
**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*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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.

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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This second edition cancels and replaces the first edition (ISO 17447-1:2015), which has been technically revised.

The main changes are as follows:

- [Tables 1, 2, 4, 6, 7](#) include now M9x1;
- [Figure A.1](#) includes now M9.

A list of all parts in the ISO 17447 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The purpose of this document is to provide a compact and concise specification on glow plugs and their cylinder head housings, which shall 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. This should 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 document 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.

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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 document 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 are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 286-1, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 1: Basis of tolerances, deviations and fits*

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: Limit deviations for screw threads*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

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
M9 × 1	6g	Plug thread (on finished plug)	8,974	8,794	8,324	8,212	7,747	7,596 ^b
	6H	Tapped hole in the cylinder head	not specified	9,000	8,500	8,350	8,153	7,917
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	Fundamental deviation ^b
	$d_{3\max}$	es
M14 × 1,25 – 6e	$d_{3\max} = (12,647 - 0,063 - 0,180) = 12,404$	0,063
M12 × 1,25 – 6e	$d_{3\max} = (10,647 - 0,063 - 0,180) = 10,404$	0,063
M10 × 1,25 – 6g	$d_{3\max} = (8,647 - 0,028 - 0,180) = 8,439$	0,028
M10 × 1 – 6g	$d_{3\max} = (8,917 - 0,026 - 0,144) = 8,747$	0,026
M9 × 1 – 6g	$d_{3\max} = (7,917 - 0,026 - 0,144) = 7,747$	0,026
M8 × 1 – 6g	$d_{3\max} = (6,917 - 0,026 - 0,144) = 6,747$	0,026

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

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

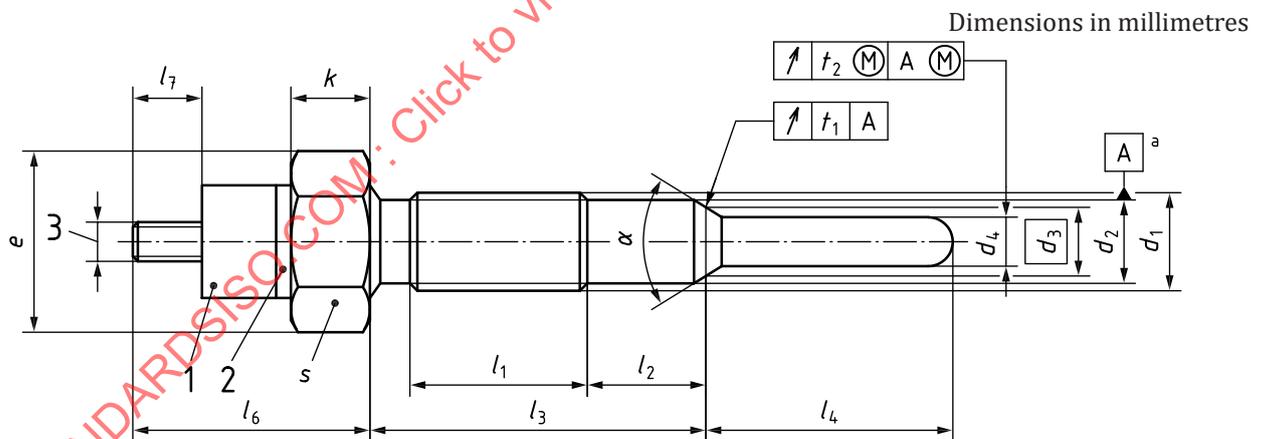
^b The fundamental deviation, es , between the pitch diameters of the thread and of the tapped hole is intended to prevent the possibility of seizure, as a result of combustion deposits on the bare threads, when removing the glow plugs. This clearance is also intended to enable glow plugs with threads in accordance with this document 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.



Key

- 1 cylinder or hexagonal nut (only for threaded terminal)
- 2 insulator
- 3 M4, M5 or pin terminal (for details see [4.2.3](#))

^a Major diameter, shall be in accordance with ISO 1101.

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.

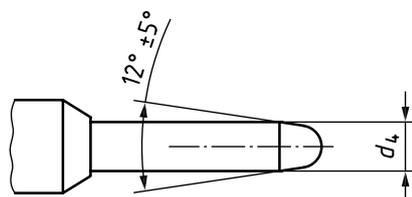


Figure 2 — With cone end diameter

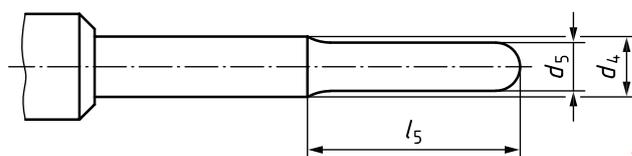


Figure 3 — With reduced tip end diameter

4.2.3 Electrical connection

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

Pin terminal dimensions for P1, P2 and P5 shall be in accordance with Annex A.

