TECHNICAL INFORMATION 11

TECHNICAL INFORMATION

Tables and technical information

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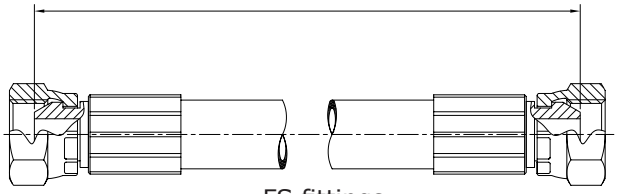
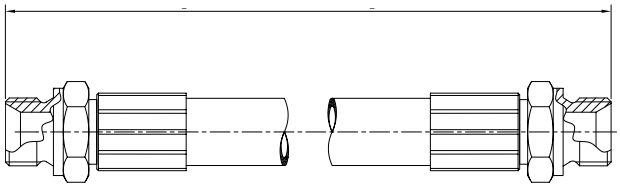
HOW TO MEASURE THE HOSE WHEN ORDERING A PRE-ASSEMBLED HOSE

Length between sealing surface



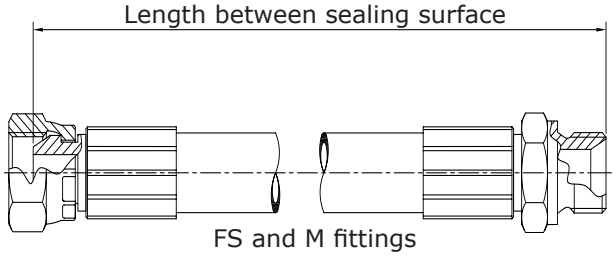
FS fittings

Length between sealing surface



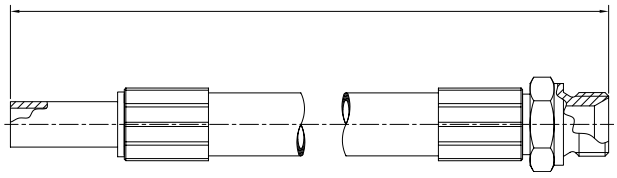
M fittings

Length between sealing surface



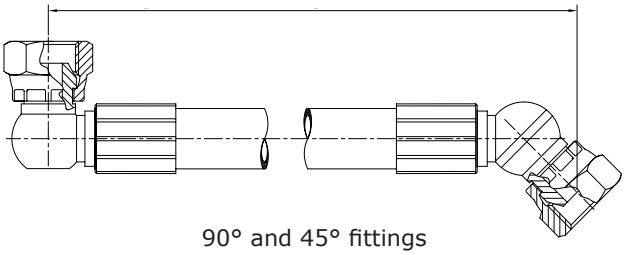
FS and M fittings

Length between sealing surface



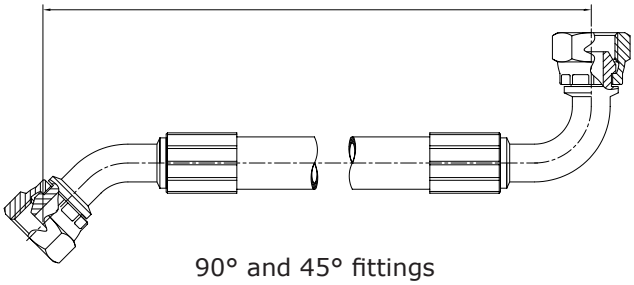
Straight standpipe and fittings

Length between the angels center lines



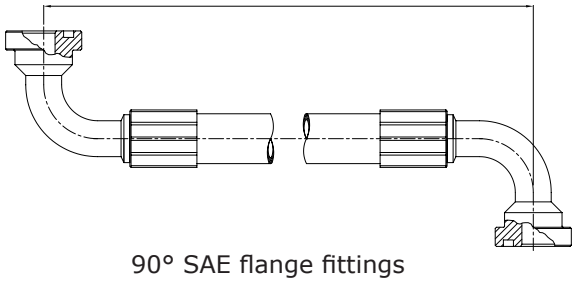
90° and 45° fittings

Length between the angels center lines



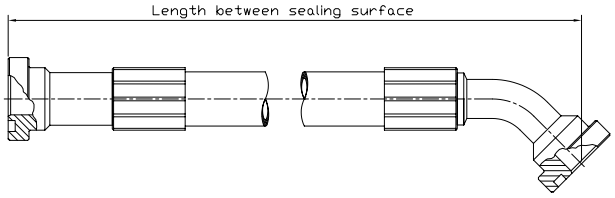
90° and 45° fittings

Length between the pipe bend centre lines



90° SAE flange fittings

Length between the pipe bend centre lines and the sealing surface of the flange

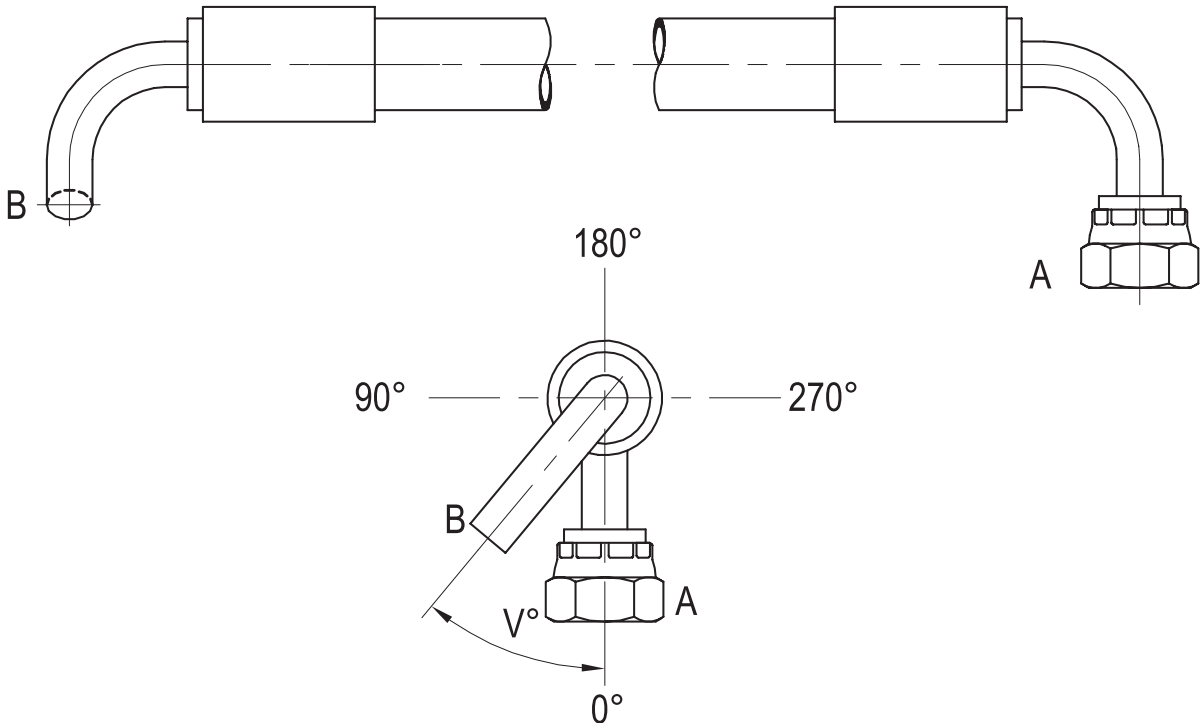


Straight 45° SAE flange fittings

TOLERANCE FOR ASSEMBLED HOSES

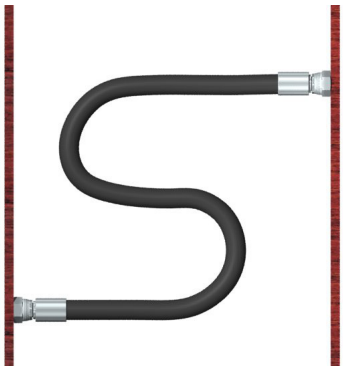
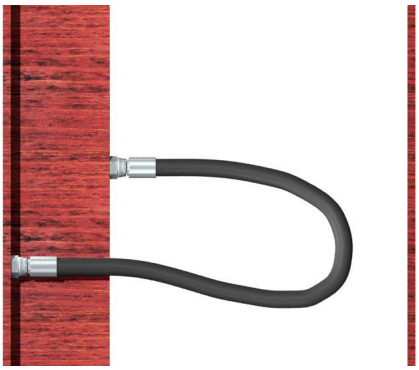
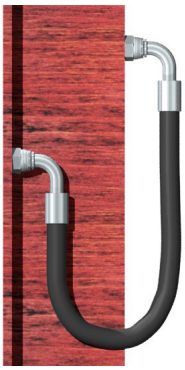
HOSE LENGTH (mm)	TOLERANCE
0-300	+/- 3 mm
300-1000	+/- 6 mm
1000-	+/- 1 %, e.g. 40 mm at a hose length of 2,000 mm

