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BRITISH STANDARD

BS 5200:1997

Incorporating Amendment No. 1

Specification for

Dimensions of hydraulic connectors and adaptors

ICS 23.100.30

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee MCE/18, Fluid power systems and components, upon which the following bodies were represented:

Association of British Mining Equipment Companies
British Compressed Air Society
British Fluid Power Association
British Hydrodynamics Research Association
Department of Trade and Industry (National Engineering Laboratory)
Ministry of Defence
University of Bath

The following bodies were also represented in the drafting of the standard, through a subcommittee panel:

British Iron and Steel Producers' Association
Engineering Equipment and Materials Users' Association

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Foreword

This revision of BS 5200 has been prepared by Technical Committee MCE/18 and supersedes BS 5200:1986, which is withdrawn. An improved design of "O"-ring seal nipple which is in general use in the fluid power industry is now incorporated. Male thread undercut details have also been added to suit bonded washer type seals. Maximum working pressure specifications have been revised so as to be consistent with current hose standards.

Table 2, Figure 1 and Figure 3 have been corrected by Amendment No. 1.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 18, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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1 Scope

This British Standard specifies the basic dimensions necessary to ensure interchangeability of hydraulic connectors and adaptors for connecting rigid and flexible tubing to hydraulic fluid power system components.

Fourteen styles of adaptor and five styles of hose fitting are specified. Adaptors and hose fittings have been allocated style designation letters and female end fittings type designation letters, according to their shape and dimensions.

For female ends, a conventional plain nipple is specified for face sealing and a nipple with a groove for "O"-ring sealing. The appropriate "O"-rings for use with the fittings and adaptors are also specified.

A spherical seating is specified as an alternative to the female conical seating, provided that all other limiting dimensions are maintained.

This standard specifies maximum working pressures but does not specify materials, production processes or dimensions that are not related to interchangeability.

NOTE 1 Hose fitting styles B, D, E and G may be made from swept elbow bends as specified in BS 5327.
NOTE 2 It is the responsibility of the designer to ensure that materials and production processes are compatible with the fluids to be encountered in service.

2 References

2.1 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Dimensions

The dimensions and details of the end interfaces and the maximum envelope dimensions for hose fittings and adaptors shall be in accordance with the tables and figures given in Table 1.

NOTE The dimensions quoted in these tables apply after any surface treatment.

4 Screw threads

All screw threads shall be in accordance with BS 2779 and all external threads shall be in accordance with class A tolerances of that standard.

5 Thread undercuts

All thread undercuts for male adaptors shall be in accordance with Form B of BS 1936-1:1952 except those for "O"-rings which shall be in accordance with BS 5380.

NOTE Where the male adaptor is used as a stud fitting with bonded washer type seals the undercut should be in accordance with Figure 23 and Table 11.

6 Sealing surfaces

All sealing surfaces shall be smooth and shall have the surface texture specified in Figure 1, Figure 2, Figure 3 and Figure 23, when measured in accordance with BS 1134-1.

7 Maximum working pressure

Every fitting and adaptor shall be capable of withstanding, without deformation, the pressure specified in Table 10.

8 Marking

8.1 Each fitting or adaptor shall be permanently marked with either:

a) the manufacturer's name or trademark and the designations listed 1) to 4)[1)]:

1) the number of this British Standard, i.e. BS 5200;

2) the relevant style letter of the hose fitting or adaptor (see Table 1);

3) the relevant type letter of female ends:

i) type C, with conical sealing nipple (see Figure 2 and Table 2); or

ii) type O, with "O"-ring sealing nipple (see Figure 1 and Table 2); or

iii) type S, with spherical sealing nipple (see Figure 2 and Table 2);

[1)] Marking BS 5200:1996 on or relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

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4) the thread designation or hose internal diameter (i.d.) (see Table 2 to Table 10); or

b) the manufacturer's name or trademark and a code identifier which shall be correlated with the designations of 1) to 4) in the manufacturer's literature.

8.2 The following are examples of designations:

a) BS 5200-AO-G ½ to identify a G ½ threaded straight hose fitting with an "O"-ring sealing nipple, for 12.5 mm hose;

b) BS 5200-LC-G ¾ to identify a 90° male-female G ¾ threaded adaptor with a conical sealing nipple;

c) BS 5200-R-G 2 to identify a 135° male-male G 2 threaded "O"-ring adjustable adaptor.

9 Threaded ports

Threaded port dimensions to accommodate male adaptors, when used as stud fittings, shall be in accordance with BS 4368-1 and BS 4368-3. Spot facing, if necessary, shall be compatible with the appropriate bonded washer seal.

NOTE It is advisable to refer to the bonded seal manufacturer's recommendations.

The port dimensions of "O"-ring sealing shall be in accordance with BS 5380.

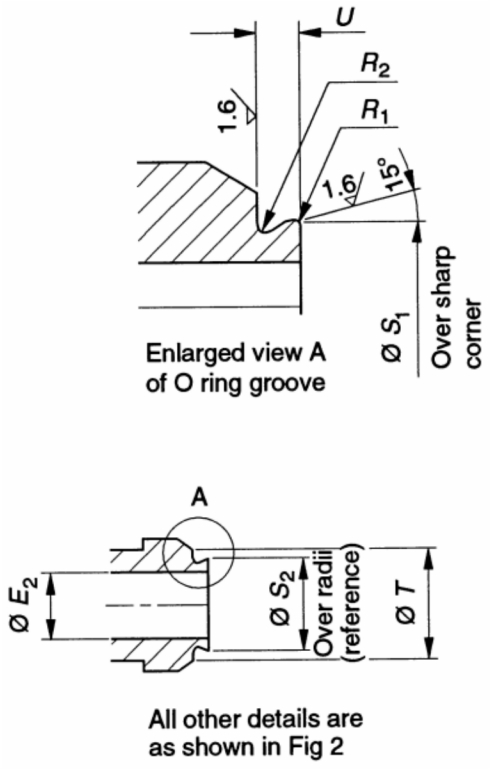


Figure 1 — Details of female end with "O"- ring sealing nipple (Type O)