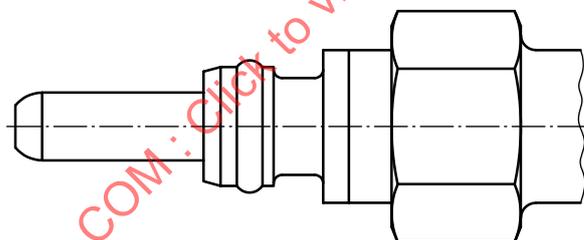


Figure 4 — Pin terminal: type P1

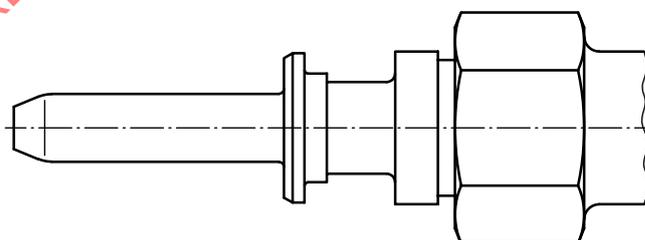
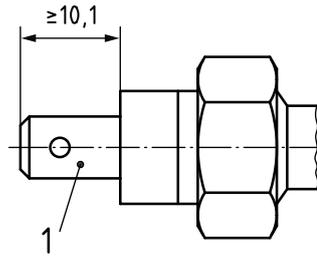
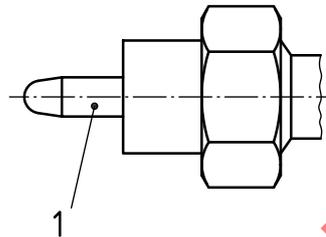


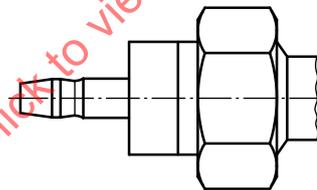
Figure 5 — Pin terminal: type P2

**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, M9 and M8 glow plugs**

Dimensions and tolerances are given in [Tables 3](#) and [4](#).

The hexagon of glow plugs shall be in accordance with ISO 286-1.

The tolerance class h13 and h14 shall be used for glow-plug hexagon.

Dimensions and tolerances for glow plugs M8 × 1 with 10 mm hexagon can be found in [Annex B](#).

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 $\pm 2^\circ$	d_2 -0,2	d_3 ref.	t_1	l_2 ± 1	$l_3 \pm 1$	d_4^{+0} -0,2	d_5^{+0} -0,2	$l_4 \pm 1$	l_5	t_2
F1	Type P3	≤ 30	≥ 12	M14 x 1,25-6e	≥ 11	14 h13	$\geq 15,5$	$\geq 4,0$	63°	12	11	0,2	6	26	6,1	-	20 to 30	-	0,7
F2	Thread M5	≤ 25	≥ 7																
E1	Thread M5	≤ 25	≥ 7	M12 x 1,25-6e	≥ 11	12 h13	$\geq 13,3$	$\geq 4,0$	63°	10	9	0,2	3 or 6	20 or 26	5,1	4,1	$\geq 6,5$	-	0,7
E2	Type P3	≤ 30	≥ 12												or 6,1				
E3	Thread M5	≤ 25	≥ 7												5,1				
E4	Type P3	≤ 30	≥ 12												5,1				