ANGULAR RELATIONSHIP

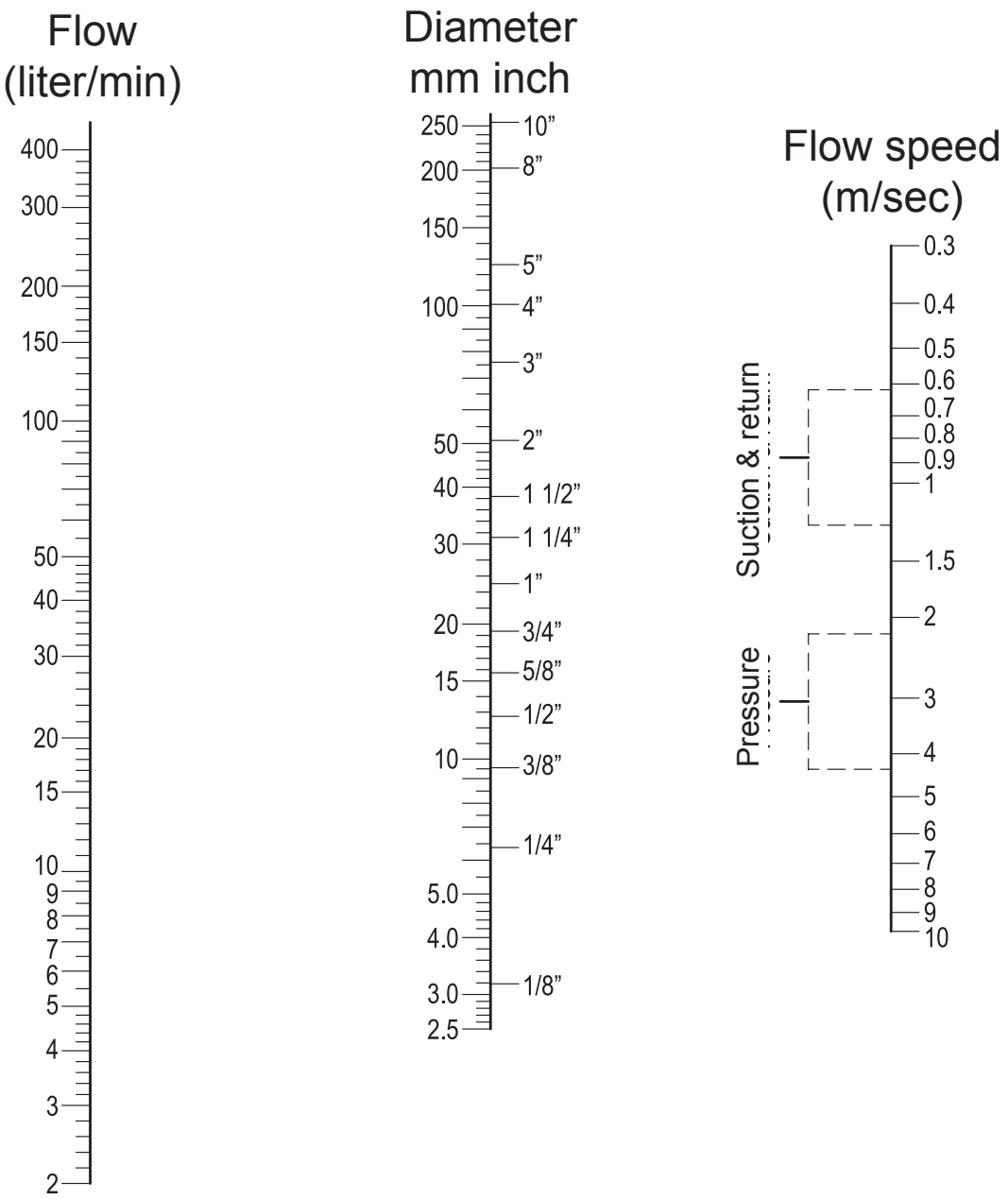


FITTING A HAS POSITION 0°. TURN FITTING B TO A DEFINED ANGLE V°. THE ANGLE TOLERANCE IS ± 3°.

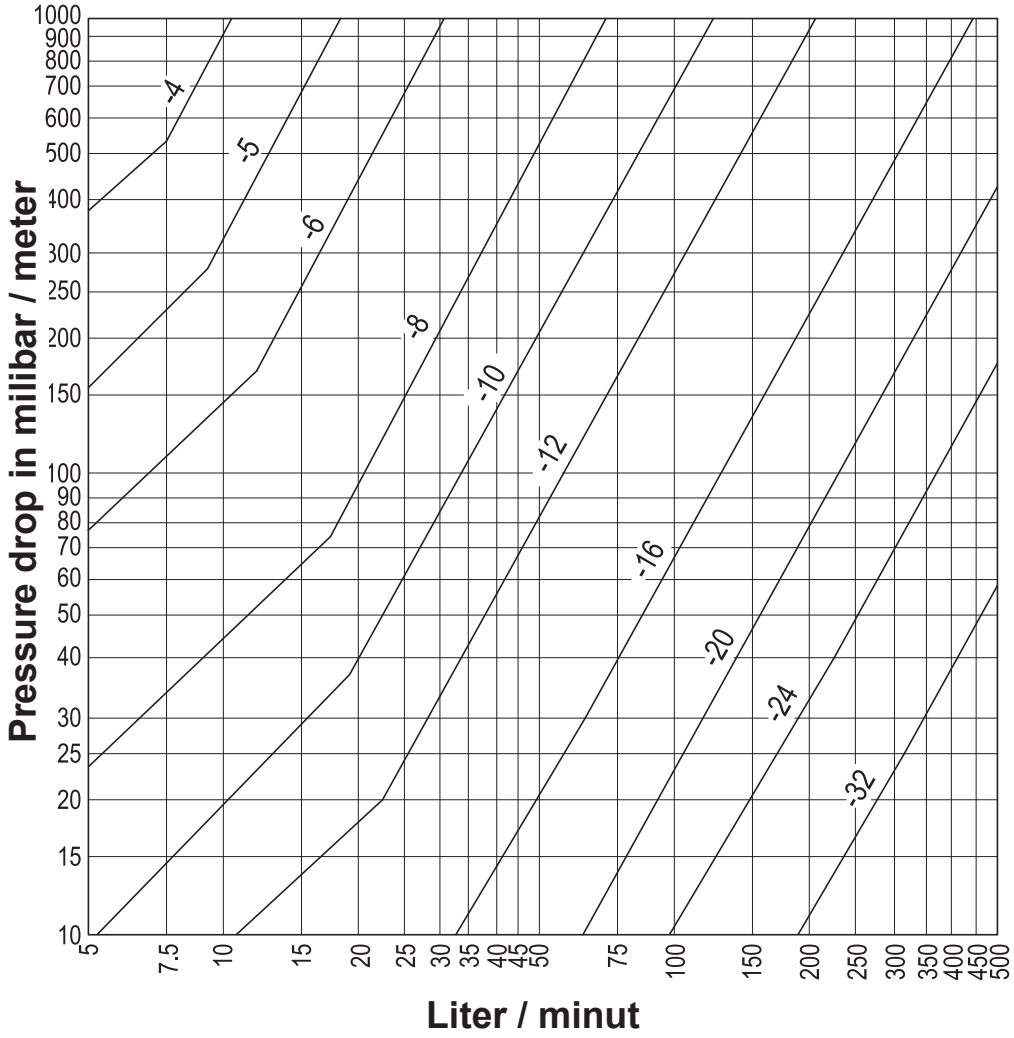
Installation examples

Wrong	Right
	
	

Hose dimensioning

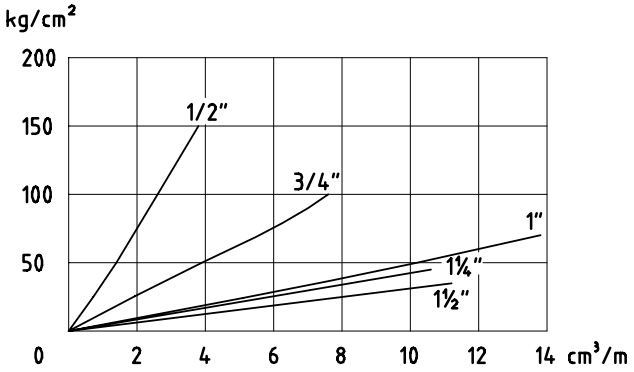


The above monogram is based on a laminar flow. A higher flow rate can be used in many applications. If so, consideration should be taken to tank volume, outside temperature and if the hydraulic aggregate will operate for long or short periods of time. A scant dimensioning results in increased oil temperature.

