INTERNATIONAL STANDARD

ISO 13948-2

Second edition
2012-04-01

Diesel engines — Fuel injection pumps and fuel injector low-pressure connections —

Part 2: Non-threaded (push-on) connections

Moteurs diesels — Raccords basse pression pour pompes d'injection de combustible et porte-injecteurs de combustible complets —

Partie 2: Raccords non filetés (à pression)

Reference number
ISO 13948-2:2012(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 13948-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 7, *Injection equipment and filters for use on road vehicles*.

This second edition cancels and replaces the first edition (ISO 13948-2:2000), which has been technically revised.

ISO 13948 consists of the following parts, under the general title *Diesel engines — Fuel injection pumps and fuel injector low-pressure connections*:

— *Part 1: Threaded connections*

— *Part 2: Non-threaded (push-on) connections*

Introduction

It is recognized that a large variety of low-pressure connections exist on fuel injection equipment, using different sealing principles as well as designs. This International Standard attempts to provide the user with a common set of preferred types.

This International Standard is divided into two parts, covering threaded connections (ISO 13948-1) and non-threaded (push-on) connections (ISO 13948-2) for use with low-pressure fuel supply and return, boost air pressure and lubricating oil supply and return.

Diesel engines — Fuel injection pumps and fuel injector low-pressure connections —

Part 2: Non-threaded (push-on) connections

1 Scope

This part of ISO 13948 specifies requirements for the connection ends of push-on connections used with fuel injection equipment.

Three types of push-on connections (types A, B and C) are described in this part of ISO 13948.

NOTE Low-pressure connections to fuel filters are covered in other International Standards; see the bibliography. High-pressure end-connections for pumps and injectors are covered in ISO 2974 and ISO 13296.

2 Normative references

The following referenced documents are indispensable for the application 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 7876 (all parts), *Fuel injection equipment — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7876 apply.

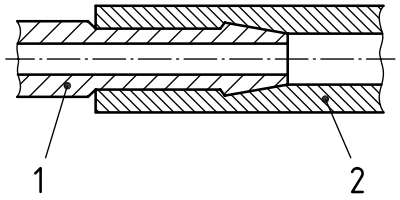
4 Connection designs and applications

4.1 Type A: nipple connection

Example: see Figure 1.

This design is intended for use directly with the mating hose (2) or in conjunction with a retaining clip around the hose (not shown) for a more secure connection.

The nipple (1) can be machined (see Figure 4), formed (see Figures 5 and 6) or moulded (see Figure 7).



Key

1 nipple
2 hose

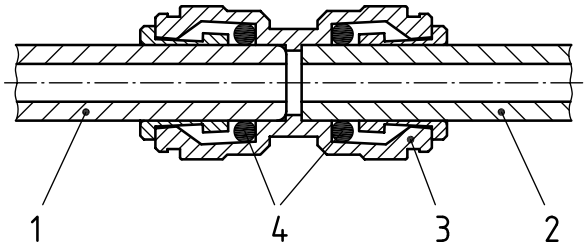
Figure 1 — Type A connection (principle)

4.2 Type B: stand pipe connection

Example: see Figure 2.

This design is used in conjunction with proprietary push-on connections (3) attached to the mating hose (2) that seals by compressing ring seals (4) around the outside diameters of the stand pipe (1) and of the mating hose (2).

An identification may be applied to indicate to the user that the hose is fully engaged (see Figure 10).



Key

1 stand pipe
2 hose
3 push-on connection
4 ring seals

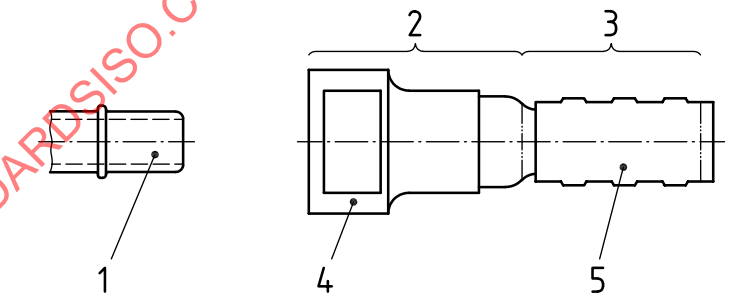
Figure 2 — Type B connection (principle)

4.3 Type C: “quick connector coupling” connection[1)]

Example: see Figure 3.

This design is used in conjunction with proprietary push-on “quick connector couplings” attached to the mating male tube end form. The quick connector coupling contains one or more O-ring seals to seal along the male tube end outer surface, and a latching device to engage with the collar diameter feature.

The male tube end form is shown in Figure 11 and the dimensions are defined in Tables 4 and 5.