Table 4 — M10, M9 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 $\pm 2^\circ$	d_2 -0,2	d_3 ref.	t_1	l_2	l_3	d_4 $\pm 0,2$	d_5 $\pm 0,3$	l_4	l_5	t_2													
D1	Thread M4	≤ 25	≥ 7	M10 x 1,25-6g	≥ 22	12,0 h13	$\geq 13,3$	$\geq 4,0$	123°	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 x 1-6g	≥ 10	9,6 h 14	$\geq 10,7$	$\geq 7,0$	93°	6,4	10	7,0 $\pm 0,25$	20,0 $\pm 0,25$	-	-	27,0 $\pm 0,5$	-	-	0,7													
C2	Type P5	-	-									9,1 $\pm 0,25$	25,9 $\pm 0,25$																			
C3												7,0 $\pm 0,25$	26,7 $\pm 0,25$																			
C4												7,0 $\pm 0,25$	26,7 $\pm 0,25$																			
B1	Thread M4	≤ 25	≥ 7	M10 x 1-6g	≥ 10	10,0 h13	≥ 11	$\geq 7,0$	63°	7	0,2	≥ 7	26 to 95 ± 1	-	-	-	-	-	-													
B2														4	4	≥ 5	0,4															
B3														3,6	3,6	≥ 5	0,7															
B4														-	-	-	-															
B5														4	4	≥ 5	0,4															
B6														3,6	3,6	≥ 5	0,7															
B7														Type P1, P2, P4	-	-	M10 x 1-6g	≥ 10	10,0 h13	≥ 11	$\geq 7,0$	63°	7	0,2	≥ 7	26 to 95 ± 1	4	-	-	-	-	-
B8																											3,3	3,3	≥ 5	0,7		
B9																											-	-	-	-		
B10																											4,4	3,5	≥ 5	0,7		
G1	Thread M4	$\leq 29,5$	≥ 7	M9 x 1-6g	≥ 10	9,0 h13	$\geq 9,7$	≥ 7	93° or 123°	7,5	6,0	0,4	≥ 10	27 to 102 $\pm 0,5$	4	-	-	-	-													
G2															3,3	3,3	≥ 5	0,7														
G3															-	-	-	-														
G4															4,4	3,5	≥ 5	0,7														
G5															-	-	-	-														
G6															4	3,3	≥ 5	0,7														
G7															-	-	-	-														
G8															4,4	3,5	≥ 5	0,7														

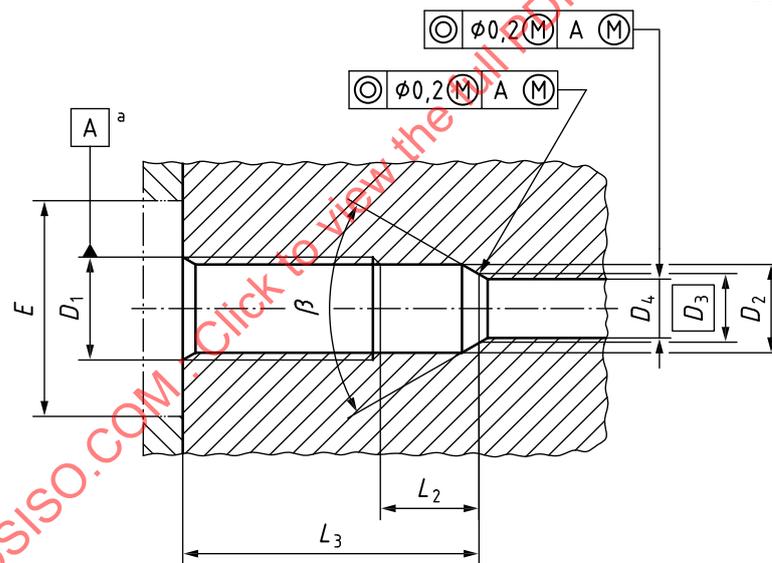
Table 4 (continued)

Glow-plug type	Electrical connection			Thread		Hexagon			Body						Heating element				
	Type	l_6	l_7	d_1	l_1	s	e	k	α $\pm 2^\circ$	d_2 $-0,2$	d_3 ref.	t_1	l_2	l_3	d_4 $\pm 0,2$	d_5 $\pm 0,3$	l_4	l_5	t_2
A1	Thread M4	$\leq 29,5$	≥ 7	M8 × 1-6g	≥ 10	8,0 h13	$\geq 8,6$	$\geq 7,5$	93° or 123°	6,7	6,0	0,4	≥ 10	27 to 102 ± 0,5	4	-	20 to 35 ± 1	-	0,7
A2															3,3	≥ 5			
A3															-	-			
A4															4,4	3,5		≥ 5	
A5	4	-	-																
A6	Type P1, P4	-	-												4	3,3		≥ 5	
A7															4,4	-		-	
A8															3,5	≥ 5			

4.3 Cylinder head housing

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

Dimensions in millimetres



Key

^a Pitch diameter, see Table 1.

NOTE See Tables 5 and 6 for dimensions.