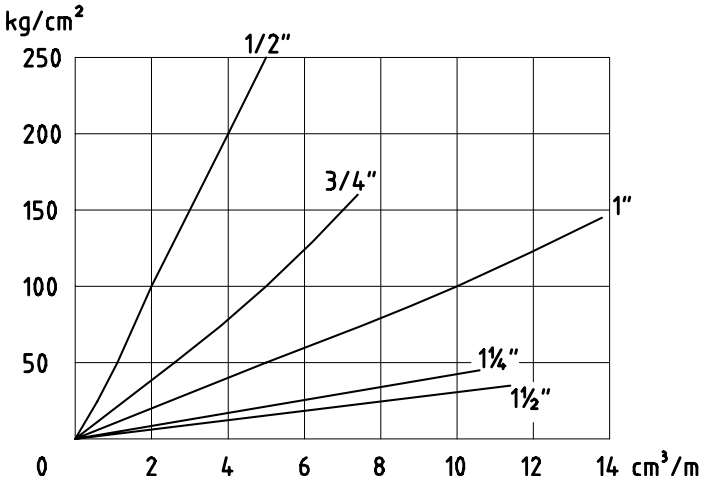


BASED ON 20 CS AT 50°C

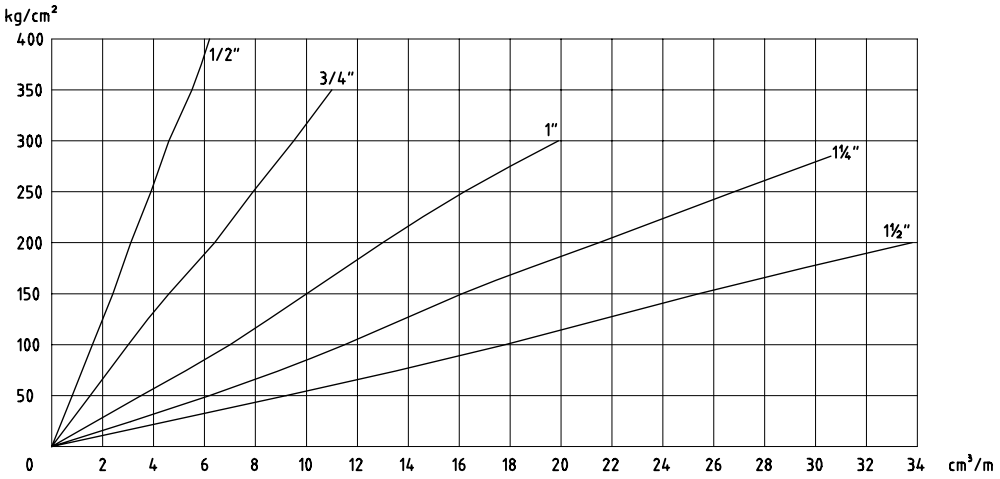
Volumetric expansion



EN 853 1SN

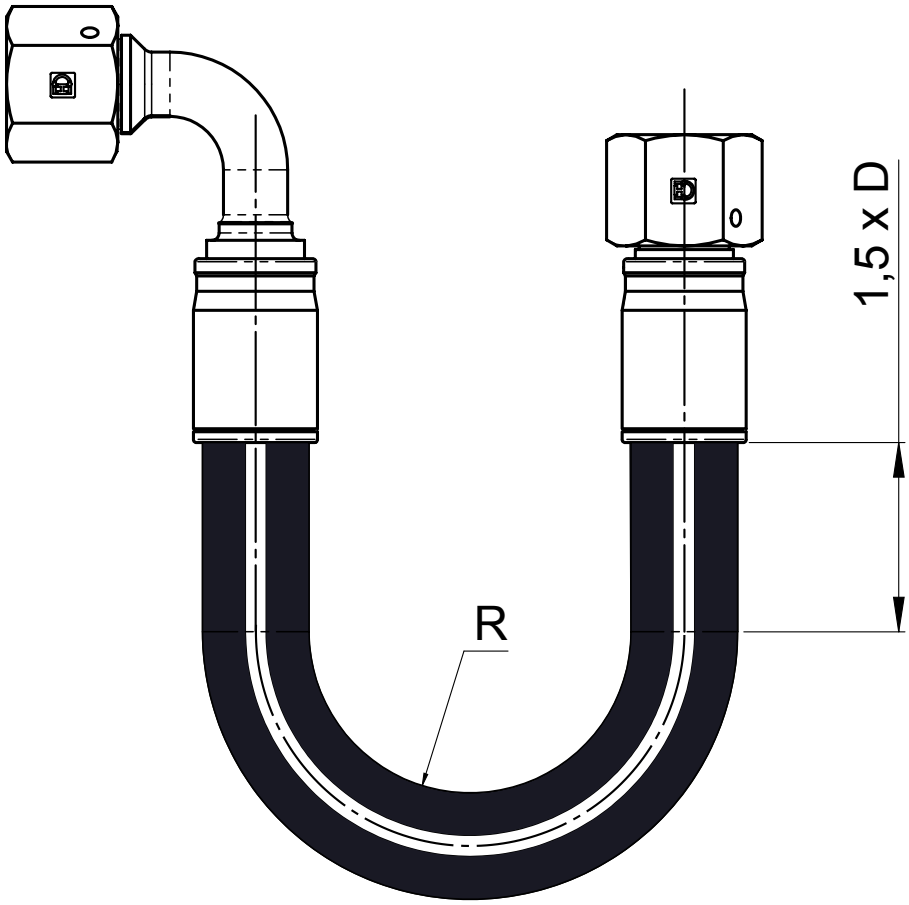


EN 853 2SN

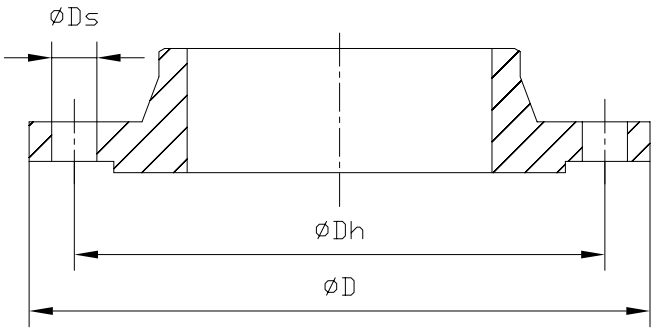


Deltaflex

A short straight hose length (1.5 x T) is required before the hose bending starts. The straight hose length is calculated from the edge of the ferrule to the hose (D = outer diameter of the hose).



Flange dimensions DIN/PN



According to DIN 2631 PN 6					
DN	D	Dh	Screw holes	DS	Screw
	mm	mm	pcs	mm	
10	75	50	4	11	M 10
15	80	55	4	11	M 10
20	90	65	4	11	M 10
25	100	75	4	11	M 10
32	120	90	4	14	M 12
40	130	100	4	14	M 12
50	140	110	4	14	M 12
65	160	130	4	14	M 12
80	190	150	4	18	M 16
100	210	170	4	18	M 16
125	240	200	8	18	M 16
150	265	225	8	18	M 16
200	320	280	8	18	M 16
250	375	335	12	18	M 16
300	440	395	12	22	M 20
350	490	445	12	22	M 20
400	540	495	16	22	M 20
500	645	600	20	22	M 20

According to DIN 2632 PN 10					
DN	D	Dh	Screw holes	DS	Screw
	mm	mm	pcs	mm	
80	200	160	8	18	M 16
200	340	295	8	22	M 20
250	395	350	12	22	M 20
300	445	400	12	22	M 20
350	505	460	16	22	M 20
400	565	515	16	26	M 24
500	670	620	20	26	M 24

