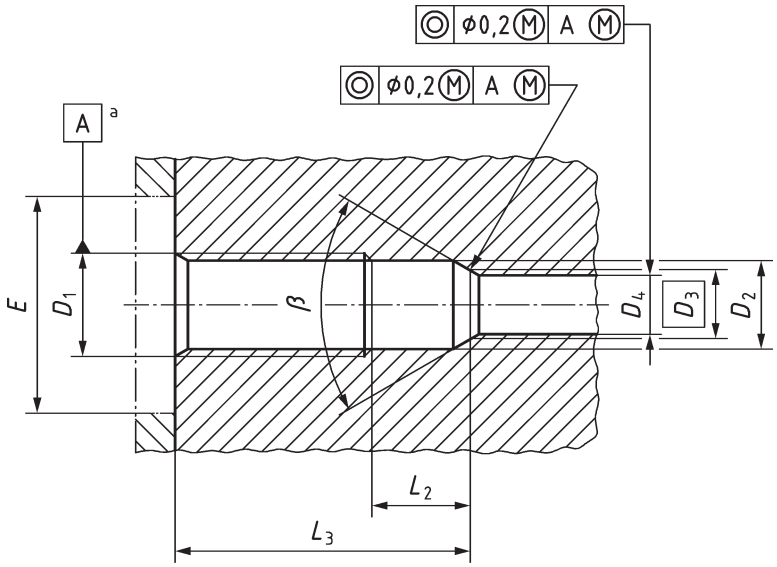
Glow-plug type	Electrical connection			Thread		Hexagon			Body						Heating element				
	Type	l_6	l_7	d_1	l_1	s	e	k	α ±2°	d_2 −0,2	d_3 ref	t_1	l_2	l_3	d_4 ±0,2	d_5 ±0,3	l_4	l_5	t_2
A1	Thread M4	≤29,5	≥7	M8 × 1 – 6g	≥10	8,0 h13	≥8,6	≥7,5	93° or 123°	6,7	6,0	0,4	≥10	27 to 102 ±0,5	4	-		-	0,7
A2																3,3		≥5	
A3															4,4	-		-	
A4																3,5		≥5	
A5	Type P1, P4	-	-												4	-		-	
A6																3,3		≥5	
A7															4,4	-		-	
A8																3,5		≥5	

4.3 Cylinder head housing

4.3.1 General

The dimensions and tolerances of the cylinder head housing for sheath-type glow-plugs shall be as given in Figure 9, Table 5, and Table 6.

Dimensions in millimetres



Key

a Pitch diameter, see Table 1.

NOTE See Tables 5 and 6 for dimensions.

Figure 9 — Cylinder head housing

4.3.2 Housing dimensions

Table 5 — Housing dimensions for M14 and M12

Dimensions in millimetres

M14 and M12 glow-plug type	D_1 6H	β ±1°	D_2	D_3 ref	D_4[a]	E	L_2	L_3
F	M14 × 1,25	α-3°	≥12,7	11,0	≥7,4	a	≤(l_2-2)	≤(l_3-3)
E	M12 × 1,25	α-3°	≥10,7	9,0	≥7,4	a	≤(l_2-2)	≤ (l_3-3)

[a] Value should be agreed between glow-plug manufacturers and engine manufacturers.

NOTE α, l_2, and l_3 are dimensions of the glow-plug. See Figure 1, Table 3, and Table 4.

Table 6 — Housing dimensions for M10 and M8

Dimensions in millimetres

M10 and M8 glow-plug type	D_1 6H	β ±1°	D_2	D_3 ref	D_4[a]	E	L_2	L_3
D	M10 × 1,25	α-3°	≥8,7	7,0	≥6,5	a	≤(l_2-2)	≤(l_3-3)
C	M10 × 1	α-3°	≥8,8	6,4	≥5,5	a	≤(l_2-2)	≤(l_3-3)
B	M10 × 1	α-3°	≥8,8	7,0	≥6,5	a	≤(l_2-2)	≤(l_3-3)
A1 to A9	M8 × 1	α-3°	6,95 +0,1	6,0	≥5,0	a	≤(l_2-2)	≤(l_3-3)
A10	M8 × 1	α-3°	6,95 +0,1	6,0	≥5,5	a	≤(l_2-2)	≤(l_3-3)

[a] Value should be agreed between glow-plug manufacturers and engine manufacturers.