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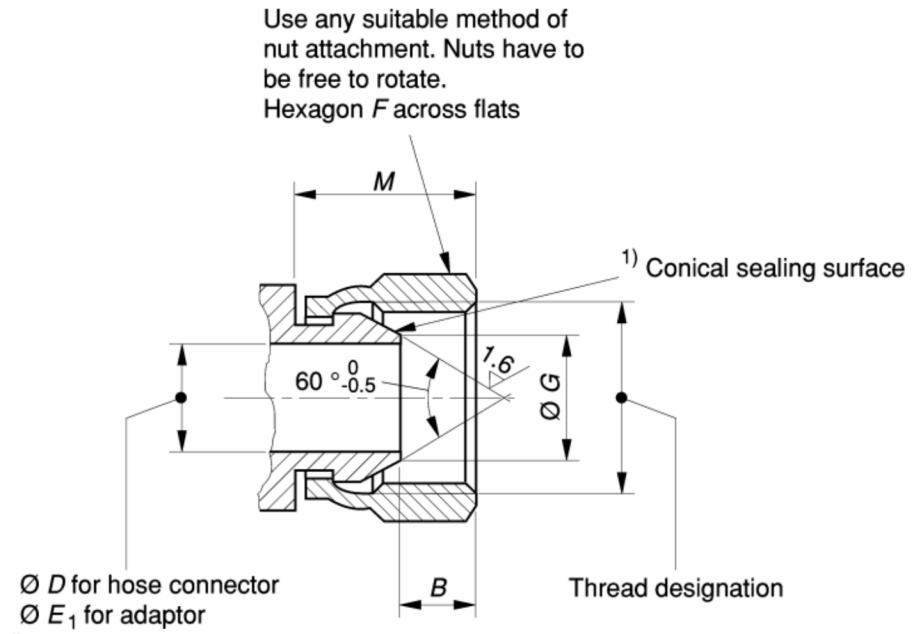
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Table 1 — Summary of tables of dimensions and related figures

Description of hose fitting or adaptor	End details		Complete hose fitting or adaptor	Style (and type of end[a])
	End no. 1	End no. 2		
Hose fittings				
straight	Figure 1 and Figure 2, Table 2	—	Figure 4, Table 3	A[a]
90° tubular elbow	Figure 1 and Figure 2, Table 2	—	Figure 5, Table 3	B[a]
135° tubular elbow	Figure 1 and Figure 2, Table 2	—	Figure 6, Table 3	D[a]
90° block elbow	Figure 1 and Figure 2, Table 2	—	Figure 7, Table 3	E[a]
135° block elbow	Figure 1 and Figure 2, Table 2	—	Figure 8, Table 3	G[a]
Male-male adaptors				
straight	Figure 3, Table 2	Figure 3, Table 2	Figure 9, Table 4	H
90°	Figure 3, Table 2	Figure 3, Table 2	Figure 10, Table 4	I
135°	Figure 3, Table 2	Figure 3, Table 2	Figure 11, Table 4	J
tee	Figure 3, Table 2	Figure 3, Table 2	Figure 12, Table 4	K
Male-female adaptors				
straight	Figure 3, Table 2	Figure 1 and Figure 2, Table 2	Figure 13, Table 5	L[a]
90°	Figure 3, Table 2	Figure 1 and Figure 2, Table 2	Figure 14, Table 5	N[a]
135°	Figure 3, Table 2	Figure 1 and Figure 2, Table 2	Figure 15, Table 5	p[a]
Straight "O"-ring adaptors				
male-male	Figures 1 and 2 of BS 5380:1984	Figure 3, Table 2	Figure 16, Table 6	Q
male-female	Figures 1 and 2 of BS 5380:1984	Figure 1 and Figure 2, Table 2	Figure 17, Table 6	R[a]
"O"-ring adjustable adaptors				
90° male-male	Figure 3, Table 2	Figure 3 of BS 5380:1984	Figure 18, Table 7	T
135° male-male	Figure 3, Table 2	Figure 3 of BS 5380:1984	Figure 19, Table 7	U
90° male-female	Figure 3 of BS 5380:1984	Figure 1 and Figure 2, Table 2	Figure 20, Table 8	V[a]
135° male-female	Figure 3 of BS 5380:1984	Figure 1 and Figure 2, Table 2	Figure 21, Table 8	W[a]
Bulkhead adaptor male-male	Figure 3, Table 2	Figure 3, Table 2 and Table 9	Figure 22, Table 9	X

[a] Type letter as listed in **8.1** a).

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1) It is acceptable for the conical seating surface to be replaced by a spherical seating, provided all other limiting dimensions are maintained.

Figure 2 — Details of end for hose connectors and for female adaptors, with either conical or spherical sealing nipples (types C and S)

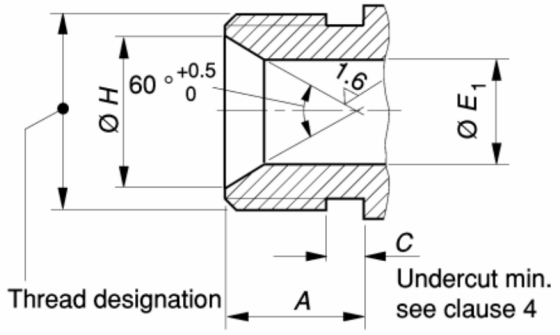


Figure 3 — Details of end for male adaptors

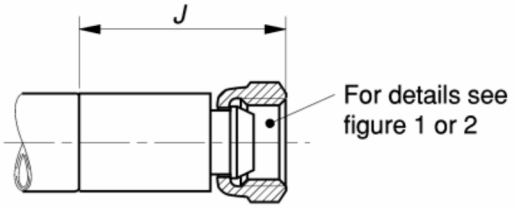


Figure 4 — Straight hose fitting (style A)