According to DIN 2633 PN 16					
DN	D	Dh	Screw holes	DS	Screw
	mm	mm	pcs	mm	
10	90	60	4	14	M 12
15	95	65	4	14	M 12
20	105	75	4	14	M 12
25	115	85	4	14	M 12
32	140	100	4	18	M 16
40	150	110	4	18	M 16
50	165	125	4	18	M 16
65	185	145	4	18	M 16
80	200	160	8	18	M 16
100	220	180	8	18	M 16
125	250	210	8	18	M 16
150	285	240	8	22	M 20
200	340	295	12	22	M 20
250	405	355	12	26	M 24
300	460	410	12	26	M 24
350	520	470	16	26	M 24
400	580	525	16	30	M 27
500	715	650	20	33	M 30

According to DIN 2634 PN 25					
DN	D	Dh	Screw holes	DS	Screw
	mm	mm	pcs	mm	
200	360	310	12	26	M 24
250	425	370	12	30	M 27
300	485	430	16	30	M 27
350	555	490	16	33	M 30
400	620	550	16	36	M 33

According to DIN 2635 PN 40					
DN	D	Dh	Screw holes	DS	Screw
	mm	mm	pcs	mm	
10	90	60	4	14	M 12
15	95	65	4	14	M 12
20	105	75	4	14	M 12
25	115	85	4	14	M 12
32	140	100	4	18	M 16
40	150	110	4	18	M 16
50	165	125	4	18	M 16
65	185	145	8	18	M 16
80	200	160	8	18	M 16
100	235	190	8	22	M 20
125	270	220	8	26	M 24
150	300	250	8	26	M 24
200	375	320	12	30	M 27
250	450	385	12	33	M 30
300	515	450	16	33	M 30
350	580	510	16	36	M 33

Transformation table

P.S.I. to BAR

PSI	BAR	PSI	BAR	PSI	BAR
1	0,07	65	4,5	4500	310
2	0,14	70	4,8	5000	345
3	0,21	75	5,2	5500	379
4	0,28	80	5,5	6000	414
5	0,35	85	5,9	6500	448
6	0,41	90	6,2	7000	483
7	0,48	95	6,6	7500	517
8	0,55	100	6,9	8000	552
9	0,62	200	13,8	8500	586
10	0,69	300	20,7	9000	621
12	0,83	400	27,6	9500	655
14	0,97	500	34,5	10000	690
16	1,10	600	41,4	11000	759
18	1,24	700	48,3	12000	828
20	1,38	800	55,2	13000	897
25	1,72	900	62,1	14000	966
30	2,07	1000	69	15000	1030
35	2,41	1500	103	16000	1100
40	2,76	2000	138	18000	1240
45	3,10	2500	172	20000	1370
50	3,45	3000	207	22000	1510
55	3,79	3500	241	24000	1650
60	4,14	4000	276	26000	1790

BAR to P.S.I.

BAR	PSI	BAR	PSI	BAR	PSI
1	14,5	50	725	360	5220
2	29,0	55	798	370	5365
3	43,5	60	870	380	5510
4	58,0	65	943	390	5655
5	72,5	70	1015	400	5800
6	87,0	75	1088	420	6090
7	102	80	1160	440	6380
8	116	85	1233	460	6670
9	131	90	1305	480	6960
10	145	95	1378	500	7250
12	174	100	1450	520	7540
14	203	120	1740	540	7830
16	232	140	2030	560	8120
18	261	160	2320	580	8410
20	290	180	2610	600	8700
22	319	200	2900	650	9425
24	348	220	3190	700	10150
26	377	240	3480	750	10875
28	406	260	3770	800	11600
30	435	280	4060	850	12325
35	508	300	4350	900	13050
40	580	320	4640	950	13775
45	653	340	4930	1000	14500

NW to millimeter

Description		Internal hose dim.mm
NW	2	3-4
NW	3	4-5
NW	4	5-6
NW	6	7-8
NW	8	9-10
NW	10	11-12
NW	13	14-15
NW	16	17-18
NW	20	21-22

Inch to millimeter

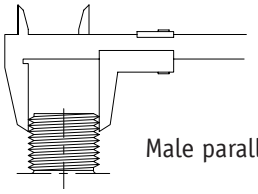
Inch	Inch	mm	**Inch**	Inch	mm
1/64	0,016	0,397	**21/32**	0,656	16,669
1/32	0,031	0,794	**43/64**	0,672	17,066
3/64	0,047	1,191	**11/16**	0,688	17,463
1/16	0,063	1,588	**45/64**	0,703	17,859
5/64	0,078	1,984	**23/32**	0,719	18,256
3/32	0,094	2,381	**47/64**	0,734	18,653
7/64	0,109	2,778	**3/4**	0,750	19,050
1/8	0,125	3,175	**49/64**	0,766	19,447
9/64	0,141	3,572	**25/32**	0,781	19,844
5/32	0,156	3,969	**51/64**	0,797	20,241
11/64	0,172	4,366	**13/16**	0,813	20,638
3/16	0,188	4,763	**53/64**	0,828	21,034
13/64	0,203	5,159	**27/32**	0,844	21,431
7/32	0,219	5,556	**55/64**	0,859	21,828
15/64	0,234	5,953	**7/8**	0,875	22,225
1/4	0,250	6,350	**57/64**	0,891	22,622
17/64	0,266	6,747	**29/32**	0,906	23,019
9/32	0,281	7,144	**59/64**	0,922	23,416
19/64	0,297	7,541	**15/16**	0,938	23,813
5/16	0,313	7,938	**61/64**	0,953	24,209
21/64	0,328	8,334	**31/32**	0,969	24,606
11/32	0,344	8,731	**63/64**	0,984	25,003
23/64	0,359	9,128	**1**	1,000	25,400
3/8	0,375	9,525	**1 1/4**	1,250	31,750
25/64	0,391	9,992	**1 1/2**	1,500	38,100
13/32	0,406	10,319	**1 3/4**	1,750	44,450
27/64	0,422	10,716	**2**	2,0	50,8
7/16	0,48	11,113	**2 1/2**	2,5	63,5
29/64	0,453	11,509	**3**	3,0	76,2
15/32	0,469	11,906	**3 1/2**	3,5	88,9
31/64	0,484	12,303	**4**	4,0	101,9
1/2	0,500	12,700	**4 1/2**	4,5	114,3
33/64	0,516	13,097	**5**	5,0	127,0
17/32	0,531	13,494	**6**	6,0	152,4
35/64	0,547	13,891	**7**	7,0	177,8
9/16	0,563	14,288	**8**	8,0	203,2
37/64	0,578	14,684	**9**	9,0	228,6
19/32	0,594	15,081	**10**	10,0	254,0
39/64	0,609	15,478	**11**	11,0	279,4
5/8	0,625	15,875			
41/64	0,641	16,272			

Standard port thread for cutting ring fittings

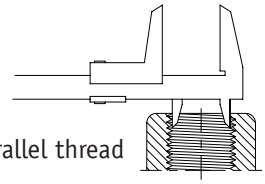
Steel and stainless steel

	Pipe external dia.	Port threads BSP	Port threads MM	Port threads NPT	Nut threads
Light series	6	1/8"	M 10x1	1/8"	M 12x1,5
	8	1/4"	M 12x1,5	1/4"	M 14x1,5
	10	1/4"	M 14x1,5	1/4"	M 16x1,5
	12	3/8"	M 16x1,5	3/8"	M 18x1,5
	15	1/2"	M 18x1,5	1/2"	M 22x1,5
	18	1/2"	M 22x1,5	1/2"	M 26x1,5
	22	3/4"	M 26x1,5	3/4"	M 30x2
	28	1"	M 33x2	1"	M 36x2
	35	1 1/4"	M 42x2	1 1/4"	M 45x2
	42	1 1/2"	M 48x2	1 1/2"	M 52x2
Heavy series	6	1/4"	M 12x1,5	1/4"	M 14x1,5
	8	1/4"	M 14x1,5	1/4"	M 16x1,5
	10	3/8"	M 16x1,5	3/8"	M 18x1,5
	12	3/8"	M 18x1,5	3/8"	M 20x1,5
	14	1/2"	M 20x1,5	1/2"	M 22x1,5
	16	1/2"	M 22x1,5	1/2"	M 24x1,5
	20	3/4"	M 27x2	3/4"	M 30x2
	25	1"	M 33x2	1"	M 36x2
	30	1 1/4"	M 42x2	1 1/4"	M 45x2
	38	1 1/2"	M 48x2	1 1/2"	M 52x2

