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Diesel engines — Clamp mounted CR fuel injectors — Mounting dimensions

Moteurs diesels — Injecteurs de combustible pour rampe commune fixés par patte — Dimensions de montage

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Foreword

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ISO 12251 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 7, *Injection equipment and filters for use on road vehicles*.

Diesel engines — Clamp mounted CR fuel injectors — Mounting dimensions

1 Scope

This International Standard specifies dimensional requirements for clamp mounted CR fuel injectors and their corresponding cylinder head features in diesel engines.

According to the injector nozzle capnut, the clamp mounted CR fuel injectors can be divided into two types:

a) Type A, where the nozzle capnut is straight (see Figure 4).

b) Type B, where the nozzle capnut is stepped (see Figure 5).

Each clamp mounted CR fuel injector type is subdivided by a series of different sizes.

NOTE This differentiation corresponds to the relationship between the two guide diameters of the clamp mounted CR fuel injectors.

2 Symbols

For the purposes of this document, the following symbols apply:

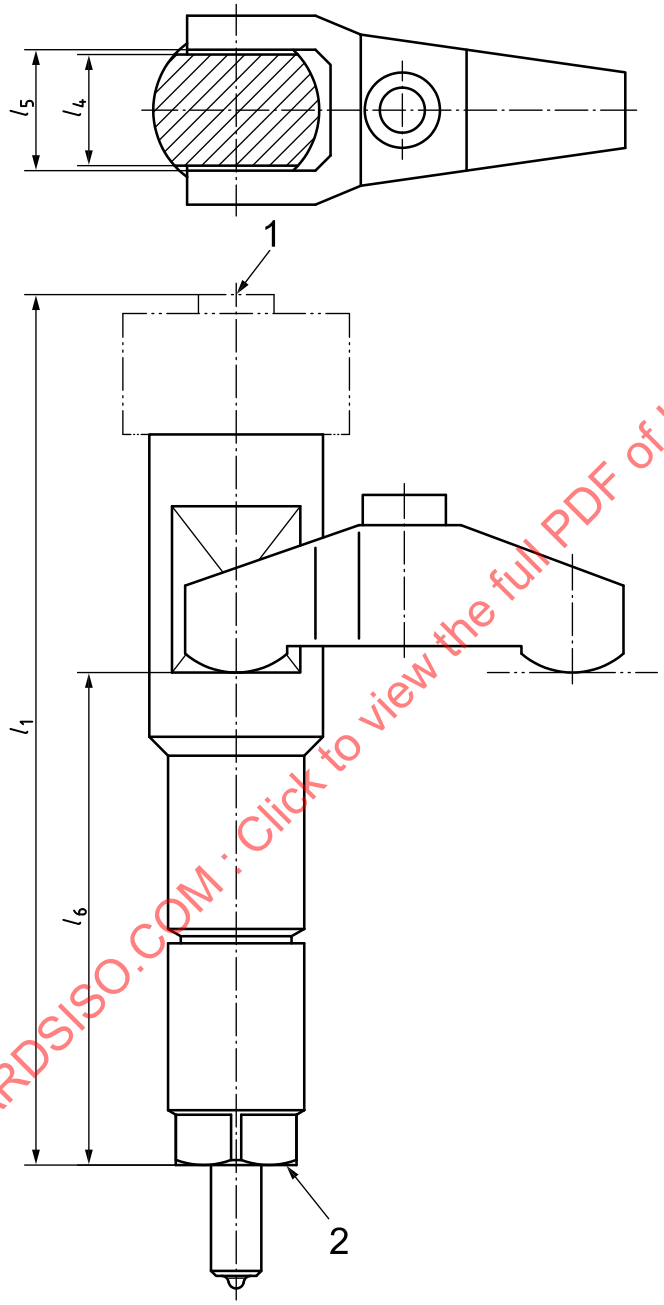
D_1 = injector shaft diameter
D_2 = injector upper guide diameter
D_3 = capnut diameter
D_4 = injector lower guide diameter
D_5 = injector nozzle shaft diameter
d_6 = bore for upper guide diameter
d_7 = bore for lower guide diameter
d_8 = bore for nozzle shaft
l_1 = overall injector length
l_2 = distance between sealing face and upper guide diameter of injector
l_3 = overlapping (upper guide diameter/cylinder head)
l_4 = injector clamping width
l_5 = clamp width
l_6 = injector clamping height
l_7 = distance between sealing face and datum B on injector
l_8 = distance between sealing face and datum C on injector

NOTE l_7 and l_8 are dependent on the cylinder head design as agreed between injector manufacturer and customer.