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Table 2 — Dimensions of hose fitting and adaptor ends

Thread size	Hose i.d nominal	A	B	C	D	E_1	E_2	F	G	H	M	Sealing ring groove						"O" ring ref no.[b]
					min.		max.	nom.			max.	S_1	S_2 Ref	T	U	R_1	R_2	
	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm			
		Tolerances																
		± 0.25	± 0.50	± 0.25		± 0.25			± 0.12	± 0.15		± 0.05		+0.10 0	+0.10 0	+0.10 0	+0.10 0	
G ⅛	5.0	8	4.3	2	3.0	3.5	—	14	5.6	7.5	16	—	—	—	—	—	—	—
G ¼	6.3	11	5.2	3	4.0	4.7	4.5	19	7.2	10.4	17	7.49	7.37	9.00	1.22	0.15	0.15	Special[c]
G ⅜	10.0	12	6.0	3	7.0	7.9	7.1	22	10.4	14.0	19	10.02	9.80	12.67	1.98	0.30	0.36	0081-16
G ½	12.5	14	6.5	4	9.0	11.1	9.7	27	13.5	17.5	22	13.07	12.85	15.72	1.98	0.30	0.36	0121-16
G ⅜[a]	16.0	16	9.7	4	12.0	14.3	12.0	30	16.8	19.3	25	15.11	14.90	17.77	1.98	0.30	0.36	0131-16
G ¾	19.0	16	8.7	4	14.0	16.7	15.5	32	19.0	22.9	25	18.66	18.44	21.31	1.98	0.30	036	0171-16
G 1	25.0	19	10.5	5	19.0	22.2	21.4	41	24.6	28.7	32	23.81	23.59	26.47	1.98	0.30	0.36	0221-16
G 1¼	31.5	20	10.1	5	26.0	28.6	27.0	50	31.1	36.8	33	30.72	30.51	33.37	1.98	0.30	0.36	0291-16
G 1½	38.0	22	12.5	5	32.0	33.3	31.8	55	37.2	42.7	37	36.89	36.68	39.55	1.98	0.30	0.36	0351-16
G 2	51.0	25	16.1	5	42.0	46.0	44.5	70	50.0	54.6	40	49.41	49.20	52.31	2.21	0.30	0.36	032[d]

[a] Described in BS 2779 as a non-preferred size
[b] In accordance with BS 4518 (Except for that described as "special")
[c] Internal Ø 6.5 ± 0.15 mm
Section Ø 1.0 ± 0.07 mm
[d] In accordance with BS 1806
Unless otherwise agreed between purchaser and supplier "O"-rings shall be made from nitrile (NBR) rubber with a hardness of $^{+10}_{0}$ IRHD

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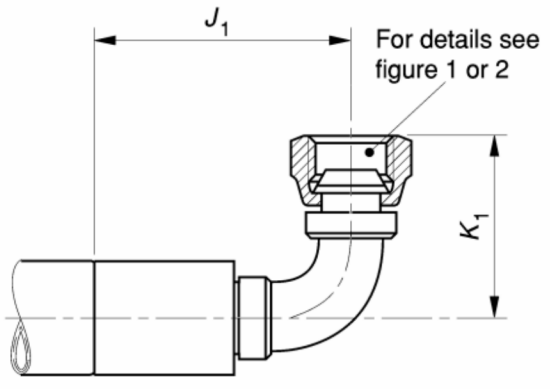


Figure 5 — 90° tubular elbow hose fitting (style B)

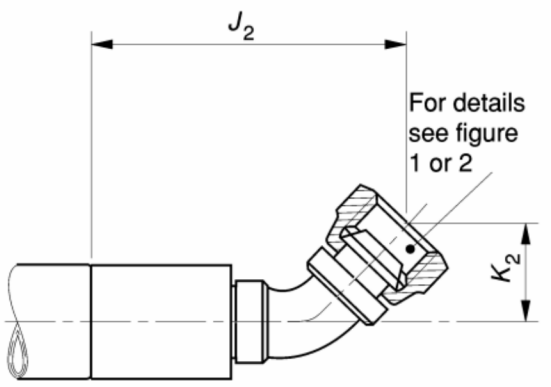


Figure 6 — 135° tubular elbow hose fitting (style D)

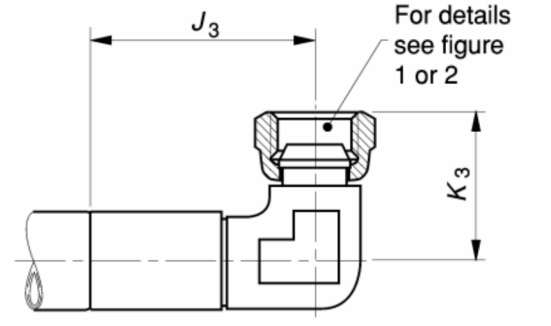


Figure 7 — 90° block elbow hose fitting (style E)

