International Standard ISO 4038

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Road vehicles — Hydraulic braking systems — Pipes, tapped holes, male fittings and hose end fittings

Véhicules routiers — Systèmes de freinage hydraulique — Tuyauteries, logements, raccords mâles et embouts de flexible

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Descriptors : road vehicles, braking systems, hydraulic brakes, pipes, (tubes), metal tubes, pipe fittings, specifications, dimensions, materials specifications.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4038 was developed by Technical Committee ISO/TC 22, *Road vehicles*, and was circulated to the member bodies in March 1981.

It has been approved by the member bodies of the following countries :

Austria	Iran	South Africa, Rep. of
Belgium	Japan	Spain
Brazil	Korea, Dem. P. Rep. of	Sweden
China	Korea, Rep. of	Switzerland
Czechoslovakia	Mexico	United Kingdom
Egypt, Arab Rep. of	Netherlands	USSR
France	New Zealand	
Germany, F.R.	Romania	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Italy
Poland
USA

This second edition cancels and replaces the first edition (i.e. ISO 4038-1977).

Printed in Switzerland

Road vehicles — Hydraulic braking systems — Pipes, tapped holes, male fittings and hose end fittings

1 Scope and field of application

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

2 References

The following International Standards will be needed to apply this International Standard :

ISO 1302, *Technical drawings — Method of indicating surface texture on drawings.*

ISO 3768, *Metallic coatings — Neutral salt spray test (NSS test).*

The following International Standards provide complementary information to this International Standard :

ISO 3996, *Road vehicles — Brake hose assemblies for hydraulic braking systems used with a non-petroleum base hydraulic fluid.*

ISO 6120, *Road vehicles — Brake hose assemblies for hydraulic braking systems used with petroleum base hydraulic fluid.*

3 Pipes

3.1 Pipes without flare

Double-walled, rolled pipe. (See table 1.)

Table 1 — Pipes

Dimensions and tolerances in millimetres

Outside diameter (Bare pipe[1])	D_1	nom.	4,75	6	8	10
		tol.	± 0,07	± 0,07	± 0,07	± 0,07
Wall thickness	B_1	nom.	0,7	0,7	0,7	0,7
		tol.	± 0,07	± 0,07	± 0,07	± 0,07
Outside diameter, D_1, with surface protection		max.	4,87	6,12	8,12	10,12
Minimum burst pressure		MPa (bar)	110 (1 100)	85 (850)	67,5 (675)	55 (550)
Average mass per metre		kg/m	0,07	0,09	0,12	0,16

1) In this connection, a bare pipe means a pipe without surface treatment (pipes which have been manufactured from surface-treated sheet material are considered as bare pipes).

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

NOTE — 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.

3.2 Pipes with flare

Pipes may also be flanged at both ends with male fittings. (See figures 1 and 2 and table 2.)

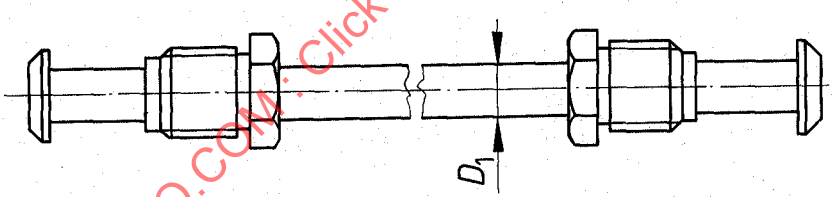

Figure 1

Table 2 — Flares

Dimensions and tolerances in millimetres

D_1	D_2 j_s14	D_3 + 0,3 − 0,2	D_4	D_5 min.	A_1 ± 0,3	E_1 min.
4,75	7,1	3,2	6,0	5,5	2,5	17
6,00	8,4	4,5	7,3	6,8	2,5	18
8,00	10,7	6,5	9,3	8,8	2,7	24
10,00	12,7	8,5	11,3	10,8	3,0	28