Key

1 male tube end
2 female connection end
3 stem
4 quick connector coupling
5 section of hose or tube

Figure 3 — Type C connection (principle)

1) As specified in SAE J2044.

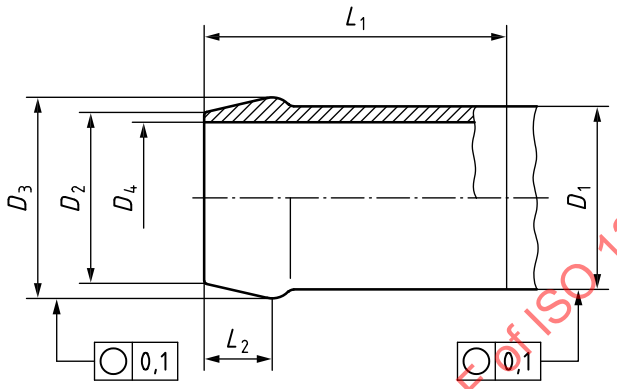
5 Dimensions and surface quality

5.1 Type A connection ends

5.1.1 Nipple types

5.1.1.1 Nipple, machined, type A.1

Dimensions in millimetres



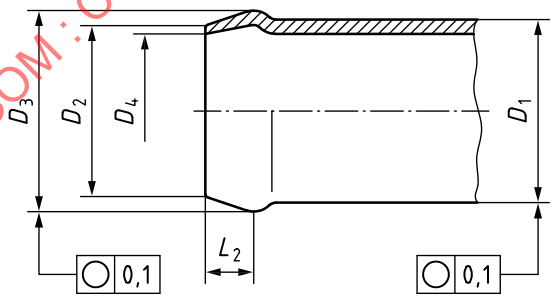
NOTE For the parameters, see Table 1.

Figure 4 — Nipple, type A.1

5.1.1.2 Nipple, formed, types A.2

5.1.1.2.1 Nipple, bulge type A.2.1

Dimensions in millimetres

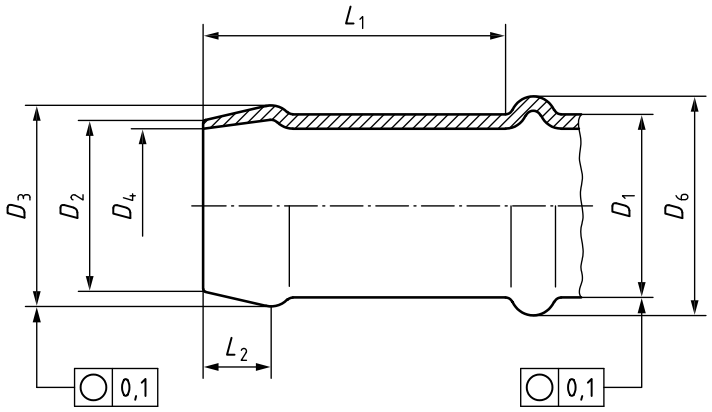


NOTE For the parameters, see Table 1.

Figure 5 — Nipple, type A.2.1

5.1.1.2.2 Nipple, bulge and spool type, A.2.2

Dimensions in millimetres



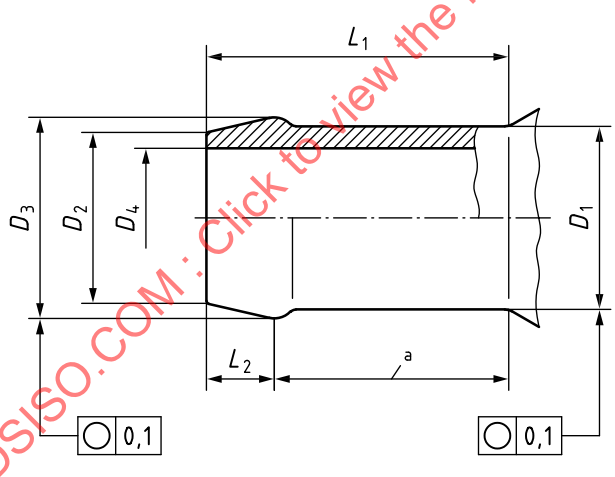
NOTE For the parameters, see Table 1.

Figure 6 — Nipple, type A.2.2

5.1.1.3 Nipple, moulded, type A.3

See Figure 7.

Dimensions in millimetres



NOTE For the parameters, see Table 1.

a Within this area:
— moulded joint misalignment: 0,05 mm max.;
— moulded joint parting height: 0,05 mm max.

Figure 7 — Nipple, type A.3

5.1.2 Basic dimensions and tolerances

See Table 1.