3 General requirements

3.1 Clamp mounting arrangement

A typical clamp mounting arrangement is shown in Figure 1 (schematically).



Key

l_1 overall injector length

l_6 injector clamping height

1 top of injector (e.g. hydraulic connection)

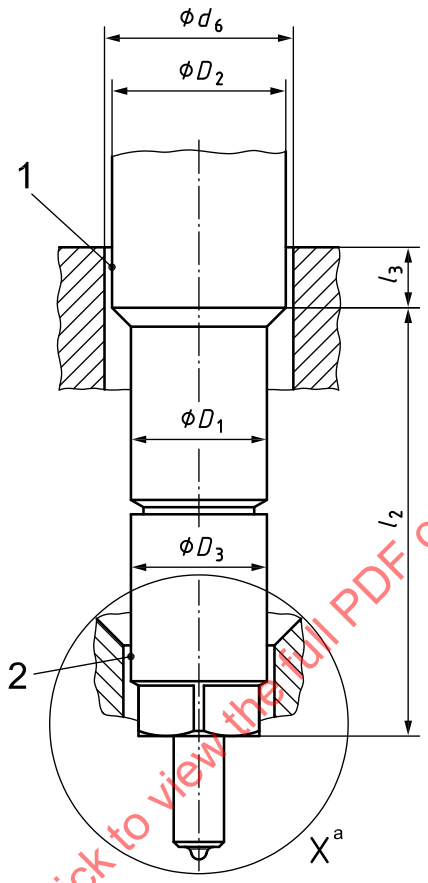
2 injector sealing face

NOTE The injector clamping height varies depending on engine application and is agreed between manufacturer and customer.

Figure 1 — Typical injector clamp mounting arrangement

3.2 Injector guiding dimensions

The important injector guiding dimensions are shown in Figure 2 (schematically).



Key

l_3 overlapping at upper guide (upper guide diameter/cylinder head)
1 upper guide
2 lower guide
[a] See Figures 4 and 5 for details.

Figure 2 — Typical injector guiding arrangement

3.3 Concentricity of the nozzle shaft

The determination of the concentricity, $\varnothing c$, of the nozzle shaft relative to the axis of the two guide diameters, $\varnothing D_2$ and $\varnothing D_4$, is shown in Figure 3 (schematically).

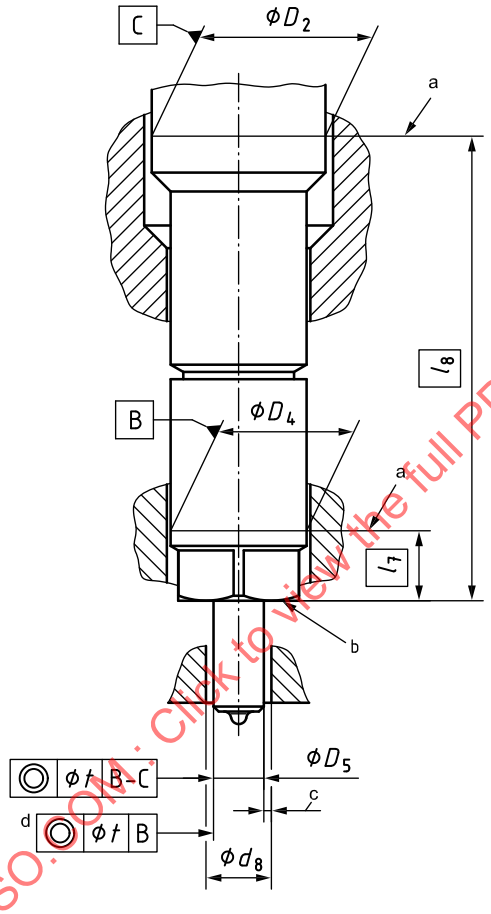
The concentricity, $\varnothing c$, is the result of the form and position tolerances of the two guide diameters, based on the production conditions, and is specified by the injector manufacturer by simultaneously taking into consideration the compatibility with the dimensional structure of the cylinder head.

