INTERNATIONAL STANDARD

ISO 4038

Third edition
1996-02-15

Road vehicles — Hydraulic braking systems — Simple flare pipes, tapped holes, male fittings and hose end fittings

Véhicules routiers — Dispositifs de freinage hydraulique — Tuyauteries à simple renflement, logements, raccords mâles et embouts de flexibles

Reference number
ISO 4038:1996(E)

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.

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.

International Standard ISO 4038 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 2, *Brake systems and equipment*.

This third edition cancels and replaces the second edition (ISO 4038:1984), which has been technically revised.

Annex A of this International Standard is for information only.

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Road vehicles — Hydraulic braking systems — Simple flare pipes, tapped holes, male fittings and hose end fittings

1 Scope

This International Standard specifies the essential dimensions and physical characteristics for metallic pipes, pipes with single flares, tapped holes, male fittings, and hose end fittings used in hydraulic braking systems for road vehicles.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 9227:1990, *Corrosion tests in artificial atmospheres — Salt spray tests.*

3 Pipes

Pipes shall be made from double-walled rolled pipe of dimensions conforming to table 1.

Pipes may be flanged at both ends with male fittings (see figure 1). Flanges shall be as shown in figure 2 and table 2.

Pipes with additional plastic coating may be used; however, these pipes shall be compatible with male fittings, tapped holes, and flares as specified in this International Standard.

Steel tubes shall have the following mechanical characteristics:

tensile strength[1]:	⩾ 290 MPa
yield point:	⩾ 200 MPa
elongation at break[1]	⩾ 25 %
hardness:	⩽ 55 HR30T

The inner and outer surfaces of the tube shall be free from oxidation. The outer surface shall be protected against corrosion and shall withstand the NSS salt spray test in accordance with ISO 9227 for at least 96 h.

Table 1 — Dimensions of pipes

Dimensions in millimetres

Outside diameter of bare pipe[1]	D	nom.	4,75	6	8	10
		tol.	± 0,07	± 0,07	± 0,07	± 0,07
Wall thickness	e_1	nom.	0,7	0,7	0,7	0,7
		tol.	± 0,07	± 0,07	± 0,07	± 0,07
Outside diameter, with surface protection	D_1	max.	4,97	6,22	8,22	10,22
Minimum burst pressure		MPa[2]	110	85	67,5	55
Average mass per metre		kg/m	0,07	0,09	0,12	0,16

NOTE — The circumferential tolerance of the pipes shall be contained within the outside diameter tolerance.

1) Bare pipe means a pipe without surface treatment. Pipes which have been manufactured from surface-treated sheet material are considered to be bare pipes.

2) 1 MPa = 10 bar

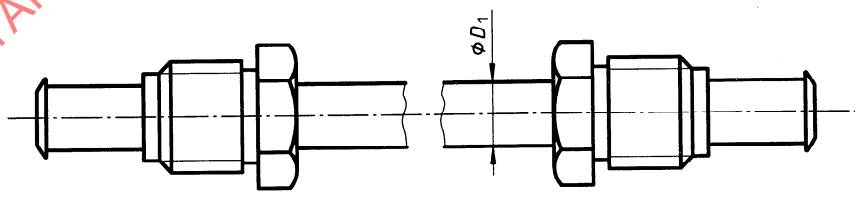


Figure 1 — Pipe flanged at both ends with male fittings

1) For pipes which are to be bent.