Thread table



Male parallel thread



Female parallel thread

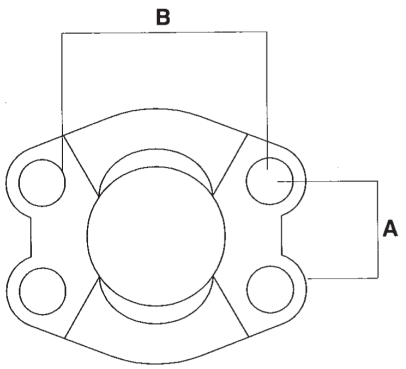
External diameter mm	BSP / BSPT	Metric	Unified	NPTF / NPSM	Internal diameter mm
6,9 – 7,3				1/16" – 27	6.7 – 7.1
7,5 – 7,7	1/16" – 28				6.6 – 6.8
9,2 – 9,7				1/8" – 27	9.1 – 9.5
9,5 – 9,7	1/8" – 28				8.6 – 8.8
9,7 – 9,9		M10 x 1,5			8.2 – 8.6
10,9 – 11,1			7/16" – 20 UNF		9.7 – 10.0
12,1 – 12,8				1/4" – 18	11.9 – 12.5
12,5 – 12,7			1/2" – 20 UNF		11.3 – 11.6
12,9, – 13,2	1/4" – 19				11.4 – 11.9
13,6 – 13,9		M14 x 1,5			12.2 – 12.6
14,0 – 14,3			9/16" – 18 UNF		12.8 – 13.1
15,5 – 16,2				3/8" – 18	15.3 – 15.9
15,6 – 15,9		M16 x 1,5			14.2 – 14.6
16,4 – 16,7	3/8" – 19				15.0 – 15.4
17,2 – 17,4			11/16" – 16 UN		15.7 – 16.1
17,6 – 17,9		M18 x 1,5			16.2 – 16.6
18,8 – 19,0			3/4" – 16 UNF		17.3 – 17.7
19,3 – 20,1				1/2" – 14	18.9 – 18.6
20,4 – 20,6			13/16" – 16 UN		18.9 – 19.3
20,7 – 21,0	1/2" – 14				18.6 – 19.2
21,6 – 21,9		M22 x 1,5			20.2 – 20.6
21,9 – 22,2			7/8" – 14 UNF		20.3 –20.7
22,6 – 22,9	5/8" – 14				20.6 – 21.1
23,6 – 23,9		M24 x 1,5			22.2 – 22.6
24,6 – 25,4				3/4" – 14	24.2 – 25.1
25,1 – 25,4			1" – 14 UNS		23.4 –23.8
25,6 – 25,9		M26 x 1,5			24.2 – 24.6
26,2 – 26,4	3/4" – 14				24.1 – 24.7
26,7 – 26,9			1 1/16" – 12 UN		24.7 – 25.1
29,6 – 29,9		M30 x 2			27.4 – 27.8
29,8 – 30,1			1 3/16" – 12 UN		27.9 – 28.3
29,6 – 29,9		M30 x 1,5			28.2 – 28.6
29,9 – 30,2	7/8" – 14				27.9 – 28.4
30,8 – 31,9				1" – 11 1/2"	30.4 – 31.5
31,6 – 31,9		M32 x 2			29.4 – 29.9
32,9 – 33,2	1" – 11				30.3 – 30.9
33,0 – 33,3			1 5/16" – 12 UN		31.0 – 31.5
35,6 – 35,9		M36 x 2			33.4 – 33.8
36,2 – 36,5			1 7/16" – 12 UN		34.2 – 34.7
37,5 – 37,9	1 1/8" – 11				34.9 – 35.6
37,6 – 37,9		M38 x 1,5			36.2 – 36.6
39,6 – 40,7				1 1/4" – 11 1/2	39.1 – 40.2
40,9 – 41,2			1 5/8" – 12 UN		39.0 – 39.4
41,6 – 41,9		M42 x 2			39.4 – 39.8
41,6 – 41,9	1 1/4" – 11				39.0 – 39.6
42,5 – 42,8				1 11/16" – 12 UN	40.6 –41.0
44,6 – 44,9		M45 x 2			42.4 – 42.8
44,6 – 44,9		M45 x 1,5			43.2 – 43.6
45,6 – 46,8				1 1/2" – 11 1/2	45.2 – 46.3
47,3 – 47,6			1 7/8" – 16 UN		45.9 – 46.3
47,4 – 47,8	1 1/2" – 11				44.8 – 45.5
50,5 – 50,8			2" – 12 UN		48.5 – 49.0
51,6 – 51,9		M52 x 2			49.4 – 49.6
51,6 – 51,9		M52 x 1,5			50.2 – 50.6
53,4 – 53,7	1 3/4" – 11				50.8 – 51.4
57,6 – 58,8				2" – 11 1/2	57.2 – 58.3
59,3 – 59,6	2" – 11				56.7 – 57.3
63,1 – 63,4			2 1/2" – 12 UN		61.1 – 61.4
65,3 – 65,7	2 1/4" – 11				62.8 – 63.4
69,1 – 70,9				2 1/2" – 8	68.5 – 70.2
74,8 – 75,2	2 1/2" – 11				72.2 – 72.9
81,1 – 81,5	2 3/4" – 11				78.6 – 79.2
84,9 – 86,8				3" – 8	84.3 – 86.1
87,5 – 87,9	3" – 11				84.9 – 85.6
99,9 – 100,3	3 1/2" – 11				97.4 – 98.0
112,6 – 113,0	4" – 11				110.1 – 110.7

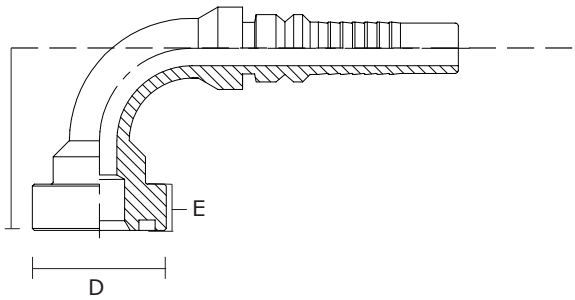
SAE flange dimensions

CODE 61 (3000)								
Max.(MPa) WP	Size	Dimension	A mm	B mm	Bolt dim. metric	Bolt dim. UNC.	D mm	E mm
34.5	8	1/2″	17.38	38.1	M 8	5/16″	30.18	6.73
34.5	12	3/4″	22.23	47.63	M10	3/8″	38.10	6.73
34.5	16	1″	26.19	52.37	M10	3/8″	44.45	8.00
27.6	20	1 1/4″	30.18	58.72	M10	7/16″	50.80	8.00
20.7	24	1 1/2″	35.71	69.85	M12	1/2″	60.33	8.00
20.7	32	2″	42.88	77.77	M12	1/2″	71.42	9.53
17.2	40	2 1/2″	50.80	88.90	M12	1/2″	84.12	9.53
13.8	48	3″	61.93	106.38	M16	1/2″	101.60	9.53
3.4	56	3 1/2″	69.85	120.65	M16	5/8″	114.30	11.23
3.4	64	4″	77.77	130.18	M16	5/8″	127.00	11.23
3.4	80	5″	92.08	152.40	M16	5/8″	152.40	11.23

CODE 62 (6000)								
Max. (MPa) WP	Size	Dimension	A mm	B mm	Bolt dim. metric	Bolt dim. UNC.	D mm	E mm
41.4	8	1/2″	18.24	40.49	M8	5/16″	31.75	7.75
41.4	12	3/4″	23.8	50.8	M10	3/8″	41.28	8.76
41.4	16	1″	27.76	57.15	M12	7/16″	47.63	9.53
41.4	20	1 1/4″	31.75	66.68	M14	1/2″	53.98	10.29
41.4	24	1 1/2″	36.5	79.38	M16	5/8″	63.5	12.57
41.4	32	2″	44.45	96.82	M20	3/4″	79.38	12.57

The table above refers to SAE standard SAE J518c.