Dimensions and tolerances in millimetres

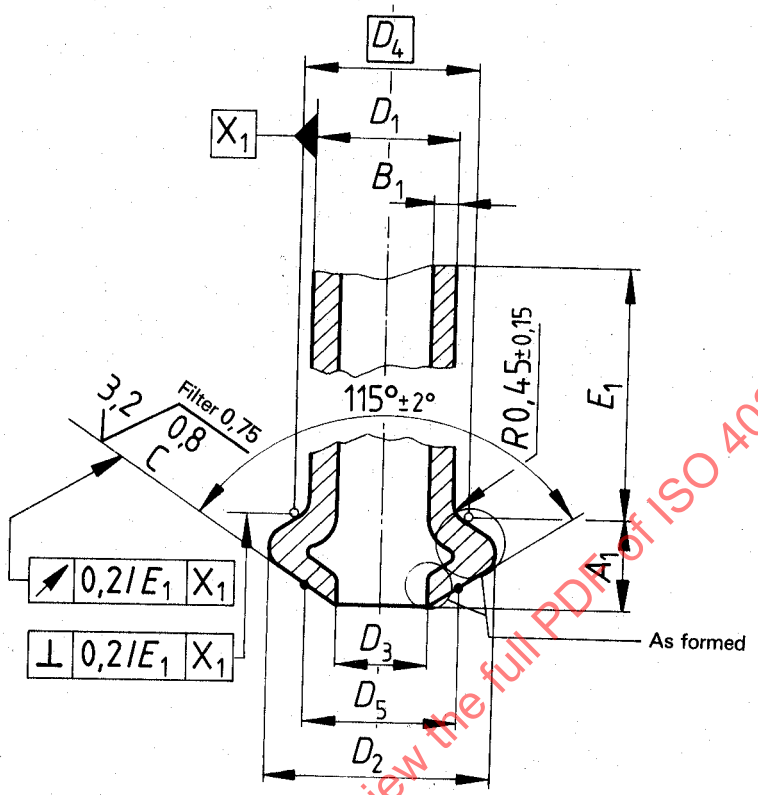

Figure 2

3.3 Material requirements

Table 3 — Material requirements

	Material	Steel[2]
Requirements	Tensile strength[1], MPa	> 290
	Yield point, MPa	> 200
	Elongation at break[1], %	> 25
	Hardness, Rockwell 30 T	< 55

1) For pipes which are to be bent.

2) "Siemens-Martin" steel or "Luft Dusche" steel.

3.4 Condition

The inner and outer surfaces shall be free from oxidation. The outer surface shall be protected against corrosion and shall withstand the salt spray test according to ISO 3768 for at least 96 h.

4 Tapped holes for cone sealing

(See figures 3 and 4 and tables 4 and 5.)