The purpose of this concentricity is to determine the position of the nozzle shaft (centre axis of $\varnothing D_5$) related to the cylinder head bore, $\varnothing d_8$; this is important in order to ensure that the nozzle shaft does not interfere with the bore in the cylinder head (see Tables 2 and 4, table footnote c, and Figure 3, key item c).

Requirements for measurement of the concentricity, $\varnothing t$:

— the datum B position (l_7) shall be agreed between injector manufacturer and customer;

— the datum C position (l_8) depends on the distance between the two guides and the overlapping (see Figure 2: l_2 and l_3) and shall be agreed between injector manufacturer and customer.



a Datum positions (at the two guide diameters).

b Injector sealing face.

c Required gap between the nozzle shaft and the bore in the cylinder head (no interference).

d For single guide diameter injector types.

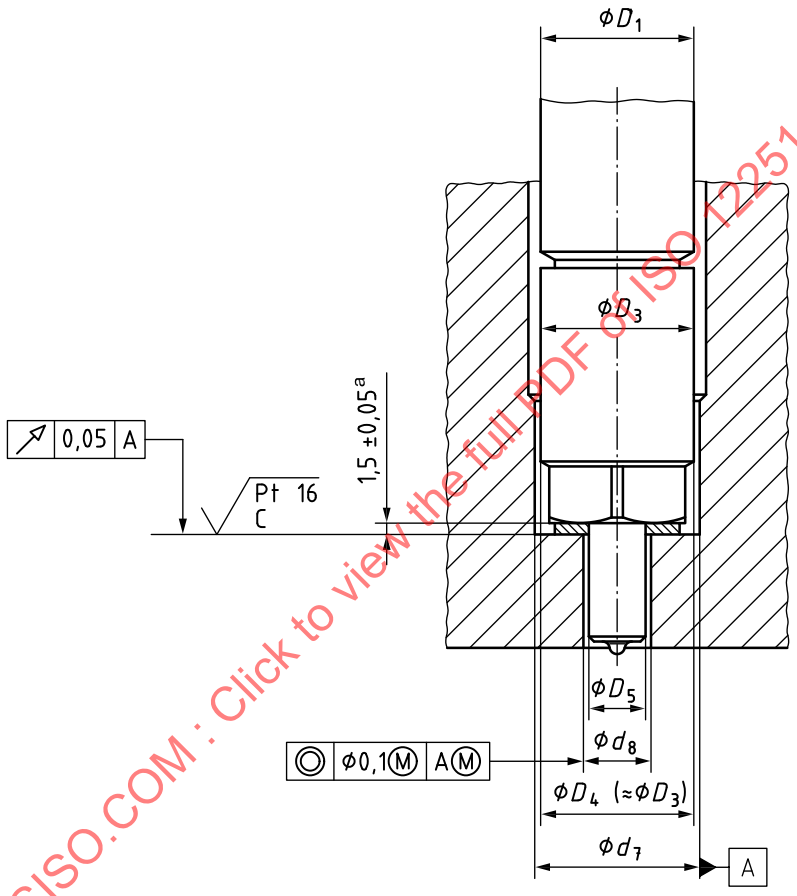
Figure 3 — Concentricity $\varnothing D_5$ of the nozzle shaft

4 Dimensions and tolerances

4.1 Type A, clamp mounted CR fuel injectors with straight capnut

Figure 4 shows the injector and nozzle dimensions and the corresponding cylinder head dimensions.

Dimensions in millimetres



[a] Sealing washer thickness may vary depending on engine manufacturer's requirements.

Figure 4 — Injector and cylinder head dimensions, Type A (detail X of Figure 2)

The specified clamp mounted CR fuel injector and nozzle dimensions and the corresponding cylinder head bore dimensions are given in Tables 1 and 2.

Table 1 — Clamp mounted CR fuel injector dimensions, Type A

Dimensions in millimetres

Size	D_1		D_2[a]		D_3		D_4		D_5		l_1[b] nom.	l_2[a] min.	l_4[b]	
A.1	16,9	+0 −0,13	16,9	+0 −0,13	17	+0,10 −0,15	17	+0 −0,11	7	+0,20 −0,15	137 to 200	40	10,8	+0 −0,10
A.2	17	+0 −0,15	17,5			+0,20 −0,15					137 to 200	50	13	
A.3	19	+0 −0,20	19,5			+0,10 −0,15					121 to 210	40	15 or 17	
A.4	19	+0 −0,15	19,5			+0,20 −0,15					150 to 200	50	12,8, 13, 14, 15 or 17	
A.5	21	+0 −0,10	24,25	+0 −0,13	24,1	+0 −0,13	24,1	+0 −0,13	9,2	+0 −0,10	164 to 207	55	13, 17, 20 or 27	

[a] See Figure 2.