TECNICAL INFORMATION ACCORDING TO SAE J518 CODE 61								
Flange	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
WP MPa	34,5	34,5	34,5	27,6	20,7	20,7	17,2	13,8
PSI	5000	5000	5000	4000	3000	3000	2500	2000
DIA	30,2	38,1	44,5	50,8	60,3	71,4	84,1	101,6

TECNICAL INFORMATION ACCORDING TO SAE J518 CODE 62								
Flange	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"		
WP MPa	41,4	41,4	41,4	41,4	41,4	41,4		
PSI	6000	6000	6000	6000	6000	6000		
DIA	31,8	41,3	47,6	53,9	63,5	79,4		

TECNICAL INFORMATION SUPERCAT						
Flange	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
WP MPa	41,4	41,4	41,4	41,4	41,4	41,4
DIA	31,8	41,3	47,6	53,9	63,5	79,4

TECNICAL INFORMATION KOMATSU						
Flange	5/8"					
WP MPa	34,5					
DIA	34,2					

Miscellaneous

Recommended tightening torque (Nm) for hose fittings

DKLO		
Pipe dim.	Thread	Nm
6L	M12 x 1.5	23
8L	M14 x 1.5	26
10L	M16 x 1.5	30
12L	M18 x 1.5	41
15L	M22 x 1.5	76
18L	M26 x 1.5	106
22L	M30 x 2.0	116
28L	M36 x 2.0	133
35L	M45 x 2.0	173
42L	M52 x 2.0	202

DKSO		
Pipe dim.	Thread	Nm
6S	M14 x 1.5	26
8S	M16 x 1.5	30
10S	M18 x 1.5	41
12S	M20 x 1.5	53
14S	M22 x 1.5	76
16S	M24 x 1.5	88
20S	M30 x 2.0	116
25S	M36 x 2.0	133
30S	M42 x 2.0	151
38S	M52 x 2.0	202

ORFS				JIC			BSP 60°	
Thread	Tightening Nm	FFWR new	FFWR re-assembly	Hose dim.	Thread	FFWR	Thread	Tightening Nm
9/16″ – 18	25	1/2–3/4	1/4–1/2	3/16	7/16"–20 UNF	2	1/8"	20
11/16″ – 16	35	1/2–3/4	1/4–1/2		1/2"–20 UNF	2	1/4"	25
13/16 – 16	55	1/2–3/4	1/4–1/2	1/4	9/16"–18 UNF	1 1/2	3/8"	40
1″ – 14	80	1/2–3/4	1/4–1/2	3/8	3/4"–16 UNF	1 1/2	1/2"	60
1 3/16″ – 12	120	1/3–1/2	1/4–1/2	1/2	7/8"–14 UNF	1 1/2	5/8"	70
1 7/16″ – 12	150	1/3–1/2	1/4–1/2	3/4	1.1/16"–12 UN	1	3/4"	115
1 11/16″ – 12	180	1/3–1/2	1/4–1/2	1	1.5/16"–12 UN	1	1"	140
2″ – 12	220	1/3–1/2	1/4–1/2	1 1/4	1.5/8"–12 UN	1	1 1/4"	200
2 1/2"– 12	490	1/3–1/2	1/4–1/2	1 1/2	1.7/8"–12 UN	1	1 1/2″	270
				2	2.1/2"–12 UN	1	2	350

FFWR Flats From Wrench Resistance

Transformation tables

Pressure

BAR	MPa	Kp / cm²	PSI	Kpa
1	0.1	1.020	14.503	100
10	1	10.20	145.03	1000
0.9810	0.0981	1	14.233	98.1
0.0690	0.0069	0.0700	1	6.9
0.01	0.001	0.0102	0.145	1

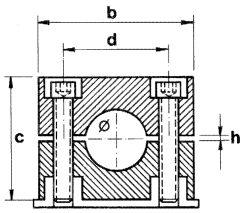
mm	Inch	Foot
1	0.0394	0.0033
25.4	1	0.083
304.8	12	1

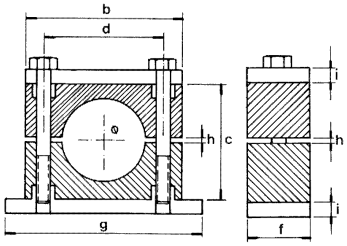
Vacuum

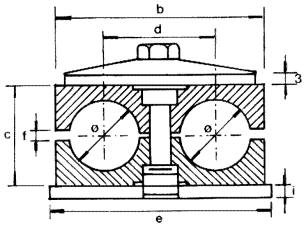
ATM	PSI	Water meter	Quicksilver mm	%
0.1	1.4	1	73.6	10
0.2	2.8	2	147.1	20
0.3	4.2	3	220.7	30
0.4	5.7	4	249.2	40
0.5	7.1	5	267.8	50
0.6	8.5	6	441.3	60
0.7	10.0	7	514.9	70
0.8	11.4	8	588.4	80
0.9	12.8	9	662.0	90
1.0	14.2	10	735.5	100

Table for pipes

Inch		Instrument pipe	
Inch	mm	Tum	mm
1/8"	10,00	1/4"	6,35
1/4"	13,25	5/16"	7,89
3/8"	16,75	3/8"	9,52
1/2"	21,25	1/2"	12,70
3/4"	26,75	5/8"	15,87
1"	33,50	3/4"	19,05
1 1/4"	42,25	7/8"	22,22
1 1/2"	48,25	1"	25,40
1 3/4"	53,74	1 1/4"	31,75
2"	60,00	1 1/2"	38,10
2 1/4"	66,00	1 3/4"	44,45
2 1/2"	75,50	2"	50,80
3"	88,25	2 1/4"	57,20
3 1/2"	101,00	2 1/2"	63,50
4"	113,50	2 3/4"	70,0
4 1/2"	126,50	3"	76,20
5"	139,00	3 1/2"	88,90
6"	168,00	4"	101,60
8"	219,00	4 1/2"	114,30
		5"	127,00
		5 1/4"	133,00
		6"	152,00
		8"	203,00



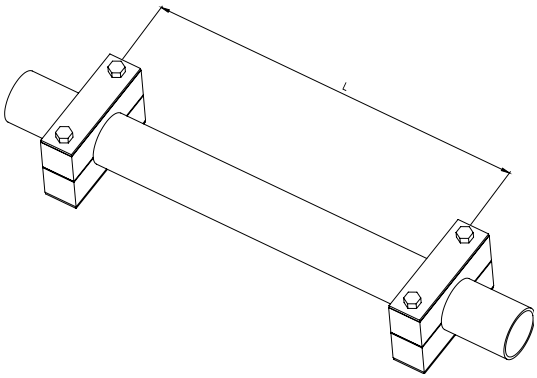


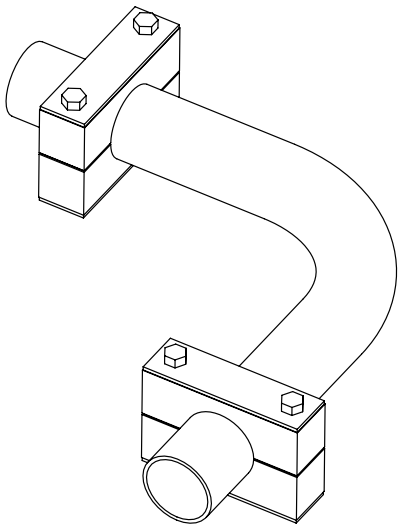


Clamp dimensions All dimensions are in mm

Standard series						Heavy series									Double clamps						
Type	ø	b	c	d	h	Type	ø	b	c	d	f	g	h	i	Type	ø	b	c	d	e	f
C2	6-12	28,0	28	-	0,6	CP1	12-20	58	33	33,0	30	70	1,0	8	CF1	6-12	36	27	20	37	0,6	4
C3	14-18	37,0	28	20	0,6	CP2	22-30	72	49	45,0	30	87	1,0	8	CF2	14-18	54	26	29	55	0,8	4
C4	20-25	50,0	36	33	0,8	CP3	30-45	87	60	60,0	30	105	1,2	8	CF3	20-25	67	37	36	70	1,0	4
C5	28-32	57,0	44	40	1,0	CP4	38-70	120	88	90,5	45	155	2,0	10	CF4	28-30	81	42	45	85	1,0	4
C6	35-42	69,5	57	52	1,0	CP5	73-90	155	118	122	60	200	3,0	10	CF5	35-42	106	53	56	110	1,2	4
						CP6	100-121	205	165	168	80	225	3,0	15							
						CP7	133-168	245	200	205	80	270	4,0	15							
						CP8	168-219	320	270	265	120	340	4,0	25							
						CP9	219-324	470	410	395	160	520	10	30							

Recommended distance between pipe clamps



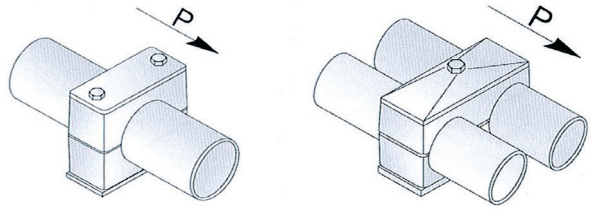


The clamp is assembled close to a pipe bend.