Dimensions and tolerances in millimetres

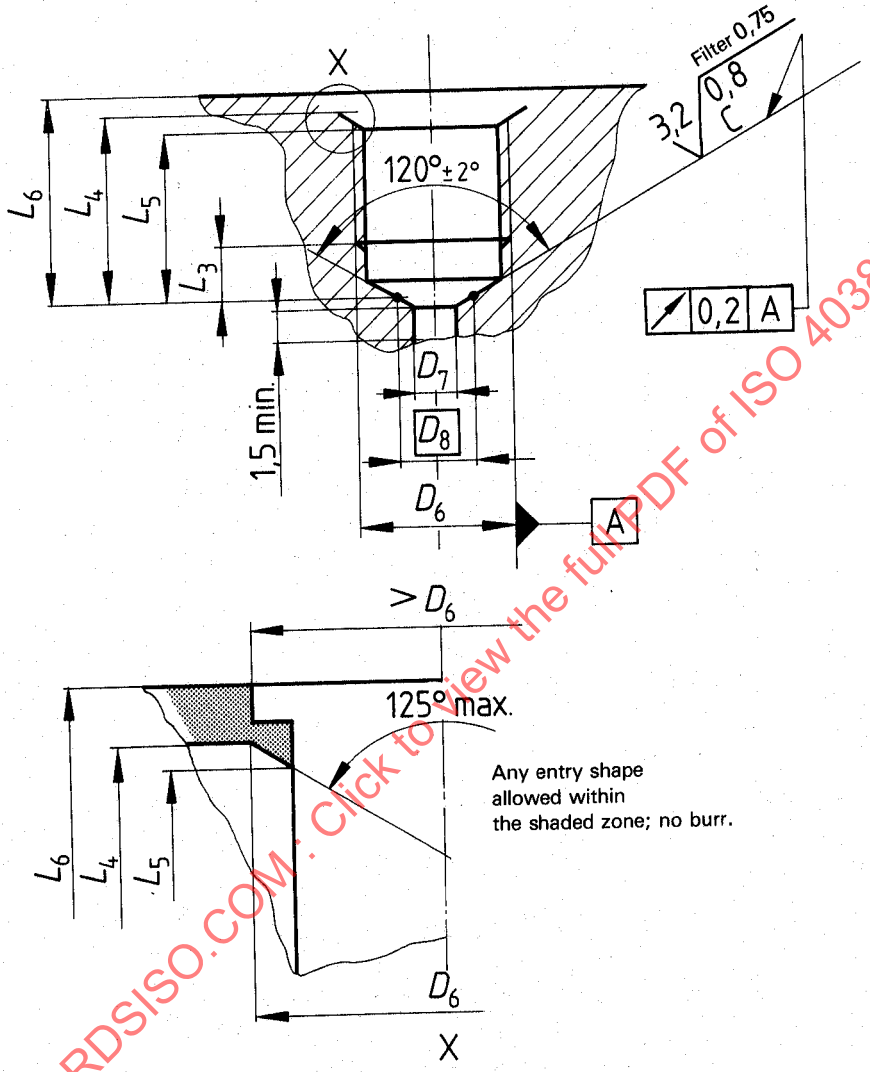

Figure 3 — Minimum requirements for functional dimensions

Table 4 — Tapped holes (minimum requirements for functional dimensions)

Dimensions and tolerances in millimetres

D_6 6H	D_7 $^{0}_{-0,4}$	D_8	L_3 max.	L_4 max.	L_5 min.	L_6 max.
M10 × 1	3,3	5,4	3,87	10,99	9,97	12,00
M12 × 1	4,6	7	3,99	13,11	12,08	14,20
M14 × 1,5	6,6	8,7	4,60	17,47	16,35	19,60
M16 × 1,5	8,6	10,7	4,60	18,47	17,35	20,60

Dimension and tolerances in millimetres

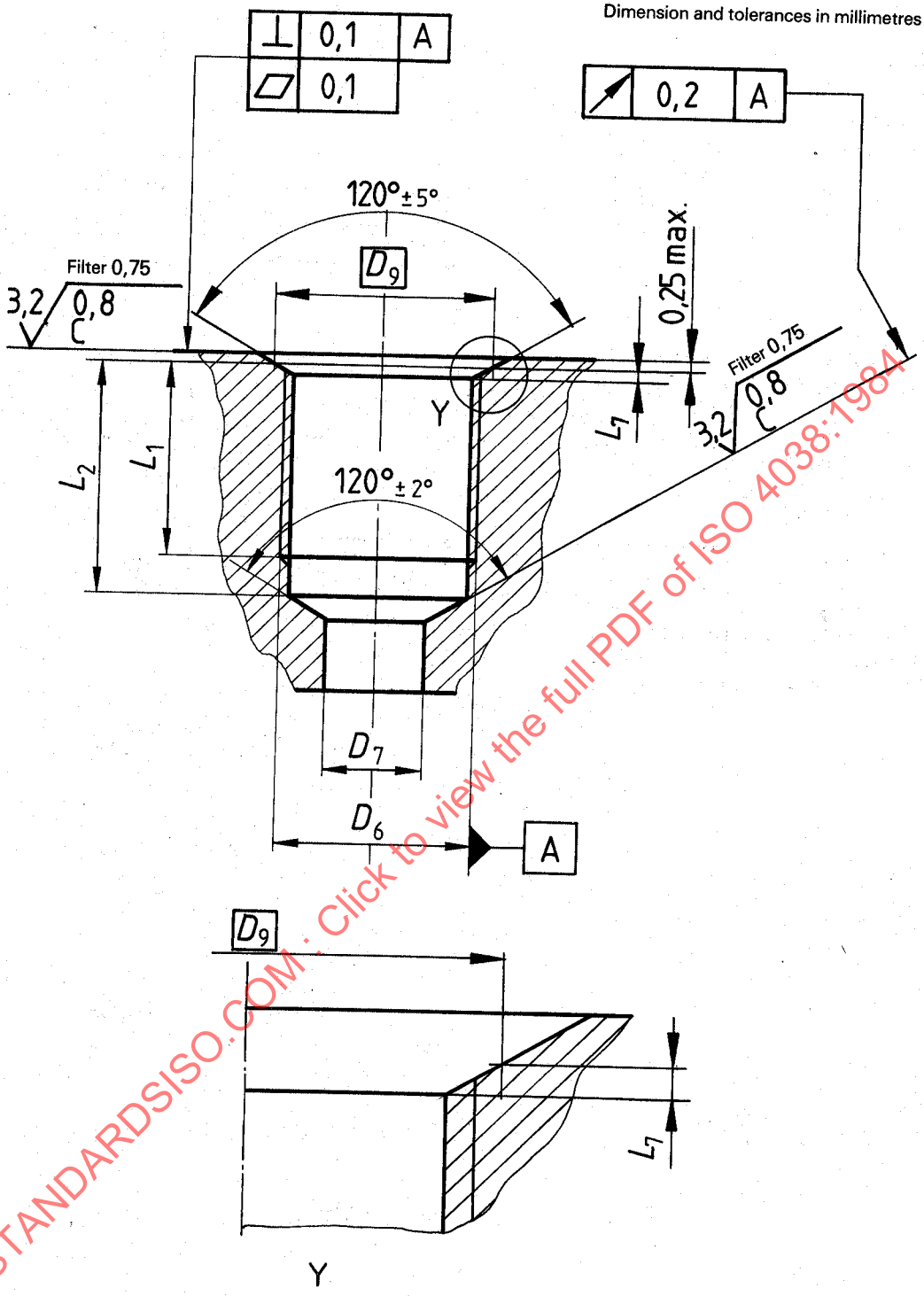

Figure 4 — Recommended execution

Table 5 — Tapped holes (recommended execution)