Dimensions in millimetres
Roughness values in micrometres

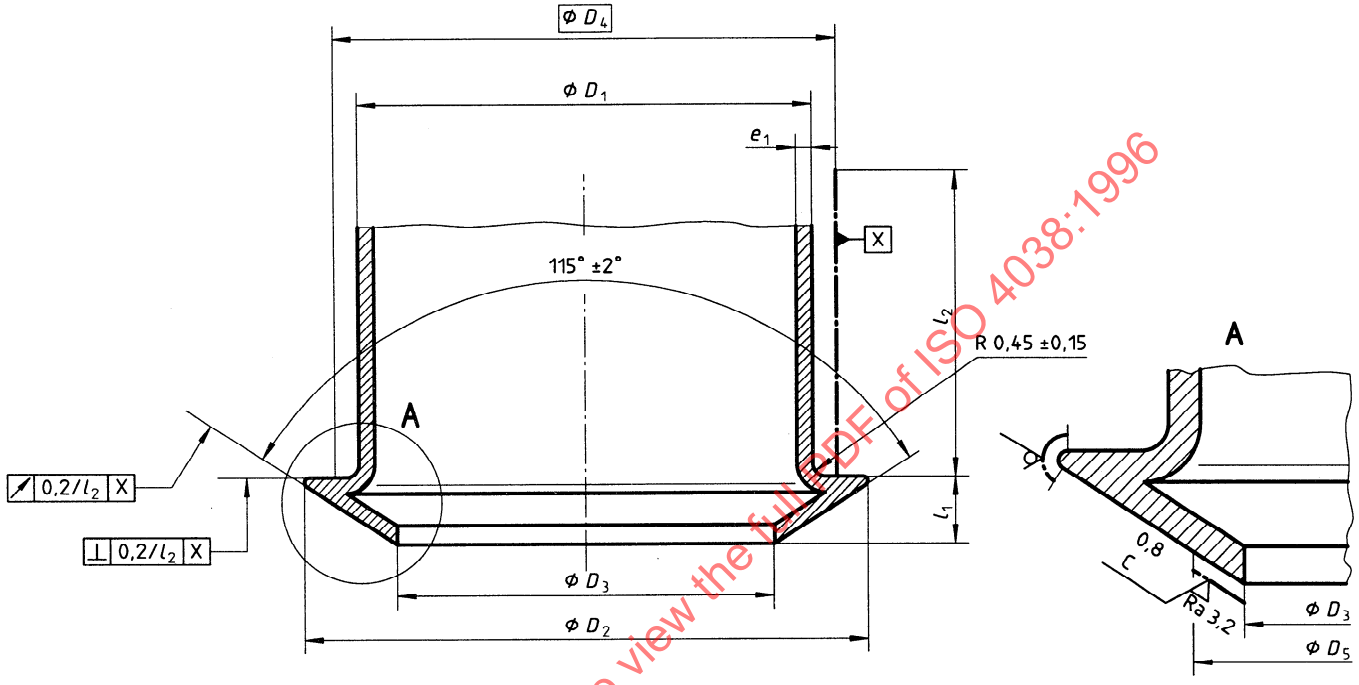


Figure 2 — Single flare

Table 2 — Dimensions of single flares

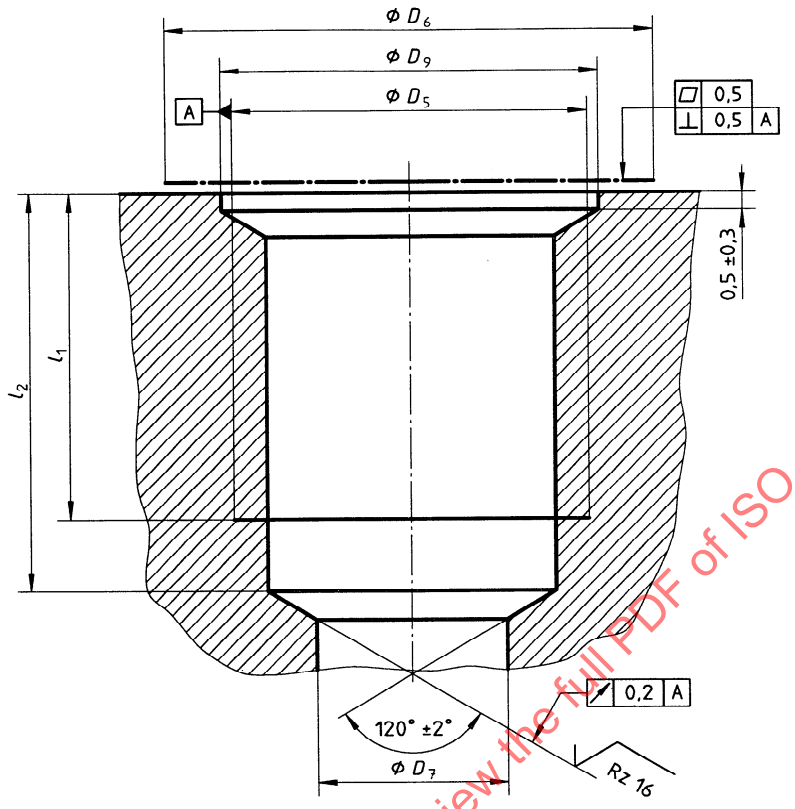
Dimensions in millimetres

Tube diameter D nom.	D_1 max.	D_2 js14	D_3 $^{+0,3}_{-0,2}$	D_4 ref.	D_5 min.	l_1 ± 0,3	l_2 min.
4,75	4,97	7,1	3,2	6	5,5	2,5	17