NOTE α, l_2 ,and l_3 are dimensions of the glow-plug. See Figure 1, Table 3, and Table 4.

5 Installation tightening torque

The installation tightening torque shall be as given in Table 7. The values apply to unused sheath-type glow-plugs without lubricant on the threads and cone. If threads are lubricated, the torque shall be reduced by approximately one-third to avoid overstressing.

Table 7 — Tightening torques

Glow-plug thread size	Electrical connection (terminal)	Glow-plug type	Installation tightening torque Nm		
			Glow-plug thread[b]	M5 terminal thread	M4 terminal thread
M14	M5 thread	F1	20 to 35	4[a]	n.a.
	Tab	F2		n.a.	n.a.
M12	M5 thread	E1, E3	15 to 25	4[a]	n.a.
	Tab	E2, E4		n.a.	n.a.
M10	M4 thread	D1	10 to 20	n.a.	0,8 to 1,5[a]
	Pin	D2		n.a.	n.a.
	Tab/pin	C		n.a.	n.a.
	M4 thread	B1 to B3	10 to 15	n.a.	≤2,5[a]
	Pin	B4 to B12		n.a.	n.a.
M8	M4 thread	A1 to A4	9 to 12	n.a.	0,8 to 1,5[a]
	Pin	A5 to A10		n.a.	n.a.

n.a. = not applicable

[a] Differing specifications apply to the admissible tightening torque depending on the nut used.

[b] Torque values for cast iron and aluminium cylinder heads as applicable.

NOTE 1 Engine manufacturers may specify a different torque for the first installation.

NOTE 2 For M8 glow-plugs, values apply to unused nickel or zinc plated sheath-type glow-plugs without lubricant on the threads.

If glow-plugs are plated with a different material and/or the threads are lubricated, the applicable torque values shall be agreed between the glow-plug manufacturer and the engine manufacturer.

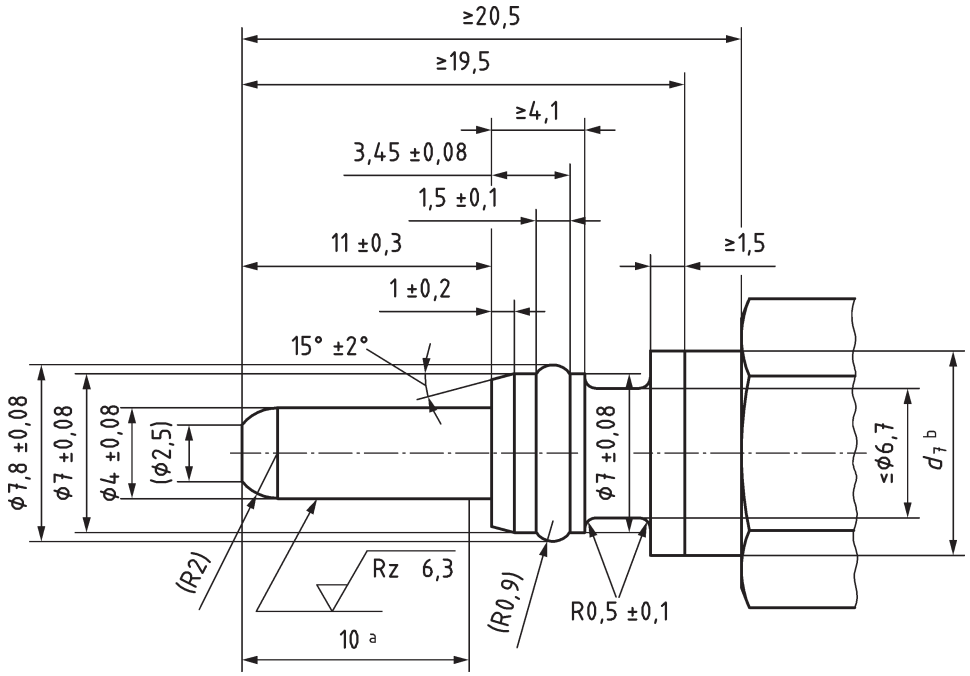
When the installation deformation by cylinder head housing material and by glow-plug plating is big, consultation should be held between glow-plug manufacturers and engine manufacturers.