Table 1 — Basic dimensions and tolerances for nipples, types A

Dimensions in millimetres

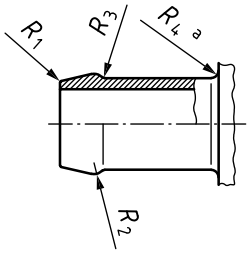
Type	L_1 nom.	L_2	D_1	D_2	D_3	D_4 max.	D_5 min.
A.1 (machined)	20 to 24	3,2 ± 0,5	Ø12,1 ± 0,1	Ø11,3 ± 0,2	Ø13,3 ± 0,1	Ø10	—
		3,2 ± 0,5	Ø10,1 ± 0,1	Ø9,3 ± 0,2	Ø11,1 ± 0,1	Ø8	—
		3,2 ± 0,5	Ø8,1 ± 0,1	Ø7,3 ± 0,2	Ø9,1 ± 0,1	Ø6	—
	16	2,8 ± 0,5	Ø6,35 ± 0,1	Ø6,2 ± 0,2	Ø7,4 ± 0,1	—[a]	—
	12	2,2 ± 0,5	Ø4,0 ± 0,1	Ø3,8 ± 0,2	Ø5 ± 0,1	Ø2,6	—
A.2.1 (formed) bulge type	—	3,2 ± 0,5	Ø12,1 ± 0,1	Ø11,3 ± 0,2	Ø13,3 ± 0,3	Ø10,2	—
		3,2 ± 0,5	Ø10,1 ± 0,1	Ø9,3 ± 0,2	Ø11,1 ± 0,3	Ø8,2	—
		3,2 ± 0,5	Ø8,1 ± 0,1	Ø7,3 ± 0,2	Ø9,1 ± 0,3	Ø6,2	—
		2,8 ± 0,5	Ø6,35 ± 0,1	Ø6,1 ± 0,2	Ø7,4 ± 0,3	Ø5	—
		2,2 ± 0,5	Ø4,76 ± 0,1	Ø4,6 ± 0,2	Ø5,6 ± 0,3	Ø3,5	—
A.2.2 (formed) bulge and spool type	20 to 24	3,2 ± 0,5	Ø12,1 ± 0,1	Ø11,3 ± 0,2	Ø13,3 ± 0,3	Ø10,2	Ø13,2
		3,2 ± 0,5	Ø10,1 ± 0,1	Ø9,3 ± 0,2	Ø11,1 ± 0,3	Ø8,2	Ø11,2
		3,2 ± 0,5	Ø8,1 ± 0,1	Ø7,3 ± 0,2	Ø9,1 ± 0,3	Ø6,2	Ø9
	28	2,8 ± 0,5	Ø6,35 ± 0,1	Ø6,1 ± 0,2	Ø7,4 ± 0,3	Ø5	Ø7,1
	28	2,2 ± 0,5	Ø4,76 ± 0,1	Ø4,6 ± 0,2	Ø5,6 ± 0,3	Ø3,5	Ø5,3
A.3 (moulded)	20 to 24	3,2 ± 0,5	Ø12,1 ± 0,1	Ø11,3 ± 0,2	Ø13,3 ± 0,1	Ø9,2	—
		3,2 ± 0,5	Ø10,1 ± 0,1	Ø9,3 ± 0,2	Ø11,1 ± 0,1	Ø7,2	—
		3,2 ± 0,5	Ø8,1 ± 0,1	Ø7,3 ± 0,2	Ø9,1 ± 0,1	Ø5,2	—
	16	2,8 ± 0,5	Ø6,35 ± 0,1	Ø6,2 ± 0,2	Ø7,4 ± 0,1	—[a]	—
	12	2,2 ± 0,5	Ø4,0 ± 0,1	Ø3,8 ± 0,2	Ø5 ± 0,1	Ø2,6	—

[a] Bore size specified by manufacturer.

5.1.3 Radii

Dimensions of the nipple radii are given in Table 2.

Positions of the nipple radii are shown in Figure 8.



NOTE For the parameters, see Table 2.

[a] Only for moulded nipples.

Figure 8 — Nipple radii

Table 2 — Dimensions of radii for nipples, types A

Dimensions in millimetres

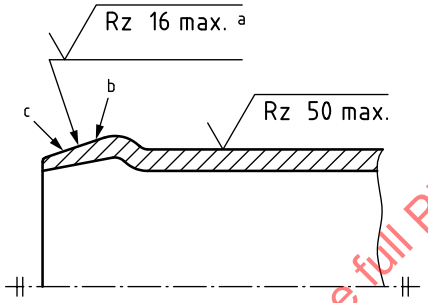
Nipple type	R_1 min.	R_2 nom.	R_3 nom.	R_4 [a] min.
machined	0,2	1 to 1,5	0,5 to 1	—
formed	0,2	1 to 1,5	0,5 to 1	—
moulded	0,2	1 to 1,5	—	1

[a] Only for moulded nipples.