6	6,22	8,4	4,5	7,3	6,8	2,5	18
8	8,22	10,7	6,5	9,3	8,8	2,7	24
10	10,22	12,7	8,5	11,3	10,8	3	28

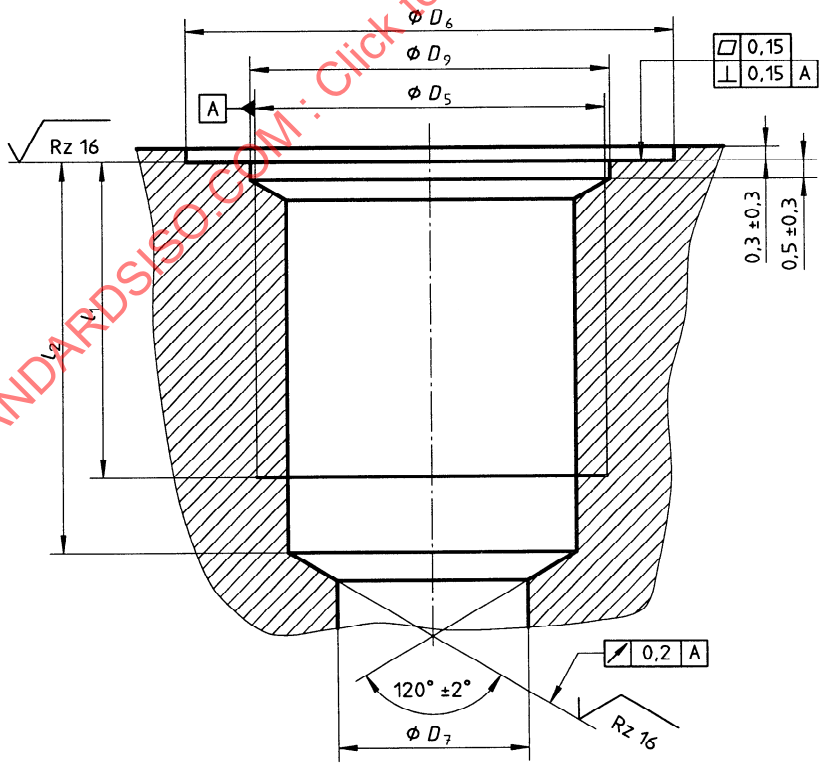
4 Tapped holes for cone sealing

Dimensions of tapped holes for cone sealing shall be as shown in figure 3 and table 3. At the discretion of the manufacturer, the hole entry may be as shown in figure 4.