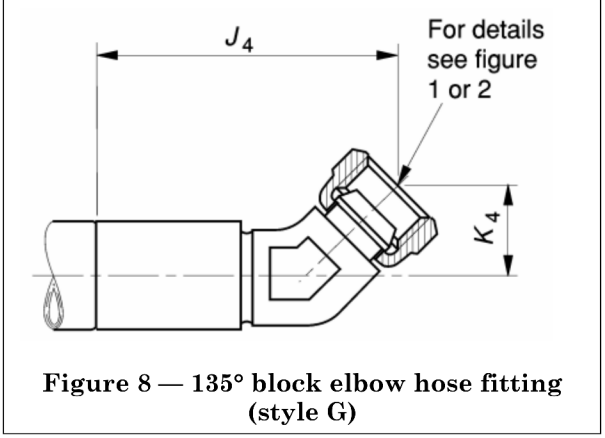
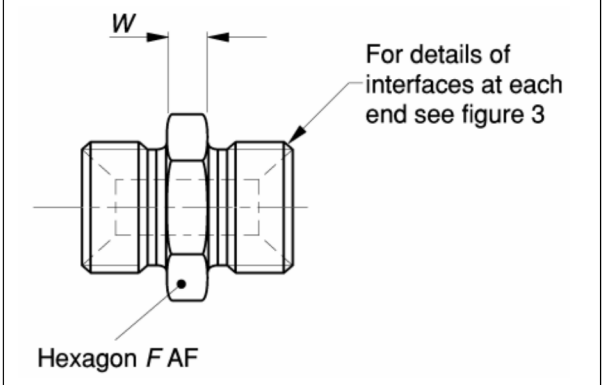


Figure 8 — 135° block elbow hose fitting (style G)



NOTE This fitting may also be used as a stud fitting in association with bonded washer type seals (subject to pressure limitations).

Figure 9 — Straight male-male adaptor (style H)

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Table 3 — Dimensions of hose fittings

Hose i.d. nominal mm	Thread designation	J max. mm	K_1 max. mm	J_1 max. mm	K_2 max. mm	J_2 max. mm	K_3 max. mm	J_3 max. mm	K_4 max. mm	J_4 max. mm
5.0	G ⅛	49	33	47	20	69	33	50	20	68
6.3	G ¼	66	42	59	25	78	34	54	21	68
10.0	G ⅜	69	50	71	28	89	38	59	24	76
12.5	G ½	73	59	85	32	102	43	68	27	86
16.0	G ⅝[a]	76	66	89	34	107	50	72	31	94
19.0	G ¾	89	83	103	43	130	55	81	32	101
25.0	G 1	105	93	128	48	150	61	95	36	111
31.5	G 1¼	117	104	143	52	170	65	109	37	122
38.0	G 1½	120	121	169	57	200	72	120	47	141
51.0	G 2	140	129	215	69	232	94	136	74	177

[a] Described in BS 2779 as a non-preferred size.

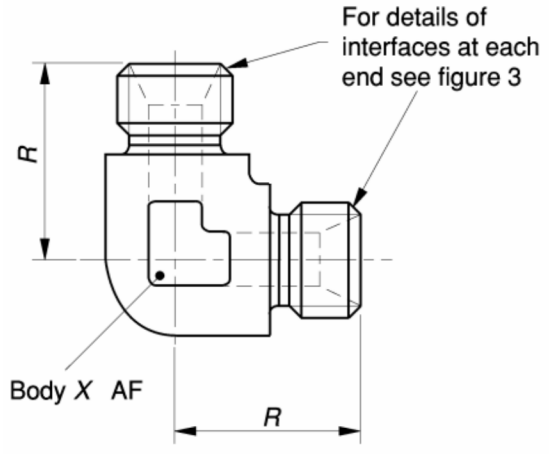


Figure 10 — 90° male-male adaptor (style I)

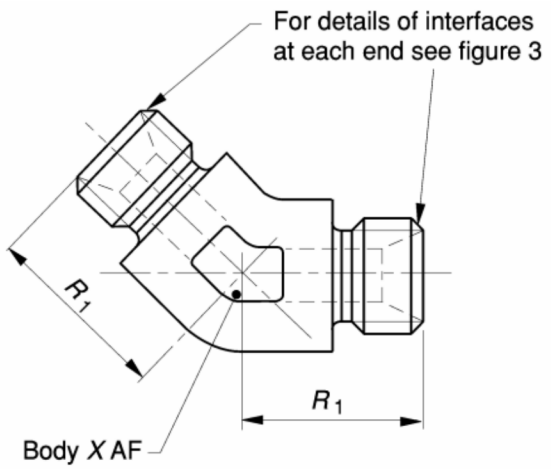


Figure 11 — 135° male-male adaptor (style J)

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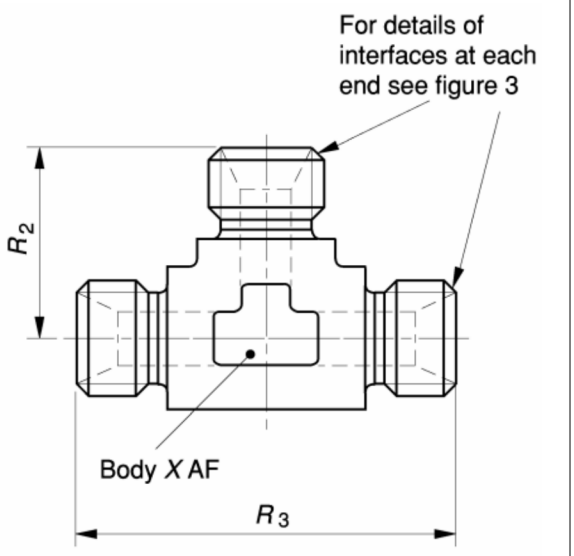
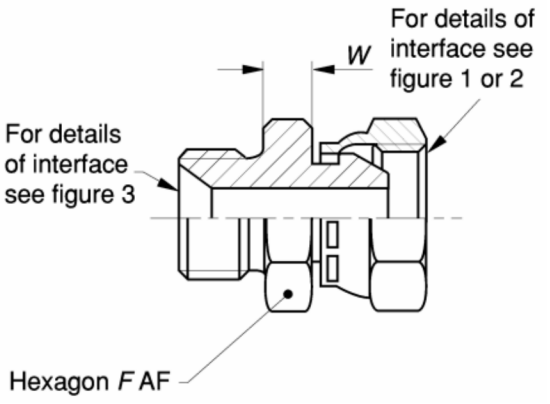


Figure 12 — Male-male tee adaptor (style K)



NOTE This fitting may also be used as a stud fitting in association with bonded washer type seals (subject to pressure limitations).