Annex A
(normative)

Pin terminal dimensions

The dimensions of pin terminals P1, P2, and P5 shall be as shown in Figures A.1, A.2, and A.3.

Dimensions in millimetres



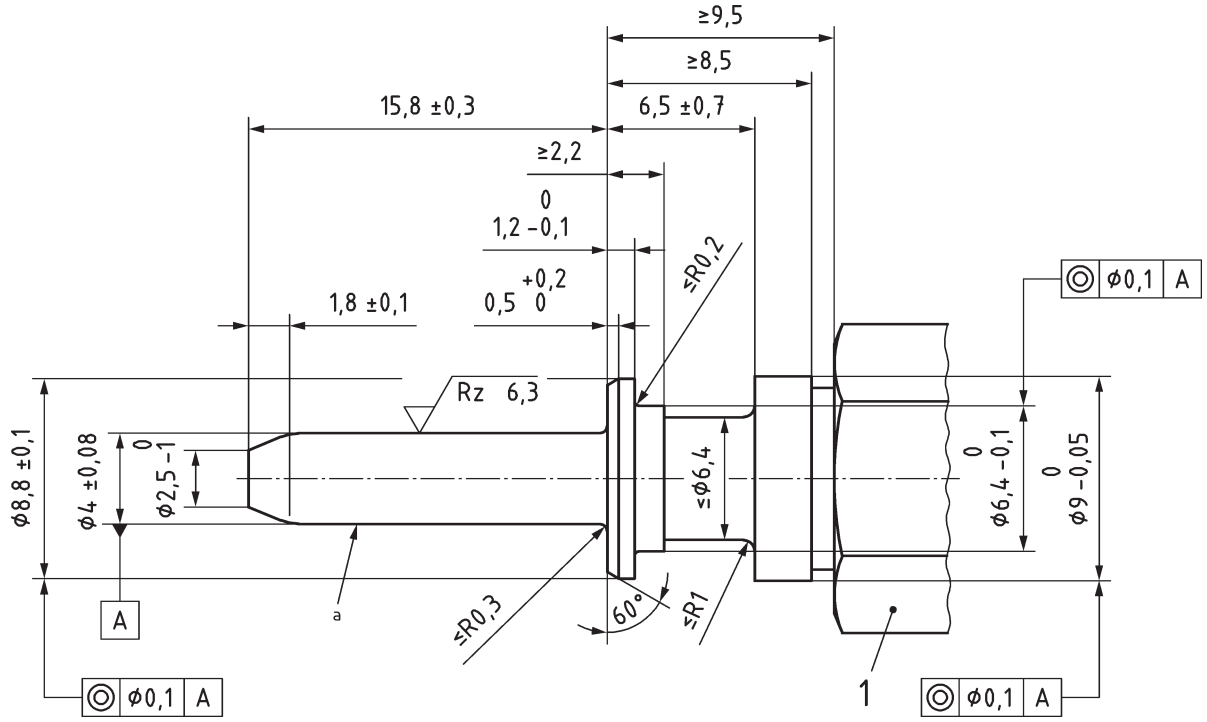
Key

a Effective dimension for diameter 4 +0,08/−0,08 and Rz 6,3.

b d7 ≤ 9 for M10; d7 ≤ 7,8 for M8.

Figure A.1 — Dimensions of pin terminal P1 for M8 and M10 glow-plugs

Dimensions in millimetres



Key

1 hexagon 10,0 h13

a The surface in this area is free of undercut.

Figure A.2 — Dimensions of pin terminal P2 for M10 glow-plugs

The dimensions of the pin P5 used as the terminal with M10 glow-plug types C3 and C4 shall be as shown in Figure A.3.