Dimensions and tolerances in millimetres

D_6 6H	D_7 $^{0}_{-0,4}$	D_9	L_1 min.	L_2 $^{0}_{-0,5}$	L_7 min.	L_7 max.
M10 × 1	3,3	10,5	7,25	10	0,35	0,50
M12 × 1	4,6	12,5	9,25	12		
M14 × 1,5	6,6	14,5	13	16,5	0,47	0,68
M16 × 1,5	8,6	16,5	14	17,5		

5 Male fittings

5.1 Dimensions

Dimensions and tolerances in millimetres

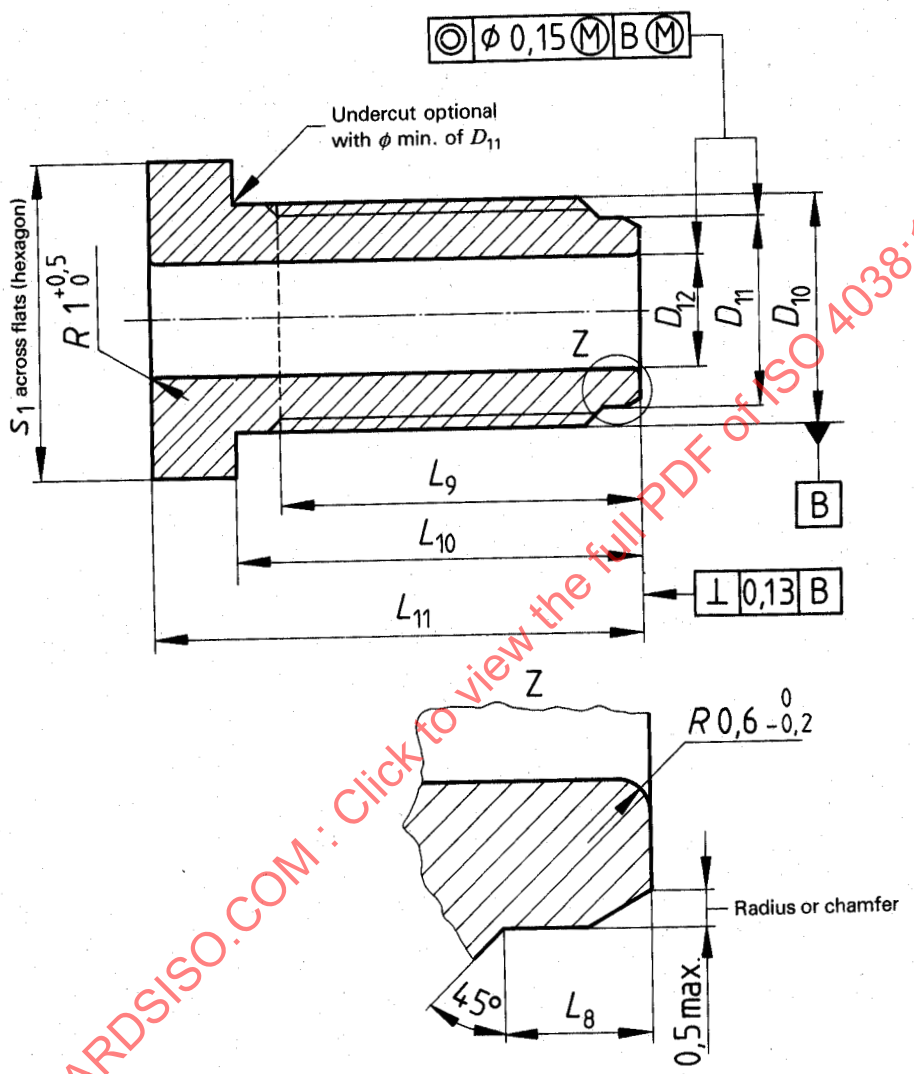

Figure 5 — Male fittings

Table 6 — Male fittings

Dimensions and tolerances in millimetres

Pipe diameter D_1	D_{10} 6g	D_{11} $^{0}_{-0,2}$	D_{12} H13	s_1 h13	L_8 $^{+0,5}_{0}$	L_9 min.	L_{10} j_s14	L_{11} j_s14
4,75	M10 × 1	8,4	5	11	2,3	10	12,5	16,5
6	M12 × 1	10,4	6,2	13	2,3	12,5	15	20
8	M14 × 1,5	11,7	8,2	14	3,3	17	20,5	25,5
10	M16 × 1,5	13,7	10,2	17	3,3	18	21,5	26,5

5.2 Condition

The inner and outer surfaces shall be free from oxidation. The outer surface shall be protected against corrosion and shall withstand the salt spray test according to ISO 3768 for at least 48 h.

