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**Diesel engines — Fuel injection pumps  
— Tapers for shaft ends and hubs**

*Moteurs diesels — Pompes d'injection de combustible — Cônes pour  
bouts d'arbre et moyeux*

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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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 34, *Pulsion, powertrain and powertrain fluids*.

This fifth edition cancels and replaces the fourth edition (ISO 6519:2015), which has been technically revised.

The main changes are as follows:

- a specification of shaft end was added;
- technical description errors were corrected.

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](http://www.iso.org/members.html).

## Introduction

To install the fuel injection pump or the high-pressure supply pump to the engine it is recommended to use one of the pump shaft ends and hubs described in this document.

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# Diesel engines — Fuel injection pumps — Tapers for shaft ends and hubs

## 1 Scope

This document specifies the dimensions of tapered shaft ends and hubs of fuel injection pumps and high-pressure supply pumps for diesel (compression-ignition) engines. The specified shaft ends and hubs can be used with or without keys.

NOTE The specified shaft ends and hubs can also be used for other applications where no specific standards exist.

## 2 Normative references

There are no normative references in this document.

## 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

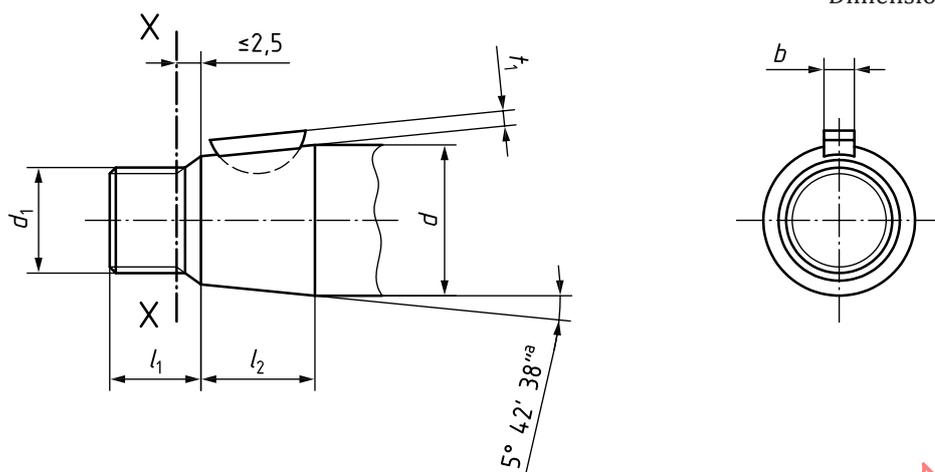
### 4.1 General

To ensure satisfactory operation of the taper drive, it is necessary for manufacturers to provide such cone angle tolerances that the contact between the cones of driven shaft and that of drive hub commences at the major diameter.

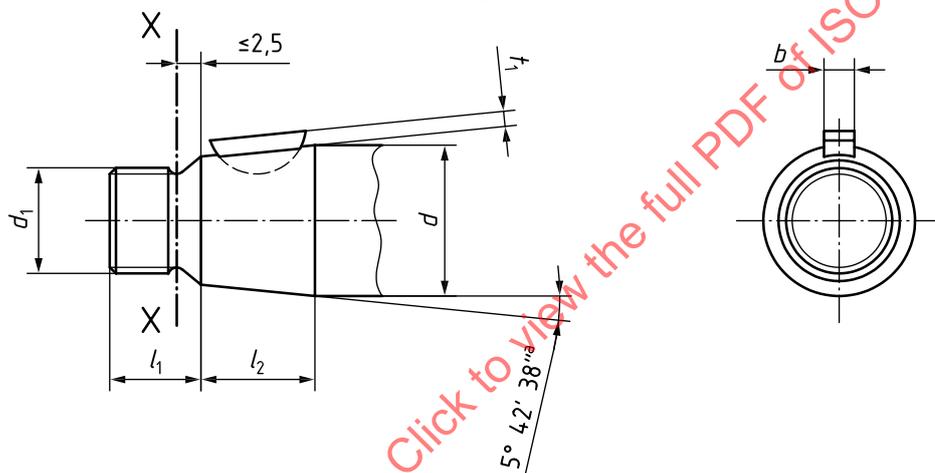
### 4.2 Shaft ends with taper

Shaft ends shall be as shown in [Figure 1](#) and [Table 1](#) or [Figure 2](#) and [Table 2](#). The shaft ends taper and thread ([Figure 1](#)) may be made optionally according to type 1 or 2. However, it shall be possible to screw the go-gauge for the thread up to the XX line for both these types.

Dimensions in millimetres



a) Type 1



b) Type 2

a Nominal.