[b] See Figure 1.

Table 2 — Cylinder head bore dimensions, Type A

Dimensions in millimetres

Size	d_6[a]		d_7		d_8[c] nom.	l_3[ad] nom.	l_5[be]	
A.1	17	+0,07 +0,02	17	+0,07 +0,02	7,6 to 8,1	5 to 10	10,85	+0,10 +0
A.2	17,5				7,6 to 7,8		13,05	
A.3	19,5				7,6 to 8,1		15,05 or 17,05	
A.4	19,5				7,6 to 7,8		12,85, 13,05, 14.05, 15,05 or 17,05	
A.5	24,3	+0,10 +0	21,8	+0,20 +0	9,5 to 9,7		13,1, 17,1, 20,1 or 27,1	+0,30 +0

[a] See Figure 2.

[b] See Figure 1.

[c] To ensure that the nozzle shaft does not interfere with the bore in the cylinder head, the maximum value of the nozzle shaft diameter, the maximum axis tilt and the bias of the injector shall be taken into account.

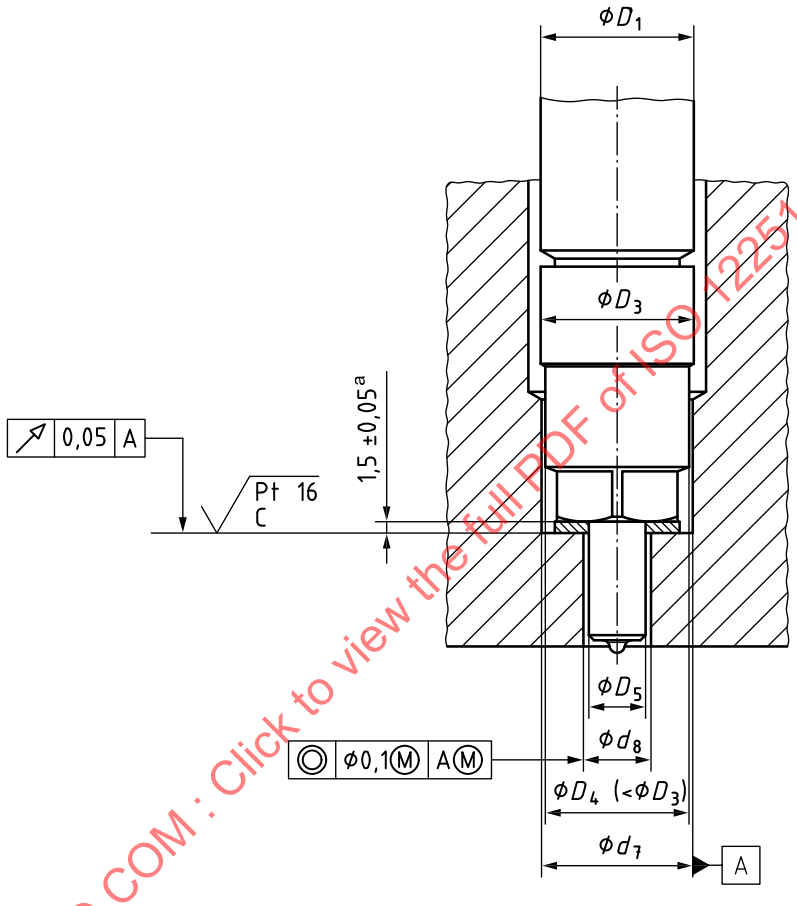
[d] Typical dimensions; other dimensions are allowable as agreed between manufacturer and customer.

[e] l_5 is an important dimension and needs to be closely controlled in order to guarantee the orientation of the injector.

4.2 Type B, clamp mounted CR fuel injectors with stepped capnut

Figure 5 shows the injector and nozzle dimensions and their corresponding cylinder head dimensions.

Dimensions in millimetres



[a] Sealing washer thickness may vary depending on engine manufacturer's requirements.

Figure 5 — Injector and cylinder head dimensions, Type B (detail X of Figure 2)