Dimensions in millimetres

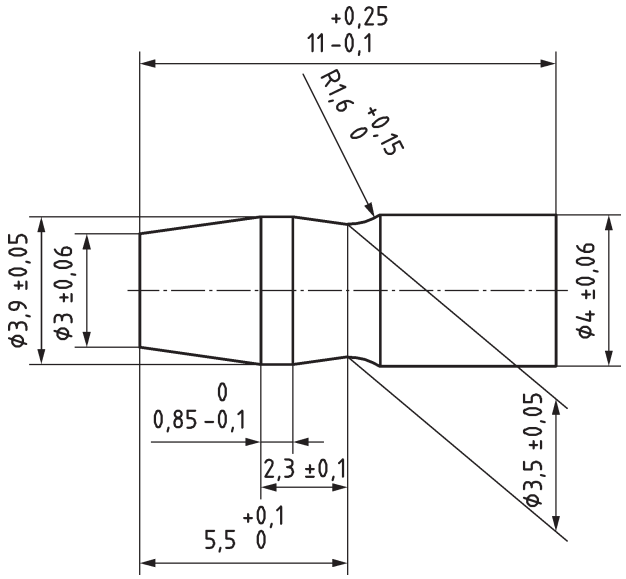


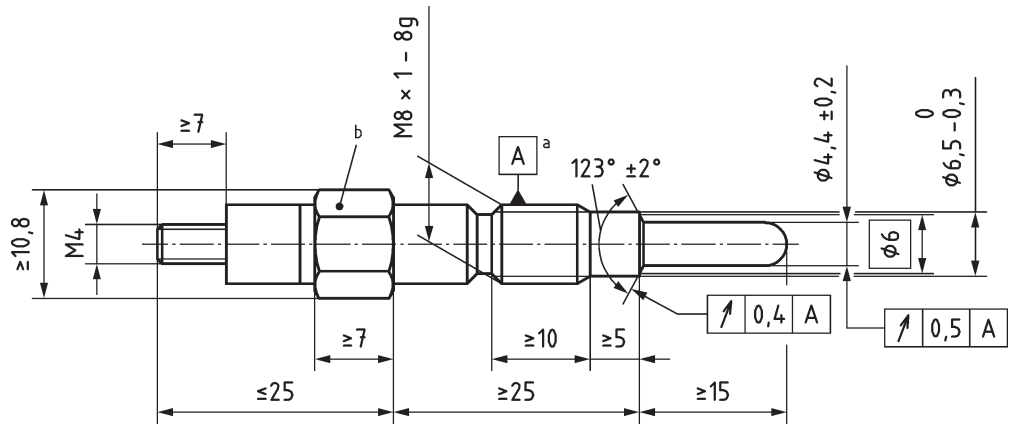
Figure A.3 — Dimension of pin terminal P5 for M10 glow-plugs

Annex B
(informative)

M8 × 1 glow-plugs with 10 mm hexagon and their cylinder head housing

Figures B.1 and B.2 illustrate M8 × 1 glow-plugs with 10 mm hexagon and their cylinder head housing.

Dimensions in millimetres



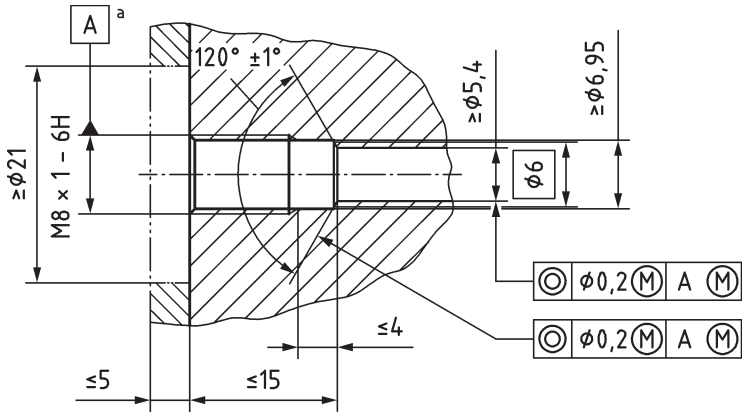
Key

a Major diameter, in accordance with ISO 965-1 and ISO 965-3.

b Hexagon 10-h13.

Figure B.1 — M8 × 1 glow-plug with threaded terminal and 10 mm hexagon

Dimensions in millimetres



Key

a Pitch diameter, see Table 1.

Figure B.2 — M8 × 1 cylinder head housing dimensions

Bibliography

[1] ISO 2768-2, *General tolerances — Part 2: Geometrical tolerances for features without individual tolerance indications*

[2] ISO 8092-1, *Road vehicles — Connections for on-board electrical wiring harnesses — Part 1: Tabs for single-pole connections — Dimensions and specific requirements*

[3] ISO 8092-4, *Road vehicles — Connections for on-board electrical wiring harnesses — Part 4: Pins for single- and multi-pole connections — Dimensions and specific requirements*

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