Figure 13 — Straight male-female adaptor (style L)

Table 4 — Dimensions of male-male adaptors

Thread designation	F nom. mm	R mm	R_1 mm	R_2 mm	R_3 mm	W mm	X nom. mm
	Tolerances						
		+3.0 0	+3.0 0	+3.0 0	+3.0 0	+0.5 0	
G ⅛	14	25.4	20.3	22.2	44.5	5	17
G ¼	19	25.4	20.3	22.2	44.5	7	17
G ⅜	22	28.5	22.8	25.4	50.8	8	22
G ½	27	32.5	25.5	30.5	61.0	10	24
G ⅝[a]	30	36.5	28.9	31.7	63.5	12	27
G ¾	32	41.3	31.2	38.1	76.2	12	32
G 1	41	44.5	33.7	44.4	88.9	15	41
G 1¼	50	50.8	35.5	50.8	101.6	19	50
G 1½	55	59.0	45.2	57.0	114.0	23	55
G 2	70	77.5	56.4	63.0	126.0	29	70

[a] Described in BS 2779 as a non-preferred size.

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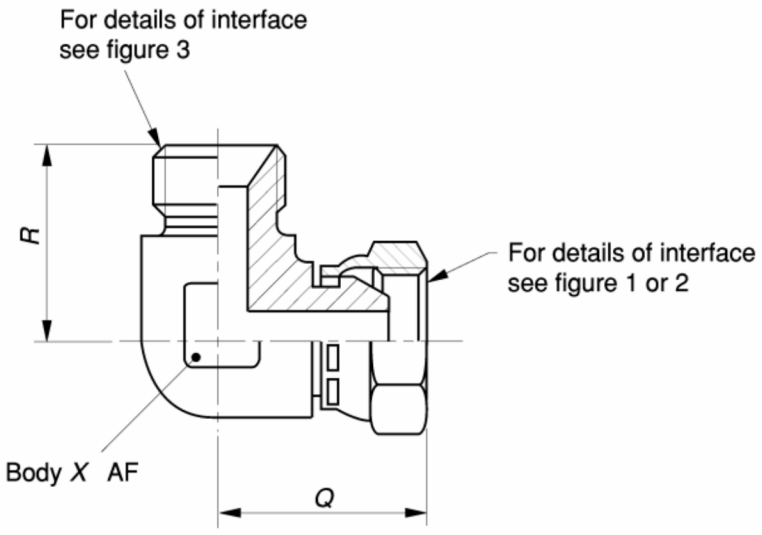


Figure 14 — 90° male-female adaptor (style N)

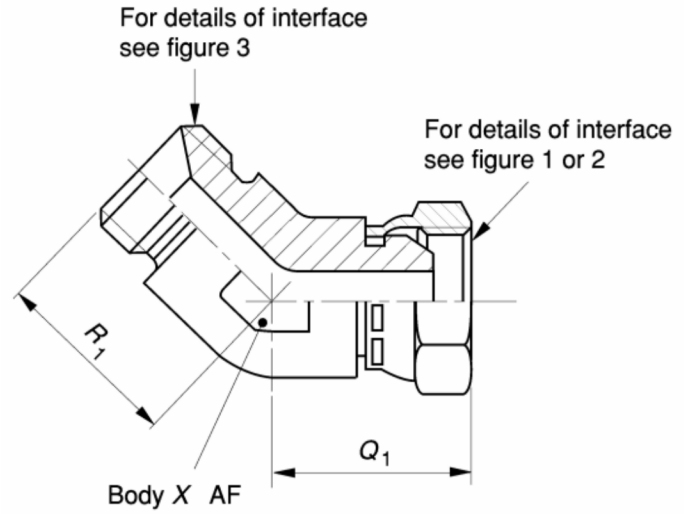


Figure 15 — 135° male-female adaptor (style P)

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Table 5 — Dimensions of male-female adaptors

Thread designation	*F* nom. mm	*Q* mm	*R* mm	Q_1 mm	R_1 mm	*W* mm	*X* nom. mm
	Tolerances						
		$^{0}_{-3.0}$	$^{+3.0}_{0}$	$^{+3.0}_{-3.0}$	$^{+3.0}_{0}$	$^{+0.5}_{0}$	
G ⅛	14	32	25.4	27	20.3	5	17
G ¼	19	34	25.4	29	20.3	7	17
G ⅜	22	38	28.5	33	22.8	8	22
G ½	27	44	32.5	37	25.5	10	24
G ⅝[a]	30	50	36.5	43	28.9	12	27
G ¾	32	55	41.3	45	31.2	12	32
G 1	41	61	44.5	50	33.7	15	41
G 1¼	50	66	50.8	51	35.5	19	50
G 1½	55	72	59.0	58	45.2	23	55
G 2	70	94	77.5	73	56.4	29	70

[a] Described in BS 2779 as a non-preferred size.

Table 6 — Dimensions of adaptors with "O"-ring sealing

Thread designation	*F* nom. mm	*L* max. mm	*N* min. mm	*P* nom. mm	*W* mm	"O"-ring ref. no.[b]
	Tolerances					
					$^{+0.5}_{0}$	
G ⅛	14	10.5	1.0	14	5	0081-16
G ¼	19	11.0	1.5	18	7	0101-16
G ⅜	22	12.5	2.0	22	8	0136-24
G ½	27	15.0	2.5	26	10	0176-24
G ⅝[a]	30	16.3	2.5	30	12	0195-30
G ¾	32	16.3	2.5	32	12	0225-30
G 1	41	19.1	2.5	39	15	0295-30
G 1¼	50	21.4	2.5	49	19	0365-30
G 1½	55	22.5	2.5	55	23	0425-30
G 2	70	25.7	3.0	68	29	0545-30

NOTE These adaptors are suitable for assembly with ports in accordance with BS 5380.