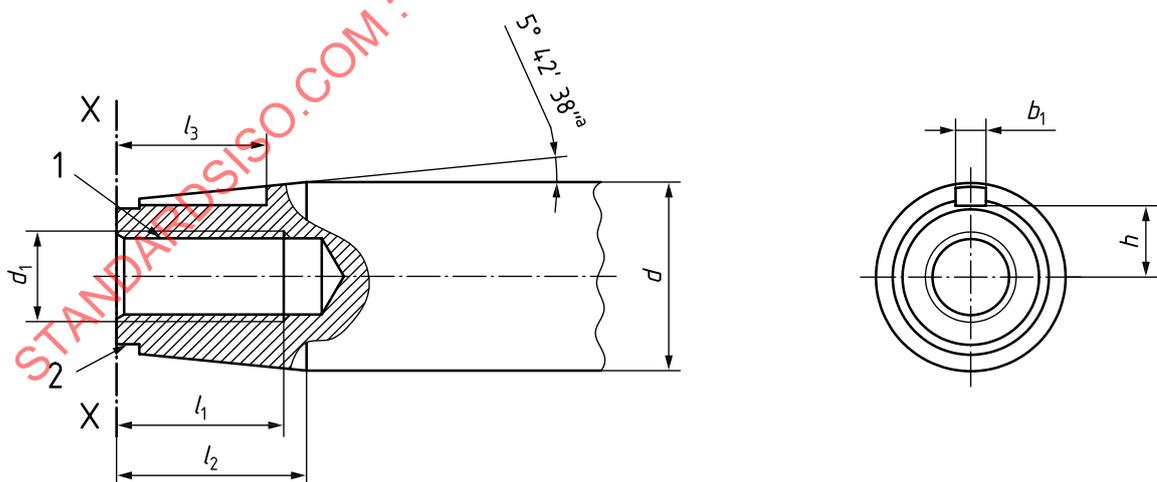
Figure 1 — Shaft ends type 1 and type 2

**Table 1 — Shaft ends type 1 and type 2**

Dimensions in millimetres

$d^a$ nominal	$d_1$	$l_1$ maximum	$l_2$ 0 -1	$t_1$ maximum	$b$ (h9)
17	M12×1,75	14,5	18	1,6	$3^0_{-0,03}$
20	M14×1,5	12	15	2,0	$4^0_{-0,03}$
		16,5	20		
22	M14×1,5	16,5	20	2,0	$4^0_{-0,03}$
	M16×1,5 <sup>b</sup>	18			
23	M16×1,5	18	23	2,0	$4^0_{-0,03}$
25	M18×1,5	15	25	2,6	$5^0_{-0,03}$
		20			
30	M20×1,5	23	30	2,6	$5^0_{-0,03}$
35	M24×1,5	19	27	2,6	$5^0_{-0,03}$
		27			
		27	35		
40	M30×1,5	27	27	2,6	$5^0_{-0,03}$
			40		

<sup>a</sup> The tolerance for dimension  $d$  depends on the type of shaft bearing.  
<sup>b</sup> The thread M16×1,5 is preferred for shaft ends with 22 mm diameter.



**Key**

- 1 internal thread
- 2 clamping collar (for manufacturing purpose only, no function at the engine)
- <sup>a</sup> Nominal.

**Figure 2 — Shaft ends type 3**

**Table 2 — Shaft ends type 3**

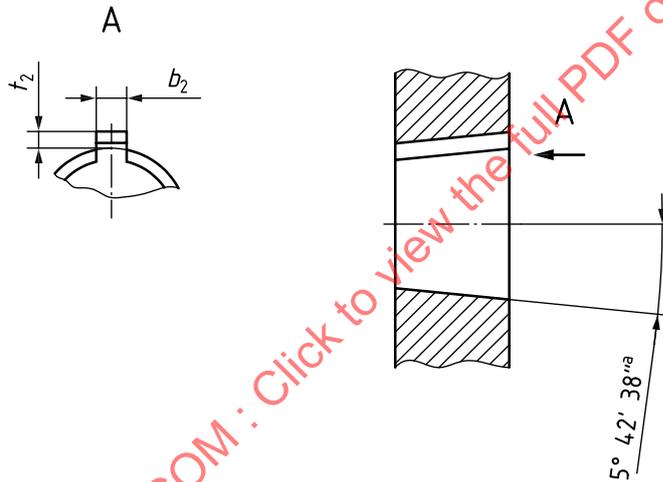
Dimensions in millimetres

$d^a$ nominal	$d_1$	$l_1$ minimum	$l_2^b$	$l_3$	$b_1^b$ nominal	$h$
25	M12×1	22	25	19,75	4	9,45
	M12×1,75					
<sup>a</sup> The tolerance for dimension $d$ depends on the type of shaft bearing. <sup>b</sup> The tolerance for dimension $l_2$ and $b_1$ should be agreed between the parties concerned.						

**4.3 Keyways of hub with taper**

Hub keyways shall be as shown in Figure 3 and Table 3. The length of the hub cone shall be such that, after assembling, the face at the smaller diameter of the hub cone lies so far in front of the XX line (see Figure 1 and Figure 2) that the fixing nut can be correctly screwed up.

The key type for type 3, parallel or tapered, its width tolerance, and the hub keyway shape, width and its tolerance should be agreed between the parties concerned.



<sup>a</sup> Nominal.

**Figure 3 — Hub**

**Table 3 — Hub**

Dimensions in millimetres

$d^a$ nominal	$t_2$ minimum	$b_2$ (D10)
17	1,8	$3^{+0,060}_{+0,020}$
20	2,2	$4^{+0,078}_{+0,030}$
22	2,2	$4^{+0,078}_{+0,030}$
<sup>a</sup> $d$ is the nominal diameter of the shaft.		

**Table 3 (continued)**

$d^a$ nominal	$t_2$ minimum	$b_2$ (D10)
23	2,2	4 <sup>+0,078</sup> +0,030
25	2,8	(4 or 5) <sup>+0,078</sup> +0,030
30	2,8	5 <sup>+0,078</sup> +0,030
35	2,8	5 <sup>+0,078</sup> +0,030
40	2,8	5 <sup>+0,078</sup> +0,030

<sup>a</sup>  $d$  is the nominal diameter of the shaft.

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