	CLAMP TYPE	PIPE DIMENSION [mm]	DISTANCE L [m]
Standard series Double clamps	Group 1	6 – 13,25	0,9
	Group 2	6 – 13,25	1,0
	Group 3	14 –18	1,2
	Group 4	20 – 25,4	1,5
	Group 5	28 – 32	1,5
	Group 6	32 – 45	2,2
	Group 7	45 – 54	2,7
	Group 8	57,2 – 76,1	3,2
	Group 9	88,9 – 102	4,0
Heavy series	Group 1	6 – 20	1,0
	Group 2	20 – 30	1,5
	Group 3	30 – 45	2,2
	Group 4	38 – 50	2,2
	Group 4	53 – 70	3,0
	Group 5	65 – 73	3,0
	Group 5	80 – 90	3,5
	Group 6	100 – 121	4,5
	Group 7	133 – 168	5,0
	Group 8	168 – 219	6,0
	Group 9	166 – 220	6,7

Tightening torque and maximum load in pipe direction

All tightening torque and load in pipe direction regards pipe clamps that are tested with steel pipes ST 35.4 with cover type "PS" and hexagon bolt UNI 5737. Sliding starts when the value "P" is reached.



PIPE CLAMPS STANDARD SERIES							
		POLYPROPYLENE		SELF-EXTINGGUISHING POLYAMIDE		ALUMINIUM	
Type	Bolt	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)
C1	M6	8	0,7	10	0,7	12	3,6
C2		8	1,2	10	0,9	12	4,3
C3		8	1,5	10	1	12	4,4
C4		8	1,7	10	1,8	12	4,8
C5		8	1,8	10	1,9	12	5,2
C6		8	2	10	2,1	12	7,5
C7		8	2,2	10	2,8	12	9
C8		8	2,3	10	2,5		
C9		8	2,4	10	2,5		

PIPE CLAMPS HEAVY SERIES							
		POLYPROPYLENE		SELF-EXTINGGUISHING POLYAMIDE		ALUMINIUM	
Type	Bolt	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)
CP1	M10	13	1,8	21	4,5	32	13
CP2		13	3	21	4,7	32	16
CP3		15	3,5	25	5,2	37	16,5
CP4	M12	30	8,5	40	9,5	55	30,5
CP5	M16	46	11,5	56	27	125	36,4
CP6	M20	80	15	155	25	225	71,7
CP7		100	30	185	34	235	62,5
CP8	M30	190	41	360	50	500	86,7
CP9		210	125	380	130	500	190,5

PIPE CLAMPS HEAVY SERIES					
		POLYPROPYLENE		SELF-EXTINGGUISHING POLYAMIDE	
Type	Bolt	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)	Tightening torque (Nm)	Max. load directly on the pipe. P (kN)
CF1	M6	6	1,1	6	1,1
CF2	M8	13	2,5	13	2,5
CF3		13	2,1	13	2,1
CF4		13	2,9	13	3,1
CF5		9	2,2	9	2,7

PIPE CLAMP				
MECHANICAL PROPERTIES	TEST METHOD	Copolymer Polypropylene "PP". High resistance and limit of stretching strain 3060MN5	Polyamide "PA" Fiber glass reinforced and self-extinguishing AG5 FR PH2 0160 Black	ALUMINIUM ALLIGATION EN AB-ALSi11Cu2(Fe)
Bending strength	DIN 53452	43 N/mm²	230 N/mm²	70 N/mm²
Impact strength	DIN 53453	11 KJ/m²	40 KJ/m²	-
Compression (pressure) strength	ASTM D 695	12000 N/mm²	160 N/mm²	HB 500 fino a 600 N/mm²
Module strength	DIN 53452	1400 N/mm²	9000 N/mm²	68000 fino a 78000 N/mm²
Limit of stretching strain	DIN 53455	35 N/mm²	160 N/mm²	170 fino a 220 N/mm²

PIPE CLAMP				
THERMAL PROPERTIES	TEST METHOD	Copolymer Polypropylene "PP". High resistance and limit of stretching strain 3060MN5	Polyamide "PA" Fiber glass reinforced and self-extinguishing AG5 FR PH2 0160 Black	ALUMINIUM ALLIGATION EN AB-ALSi11Cu2(Fe)
Flammability	UL 94	HB	V0	
Rekommended min/max temperature		-30° +90°C	-40° + 120°C	Up to +400°C

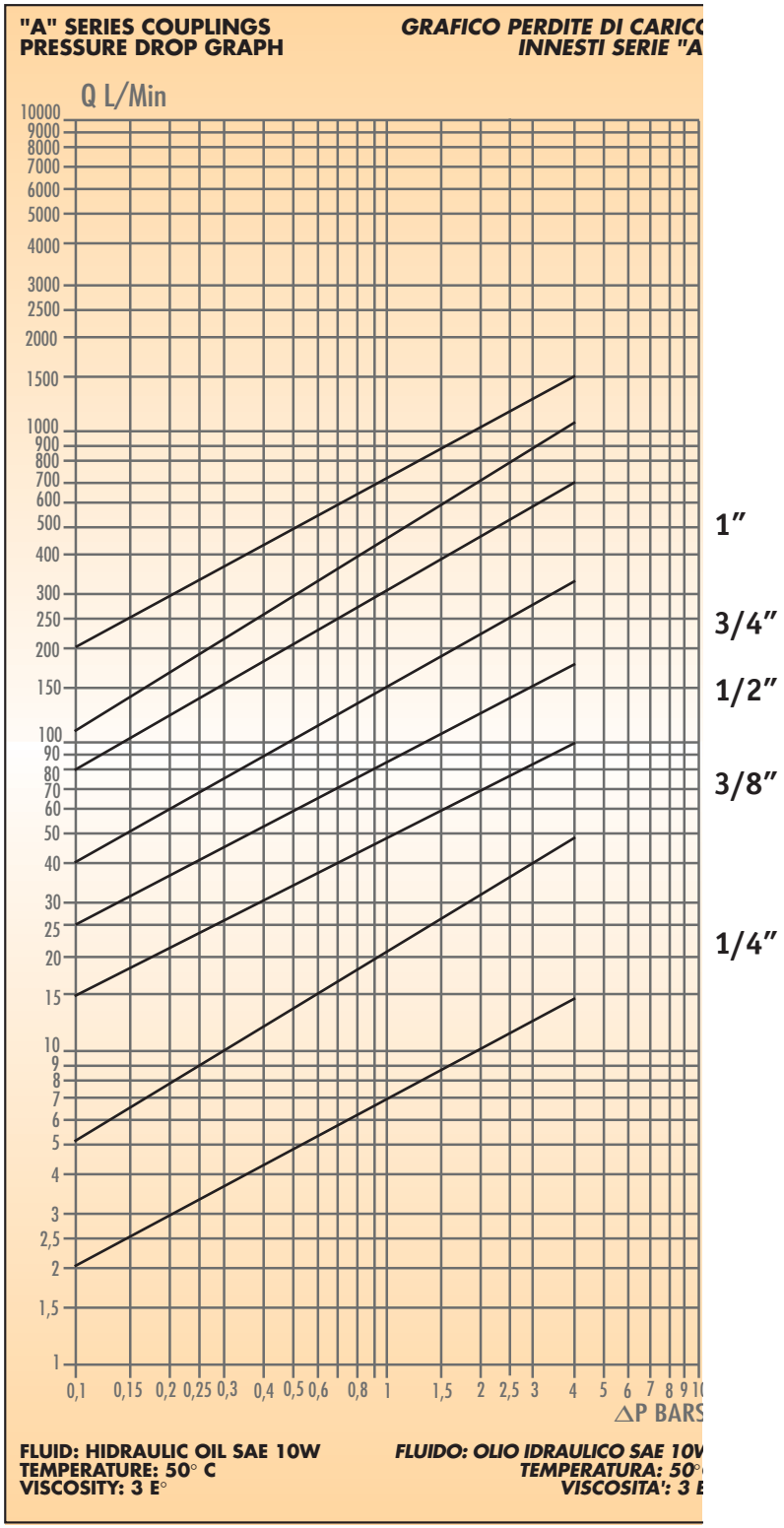
PIPE CLAMP				
ELECTRICAL PROPERTIES	TEST METHOD	Copolymer Polypropylene "PP". High resistance and limit of stretching strain 3060MN5	Polyamide "PA" Fiber glass reinforced and self-extinguishing AG5 FR PH2 0160 Black	ALUMINIUM ALLIGATION EN AB-ALSi11Cu2(Fe)
Resistance	DIN 53482	10^{18} Ohm x cm	10^{15} Ohm x cm	