[a] Described in BS 2779 as a non-preferred size.

[b] In accordance with BS 4518.

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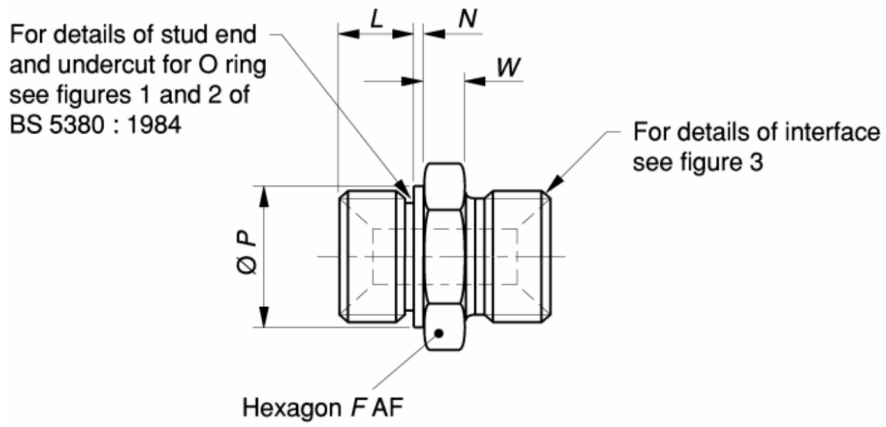


Figure 16 — Straight male-male adaptor with "O"-ring sealing (style Q)

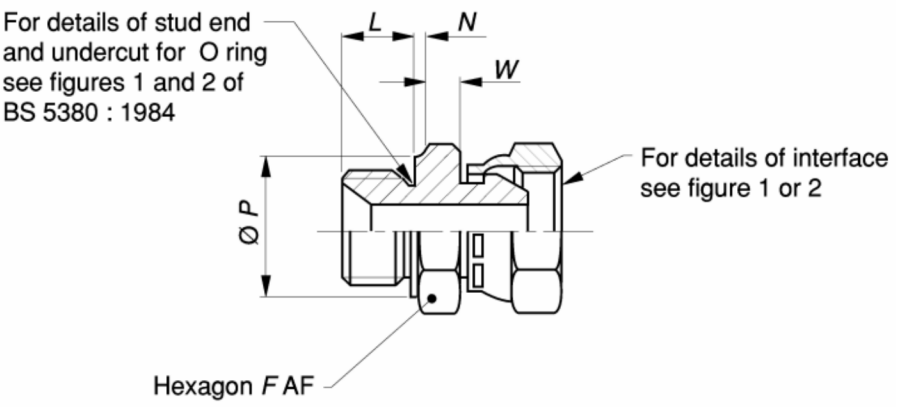


Figure 17 — Straight male-female adaptor with "O"-ring sealing (style R)

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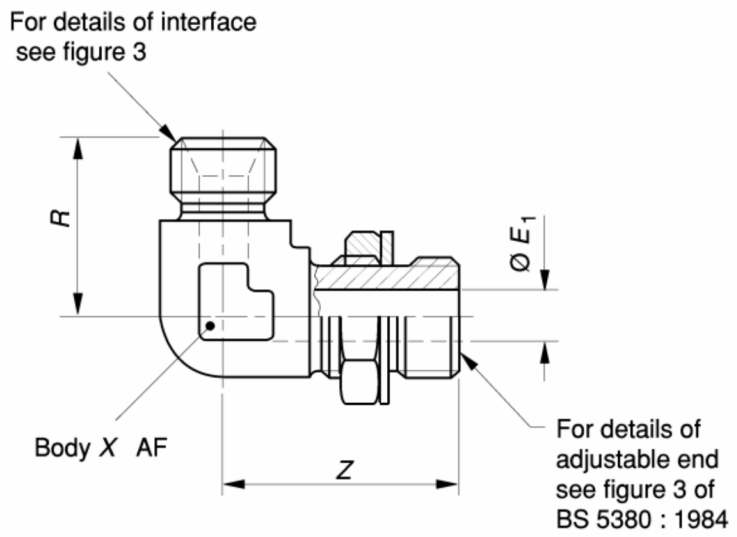


Figure 18 — 90° male-male "O"-ring adjustable adaptor (style T)

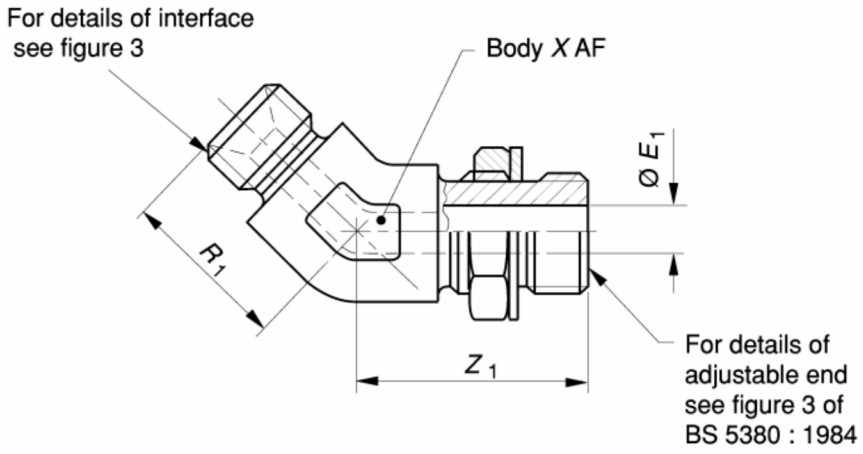


Figure 19 — 135° male-male "O"-ring adjustable adaptor (style U)