Dimensions in millimetres
Roughness values in micrometres



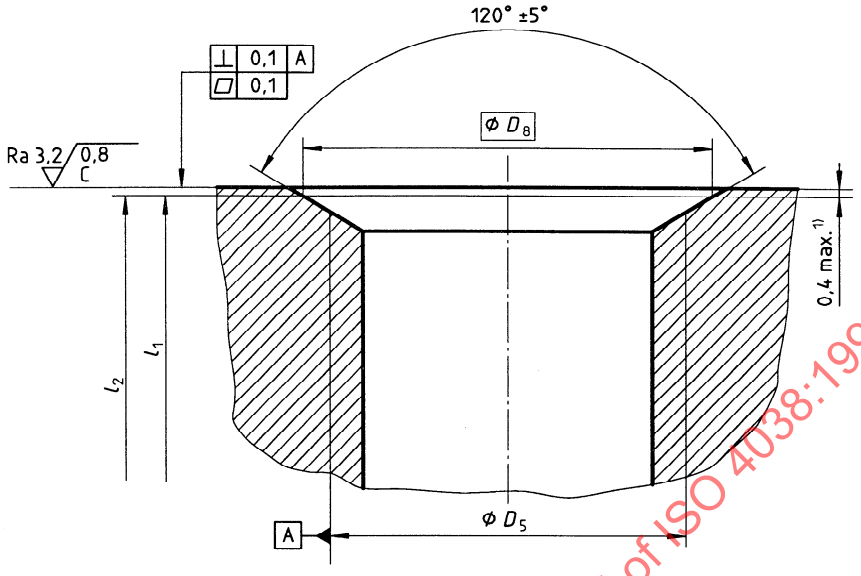
a) Type A: inside sealing only



b) Type B: inside and outside sealing

Figure 3 — Tapped holes for cone sealing

Dimensions in millimetres
Roughness values in micrometres



1) Does not apply to cases where outside seating is used.

Figure 4 — Optional hole entry

Table 3 — Dimensions of tapped holes for cone sealing

Dimensions in millimetres

Tube diameter D nom.	D_5 6H	D_6 min.	D_7 $^{0}_{-0,4}$	D_8 ref.	D_9 ± 0,2	l_1 min.	l_2 ± 0,25
4,75	M10 × 1	16	3,3	10,5	10,2	7,5	10
6	M12 × 1	18	4,6	12,5	12,2	9,5	12
8	M14 × 1,5	20	6,6	14,5	14,2	13,25	16,5
10	M16 × 1,5	22	8,6	16,5	16,2	14,25	17,5

5 Male fittings

Dimensions of male fittings shall be as shown in figure 5 and table 4.

Fittings shall withstand the following minimum torques:

fitting M10 × 1 : 30 N·m;

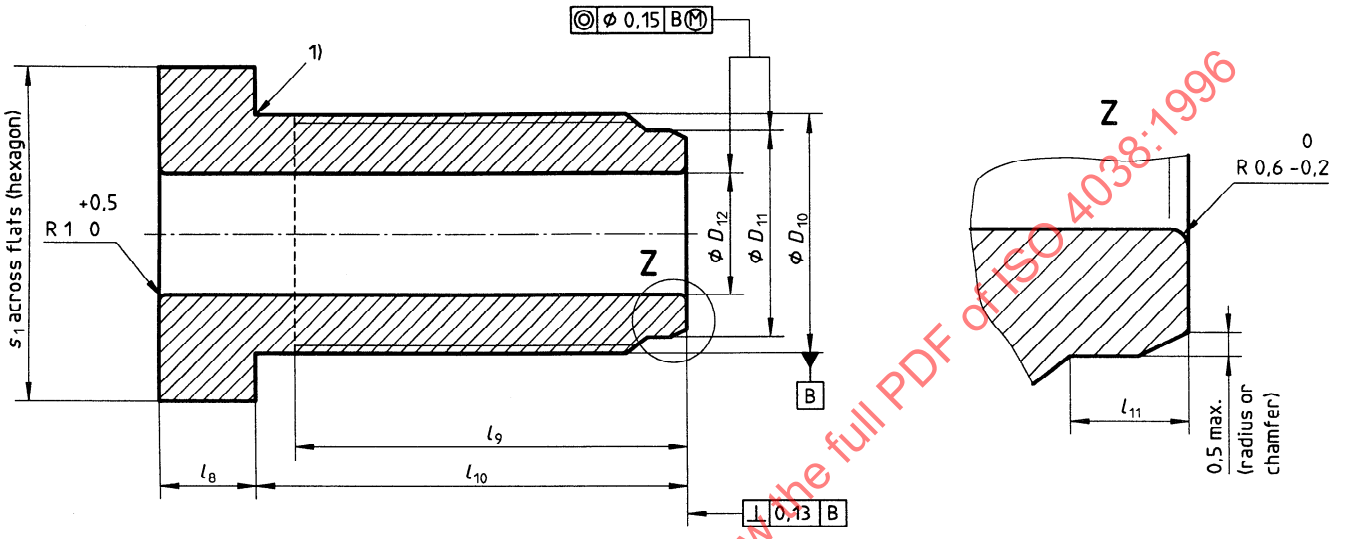
fitting M12 × 1 : 30 N·m;

fitting M14 × 1,5 : 35 N·m;

fitting M16 × 1,5 : 35 N·m.