5.3 Physical characteristics

Failure torque

M10 × 1 ⩾ 25 N·m

M12 × 1 ⩾ 25 N·m

M14 × 1,5 ⩾ 35 N·m

M16 × 1,5 ⩾ 35 N·m

6 Hose end fittings

6.1 Male hose end fitting for cone sealings

Tolerances in millimetres

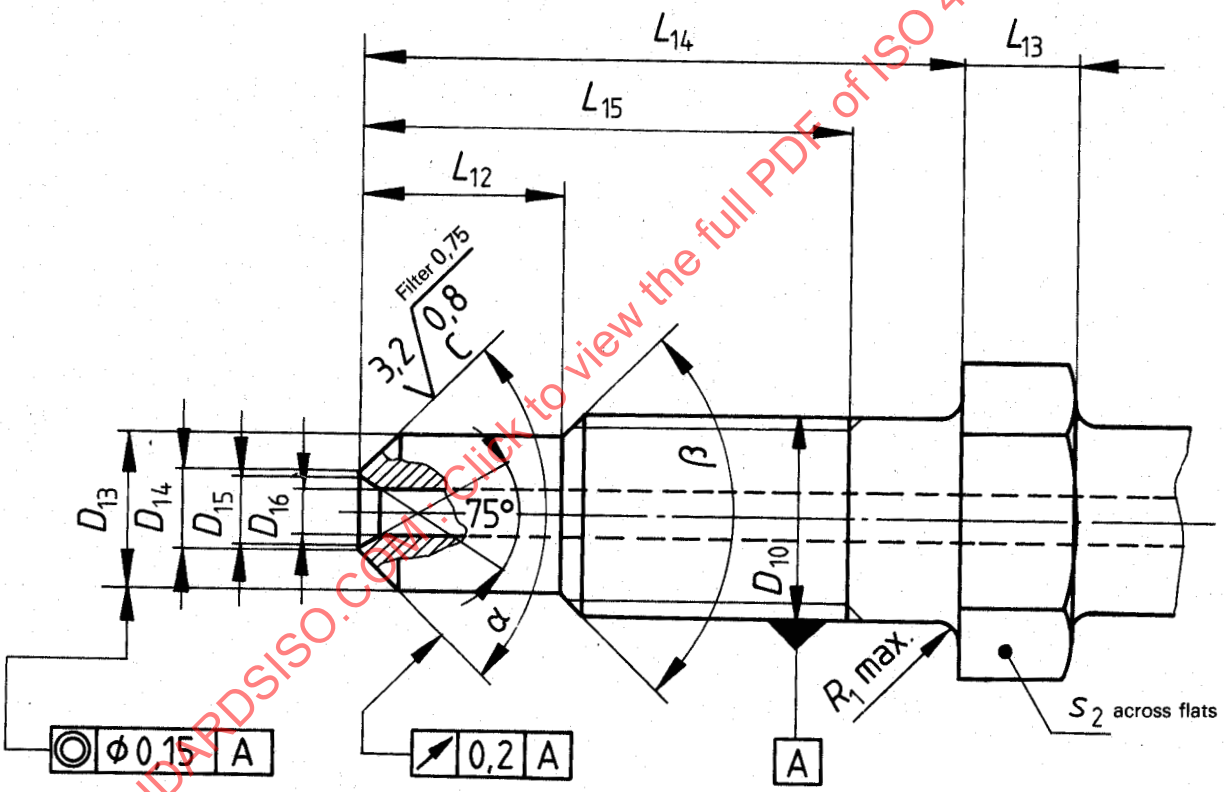

Figure 6

Table 7

Dimensions and tolerances in millimetres

D_{10} 6g	D_{13} h13	D_{14} $^{0}_{-0,4}$	D_{15} j_s14	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°	Failure torque min. N·m
M10 × 1	8,5	7	5,7	3,3	14	3	5	14	11,5	90°	90°	35
M12 × 1	10,5	9	7	4,6	17	3	5	16	13,5	90°	90°	35