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Table 7 — Dimensions of male-male "O"-ring adjustable adaptors

Thread designation	E_1 mm	R mm	Z mm	R_1 mm	Z_1 mm	X nom. mm	"O"-ring ref. no.
	Tolerances						
		+3.0 0	+3.0 0	+3.0 0	+3.0 0		
G ⅛	3.5	21.0	22.0	20.3	25.4	17	0081-16
G ¼	4.7	25.4	27.6	20.3	25.4	17	0101-24
G ⅜	7.9	28.5	32.9	22.8	29.2	22	0136-24
G ½	11.1	32.5	42.0	25.5	37.2	24	0176-24
G ⅝[a]	14.3	36.5	43.5	28.9	38.4	27	0195-30
G ¾	16.7	41.3	51.3	31.2	44.0	32	0225-30
G 1	22.2	44.5	54.2	33.7	47.1	41	0295-30
G 1¼	28.6	50.8	62.9	35.5	55.0	50	0365-30
G 1½	33.3	59.0	66.1	45.2	58.2	55	0425-30
G 2	46.0	77.5	82.5	56.4	76.5	70	0545-30

NOTE These adaptors are suitable for assembly with ports in accordance with BS 5380.

[a] Described in BS 2779 as a non-preferred size.

[b] In accordance with BS 4518.

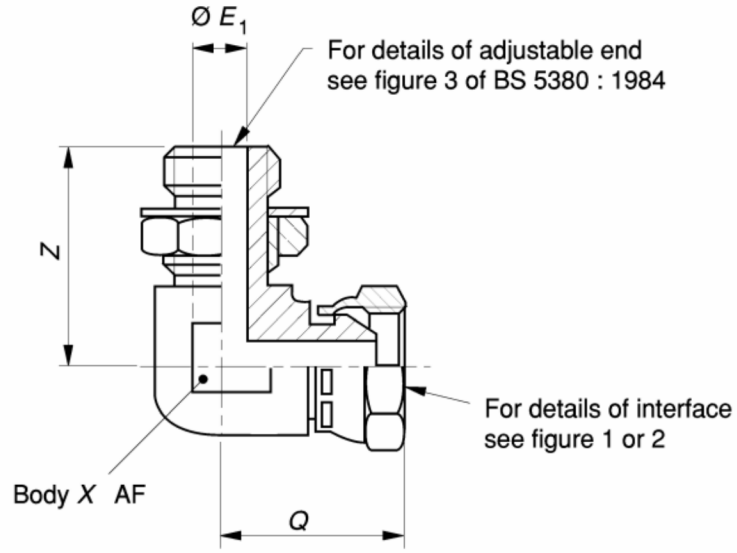


Figure 20 — 90° male-female "O"-ring adjustable adaptor (style V)

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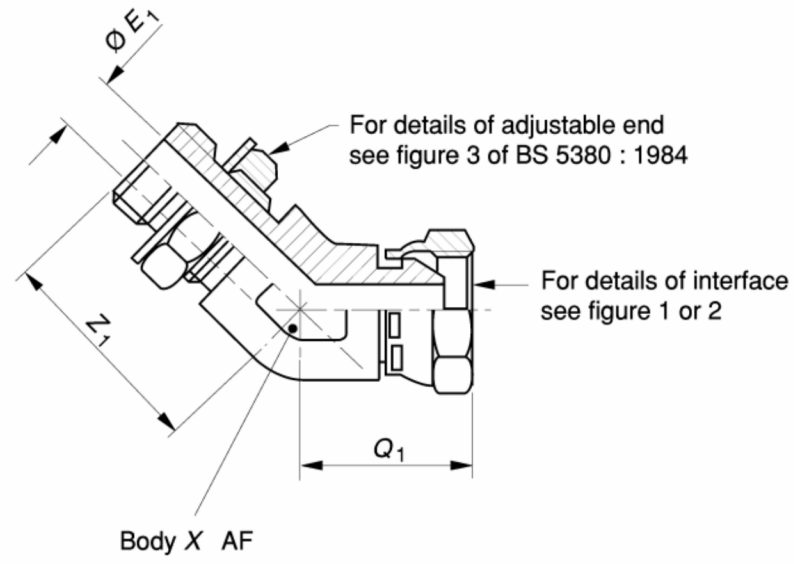


Figure 21 — 135° male-female "O"-ring adjustable adaptor (style W)

Table 8 — Dimensions of male-female "O"-ring adjustable adaptors

Thread designation	E_1 max.	Q	Z	Q_1	Z_1	X nom.	"O"-ring ref. no.
	mm	mm	mm	mm	mm	mm	mm
	Tolerances						
		$^{0}_{-3}$	$^{+3.0}_{0}$	$^{0}_{-3}$	$^{+3.0}_{0}$		
G ⅛	3.5	28	22.0	23	20.0	17	0081-16
G ¼	4.7	30	27.6	25	25.4	17	0101-24
G ⅜	7.9	35	32.9	29	29.2	22	0136-24
G ½	11.1	39	42.0	32	37.2	24	0176-24
G ⅝ [1)]	14.3	47	43.5	39	38.4	27	0195-30
G ¾	16.7	50	51.3	40	44.0	32	0225-30
G 1	22.2	55	54.2	45	47.1	41	0295-30
G 1¼	28.6	61	62.9	46	55.0	50	0365-30
G 1½	33.3	72	66.1	58	58.2	55	0425-30
G 2	46.0	94	82.5	73	76.5	70	0545-30

NOTE These adaptors are suitable for assembly with ports in accordance with BS 5380.

[1)] Described in BS 2779 as a non-preferred size.

[2)] In accordance with BS 4518.