The inner and outer surfaces of the fitting shall be free from oxidation. The outer surface shall be protected against corrosion and shall withstand the NSS salt spray test in accordance with ISO 9227 for at least 96 h.

Dimensions in millimetres



1) Throat optional ⌀ min. = D_{11}

Figure 5 — Male fittings

Table 4 — Dimensions of male fittings

Dimensions in millimetres

Tube diameter D nom.	D_{10} 6g	D_{11} $^{0}_{-0,2}$	D_{12} $^{+0,2}_{0}$	s_1 h13	l_8 $^{+1,5}_{0}$	l_9 min.	l_{10} js14	l_{11} $^{+0,5}_{0}$
4,75	M10 × 1	8,4	5,05	11	4	10	12,5	2,3
6	M12 × 1	10,4	6,3	13	5	12,5	15	2,3
8	M14 × 1,5	11,7	8,3	14	5	17	20,5	3,3
10	M16 × 1,5	13,7	10,3	17	5	18	21,5	3,3

6 Hose end fittings

Hose end fittings may be of the male type, conforming to figure 6 and table 5, or of the female type, conforming to figure 7 and table 6. They shall withstand a minimum torque of 35 N·m.

Dimensions in millimetres
Roughness values in micrometres

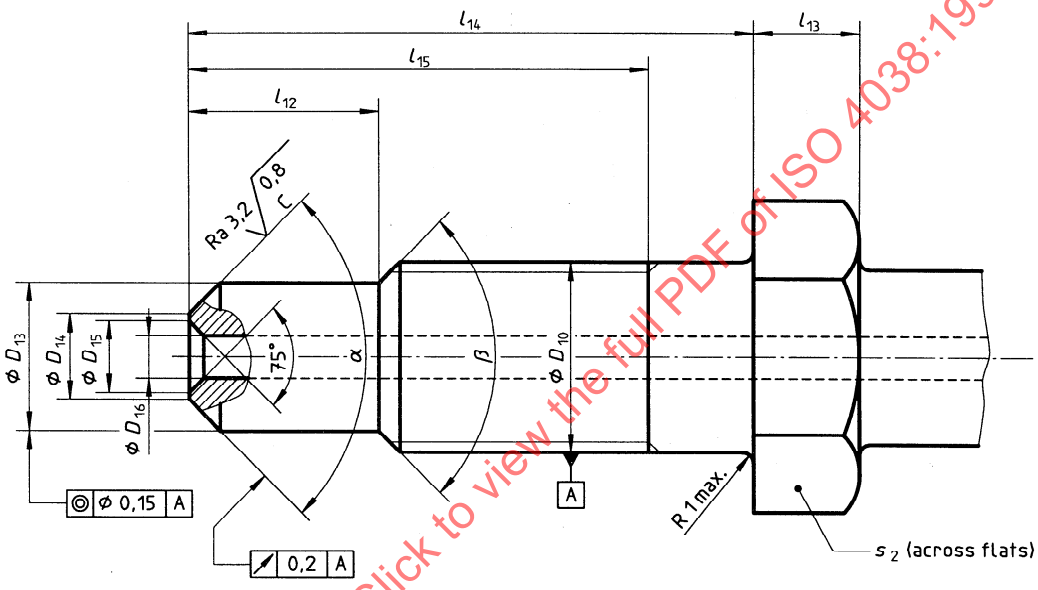


Figure 6 — Male hose end fittings for cone sealings

Table 5 — Dimensions of male hose end fittings

Dimensions in millimetres

D_{10} 6g	D_{13} h13	D_{14} $^{0}_{-0,4}$	D_{15} JS14	D_{16} $^{0}_{-0,4}$	s_2 h13	l_{12} $^{+0,5}_{0}$	l_{13} min.	l_{14} H14	l_{15} min.	α ± 2°	β $^{0°}_{-10°}$
M10 × 1	8,5	7	5,7	3,3	14	3	5	14	11,5	90°	90°
M12 × 1	10,5	9	7	4,6	17	3	5	16	13,5	90°	90°