5.1.4 Surface quality

The outside surface quality requirements (roughness and imperfections) are given in Figure 9.

Surface roughnesses in micrometres



a Measured lengthwise and crosswise.

b No longitudinal marks are permitted.

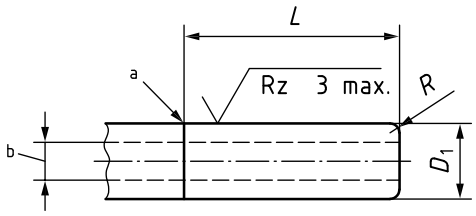
c Single imperfections with a depth up to 0,05 mm and a length up to 0,5 mm are permitted.

Figure 9 — Outside surface quality requirements

5.2 Type B connection end

See Figure 10.

Surface roughnesses in micrometres



NOTE 1 Materials can be different, for example plastics.

NOTE 2 For the parameters, see Table 3.

a Identification (optional).

b Bore size specified by manufacturer.

Figure 10 — Stand pipe, type B

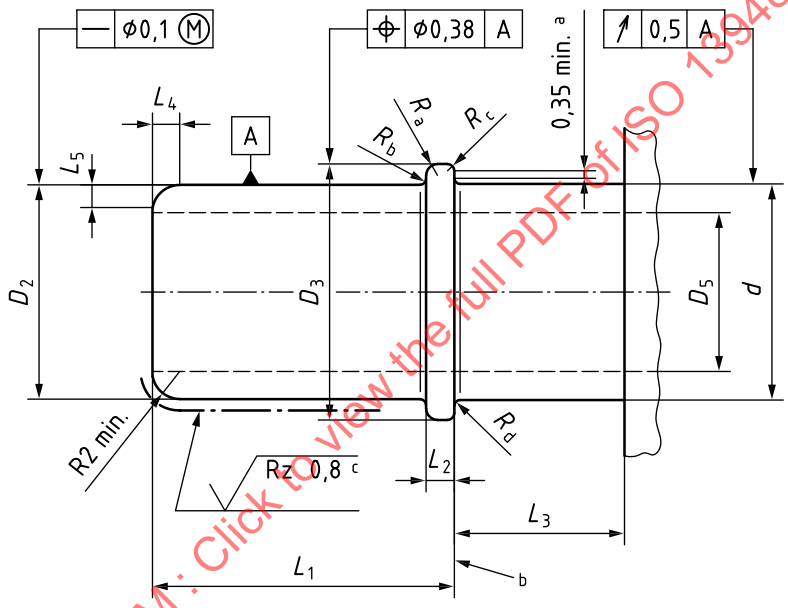
Table 3 — Dimensions and tolerances for type B

Dimensions in millimetres

D_1	L	R
Ø8 ± 0,05	28,5 ± 0,5	$1{,}2^{+0,5}_{-0,3}$
Ø10 ± 0,05	28,5 ± 0,5	$1{,}2^{+0,5}_{-0,3}$

5.3 Type C connection end

Dimensions in millimetres
Surface roughnesses in micrometres



Key

d	nominal diameter	L_1	length
D_2	seal diameter	L_2	collar width
D_3	collar diameter	L_3	clearance
D_5	minimum inner diameter		

NOTE For the parameters, see Tables 4 and 5.

a Minimum 0,35 annular surface perpendicular to tube.

b Collar to start of bend: see connector drawings for minimum distance.

c Measure across lay, tool marks or weld seams. No flows to exceed 30 µm Rz.

Figure 11 — Male tube end form, type C

6 Designation

Low-pressure connections in accordance with this part of ISO 13948 shall be designated by the following elements:

a) reference to this part of ISO 13948 (ISO 13948-2:2012);

b) the type of connection in accordance with Figure 4, 5, 6, 7, 10 or 11;

c) the diameter, D_1, of the type of connection in accordance with Table 1, 3, 4 or 5.

EXAMPLE 1

A low-pressure fuel connection of type A.2.1 (nipple, formed) with a diameter D_1 = 10,1 mm is designated as follows:

ISO 13948-2 - A.2.1 - 10,1

EXAMPLE 2

A low-pressure fuel connection of type B with a diameter D_1 = 8 mm is designated as follows:

ISO 13948-2 - B - 8

EXAMPLE 3

A low-pressure fuel connection of type C with a diameter D_1 = 12,7 mm is designated as follows:

ISO 13948-2 - C - 12,7