Figure 9 — Cylinder head housing

Housing dimensions

Table 5 — Housing dimensions for M14 and M12

Dimensions in millimetres

M14 and M12 glow-plug type	D_1 6H	β $\pm 1^\circ$	D_2	D_3 ref.	D_4^a	E	L_2	L_3
F	M14 × 1,25	$\alpha-3^\circ$	$\geq 12,7$	11,0	$\geq 7,4$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
E	M12 × 1,25	$\alpha-3^\circ$	$\geq 10,7$	9,0	$\geq 7,4$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$

^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](#), [Tables 3](#) and [4](#).

Table 6 — Housing dimensions for M10, M9 and M8

Dimensions in millimetres

M10, M9 and M8 glow-plug type	D_1 6H	β $\pm 1^\circ$	D_2	D_3 ref.	D_4^a	E	L_2	L_3
D	M10 × 1,25	$\alpha-3^\circ$	$\geq 8,7$	7,0	$\geq 6,5$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
C	M10 × 1	$\alpha-3^\circ$	$\geq 8,8$	6,4	$\geq 5,5$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
B	M10 × 1	$\alpha-3^\circ$	$\geq 8,8$	7,0	$\geq 6,5$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
G1, G2, G5, G6	M9 × 1	$\alpha-3^\circ$	7,95 + 0,1	6,0	$\geq 5,0$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
G3, G4, G7, G8	M9 × 1	$\alpha-3^\circ$	7,95 + 0,1	6,0	$\geq 5,5$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
A1, A2, A5, A6	M8 × 1	$\alpha-3^\circ$	6,95 + 0,1	6,0	$\geq 5,0$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$
A3, A4, A7, A8	M8 × 1	$\alpha-3^\circ$	6,95 + 0,1	6,0	$\geq 5,5$	^a	$\leq (l_2-2)$	$\leq (l_3-3)$

^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](#), [Tables 3](#) and [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 B10		n.a.	n.a.
M9	M4 thread	G1 to G4	9 to 12	n.a.	0,8 to 1,5 ^a
	Pin	G5 to G8		n.a.	n.a.
M8	M4 thread	A1 to A4	9 to 12	n.a.	0,8 to 1,5 ^a
	Pin	A5 to A8		n.a.	n.a.

n.a. = not applicable

Note that for M8 and M9 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.

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

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

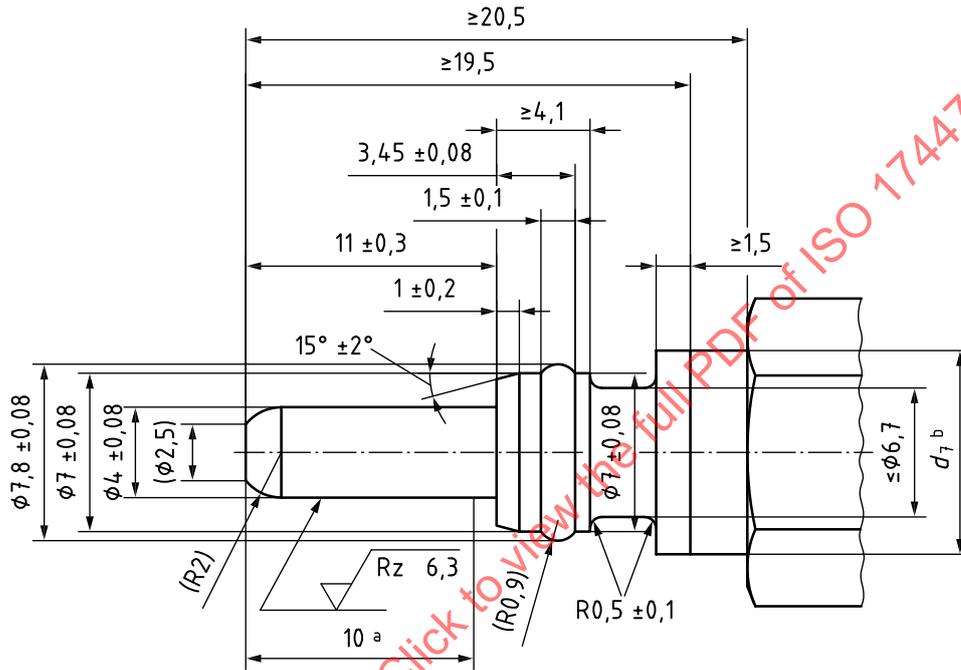
^b Torque values for cast iron and aluminium cylinder heads as applicable.

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 $d7 \leq 9$ for M10; $d7 \leq 7,8$ for M8 and M9.

Figure A.1 — Dimensions of pin terminal P1 for M8, M9 and M10 glow plugs