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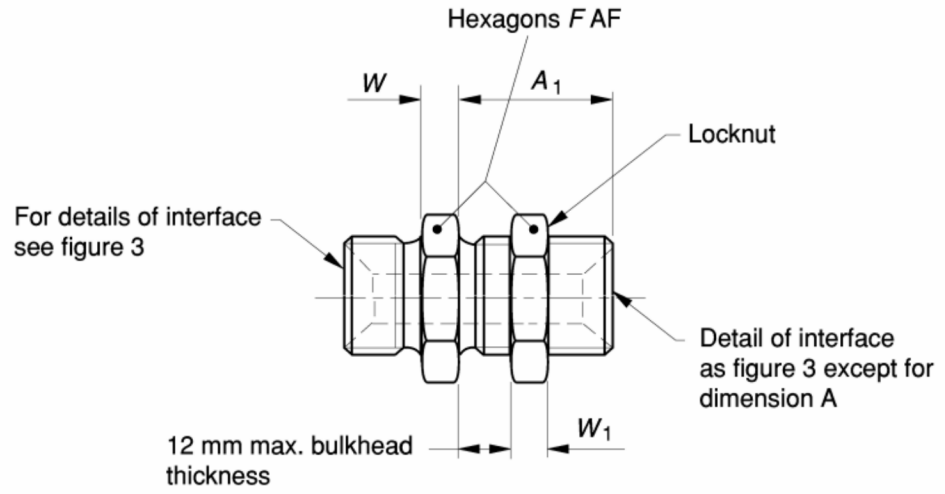


Figure 22 — Male-male bulkhead adaptors (style X)

Table 9 — Dimensions of male-male bulkhead adaptors

Thread designation	A_1 mm	F nom. mm	W mm	W_1 mm
	Tolerances			
			+0.5 0	+0.5 0
G ⅛	28	14	5	5
G ¼	28	19	7	6
G ⅜	32	22	8	7
G ½	35	27	10	8
G ⅝[a]	35	30	12	8
G ¾	38	32	12	9
G 1	41	41	15	10
G 1¼	44	50	19	13
G 1½	48	55	23	15
G 2	48	70	29	15

[a] Described in BS 2779 as a non-preferred size.

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Table 10 — Maximum working pressures

Thread designation	Hose i.d. nom. mm	Working pressure max. bar[a]	Comments
G ⅛	5.0	350	Pressure corresponds with rating for type 2 hose in accordance with BS 3832
G ¼	6.3	775	Pressures correspond with ratings for type 4 hoses in accordance with BS 4586
G ⅜	10.0	690	
G ½	12.5	515	
G ⅝	16.0	480	
G ¾	19.0	430	
G 1	25.0	345	Pressure corresponds with rating for type 5 hose in accordance with BS 4586
G 1¼	31.5	345	Pressures correspond with ratings for type 7 hoses in accordance with BS 4586
G 1½	38.0	345	
G 2	51.0	345	
[a] 1 bar = 10^5 N/m^2 = 10^5 Pa.			

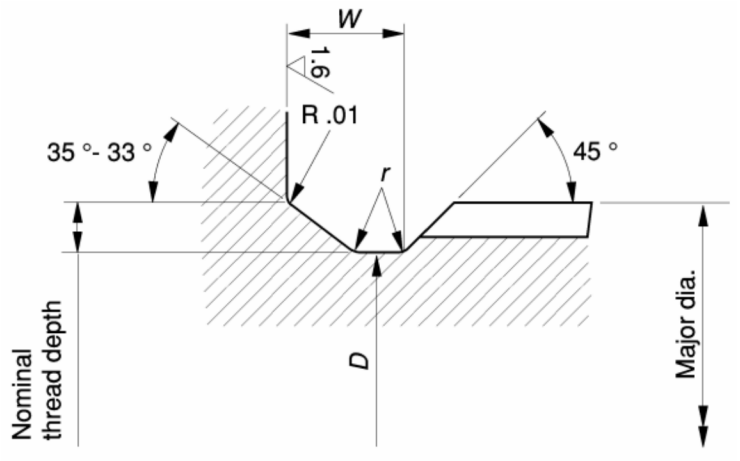


Figure 23 — Preferred thread undercut details for bonded washer type seals

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Table 11 — Preferred thread undercuts for male adaptors when used as stud fittings with bonded washer type seals

Thread designation	Major dia. mm	*D* mm	*r* mm	*W* max. mm
G ⅛	9.728 9.514	8.25 8.00	0.50	2.54
G ¼	13.157 12.907	11.18 10.92	0.76	3.81
G ⅜	16.662 16.412	14.60 14.30	0.76	3.81
G ½	20.955 20.671	18.29 17.98	1.0	4.82
G ⅝[a]	22.911 22.627	20.19 19.89	1.0	4.82
G ¾	26.441 26.157	23.75 23.42	1.0	4.82
G 1	33.249 32.889	29.97 29.59	1.0	5.84
G 1¼	41.910 41.550	38.61 38.23	1.0	5.84
G 1½	47.803 47.443	44.45 44.07	1.0	5.84
G 2	59.614 59.254	56.26 55.88	1.0	5.84

[a] Described in BS 2779 as a non-preferred size.

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List of references (see clause 2)

Normative references

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BS 3832:1991, *Specification for wire reinforced rubber hoses and hose assemblies for hydraulic installations.*

BS 4368, *Compression couplings for tubes.*

BS 4368-1:1972, *Specification for heavy series couplings (metric).*

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BS 4518:1982, *Specification for metric dimensions of loroidal sealing rings ("O"-rings) and their housings.*

BS 4586:1992, *Specification for spiral wire reinforced rubber covered hydraulic hoses and hose assemblies.*

BS 5327:1976, *Specification — Swept elbow bends for fluid power applications .*

BS 5380:1984, *Specification for hydraulic port and stud coupling using "O"-ring sealing and "G" series fastening threads.*

Informative references

Other publications

ANSI/SAE J 517 Hydraulic hose.

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