PIPE CLAMP				
CHEMICAL PROPERTIES	TEST METHOD	Copolymer Polypropylene "PP". High resistance and limit of stretching strain 3060MN5	Polyamide "PA" Fiber glass reinforced and self-extinguishing AG5 FR PH2 0160 Black	ALUMINIUM ALLIGATION EN AB-ALSi11Cu2(Fe)
Low acid - alkaline solution		Limited resistance	Good resistance	
Gasoline - mineral oils		Good resistance	Good resistance	
Alcohol - other oils - sea water		Good resistance	Good resistance	

METAL PARTS			
MATERIAL TYPE	STANDARD	LIMIT OF STRETCHING STRAIN Rm N/mm²	HARDNESS
Aluminium alligation EN AB-AISi11Cu2(Fe)	EN AB - 46100	265-295	80 HBS
Steel Fe 360 (S235JR)	UNI EN - 10025	360-510	
Steel Fe 430B	UNI EN - 10025	330	
Steel Fe P11	UNI EN 10111	360-390	70 HRB
Steel AVP (11 SMn Pb 37)	UNI EN 10227-3	380-700	179 HB
Stainless steel AISI 316 L (X2CrNiMo17-12-2)	UNI EN 10088-2	530-680	
Zamak	UNI EN 3718		

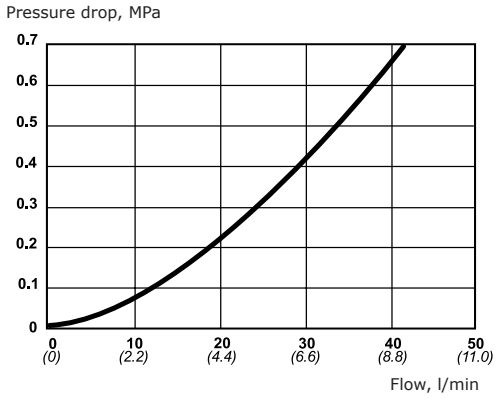
USED MATERIALS		
PRODUCT	MATERIAL	ARTICLE TYPE
Clamps	Copolymer Polypropylene "PP". High resistance and limit of stretching strain	
	Polyamid "PA" Fiberglass reinforced and self-extinguishing	Standard series - "CF"-series - "S"-series and heavy series
	Aluminium alligation EN AB-AISi11Cu2(Fe)	Standard series - Heavy series
	Steel FE 430 B	Super heavy series
Bushings and o-rings	Rubber compounds NBR 70	Art. AG - BG
Plates and accessories	Stainless steel AISI 316L	Specified products
	Steel Fe 360	Art. BB
	Steel Fe 430B	Art. P CP -PS CP - CDPS CP - CDP CP - PB CP - PA - PAM - CL - CM - CP - CQ/L/M/P
	Steel Fe P11	Art. P - PL - PS - PB - PD - PM - PM..1P - PM..2P - PCF - PSCF - PBCF - PMCF - PP - PPM - BBP
	Steel AVP	Art. VA - B - DF P
	Zamak	Art. DF M06 - DF M08
Surface treatment	All metal parts are electrolytically zink plated. Fe ZN 8 c (white) Fe ZN 8 c 2C (yellow) Only rail "BB" are plated according to "SENDIZIMIR" method.	

Pressure drop graph quick release fittings QRA

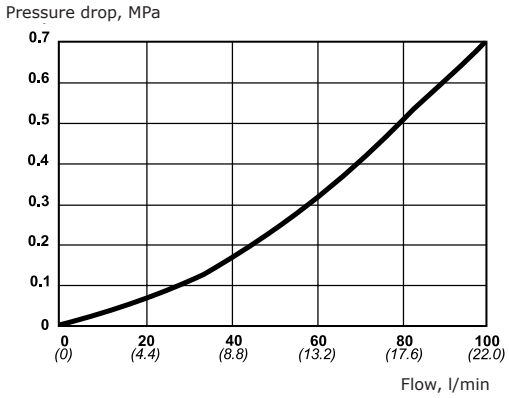


Pressure drop graph quick release fittings QRT

1/4″



3/8″



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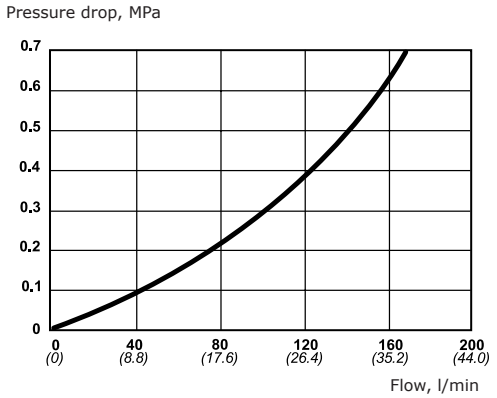

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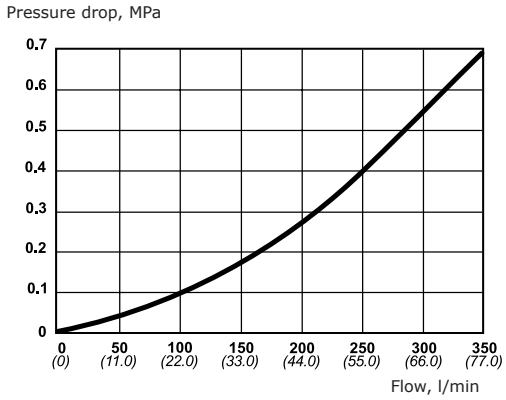

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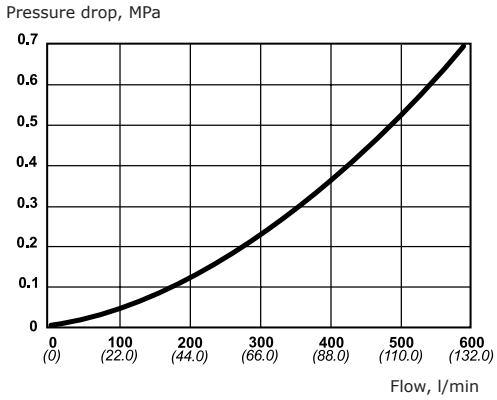
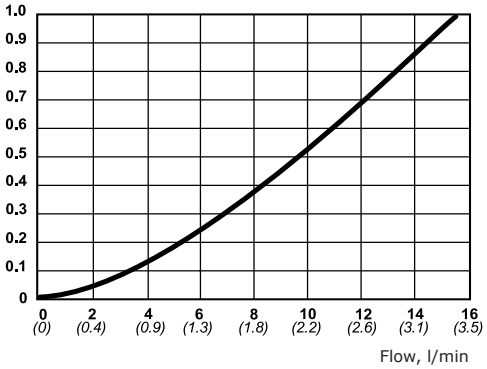


The flow capacity is measured at 0,4 MPa (4 bar) pressure drop

Pressure drop graph quick release fittings QRF

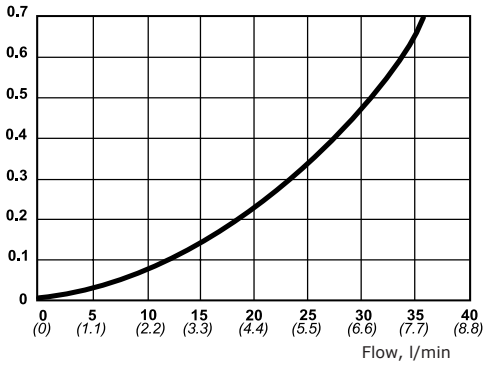
DN 05

Pressure drop, MPa



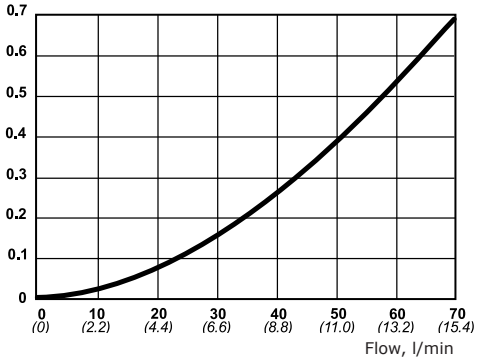
DN 06

Pressure drop, MPa



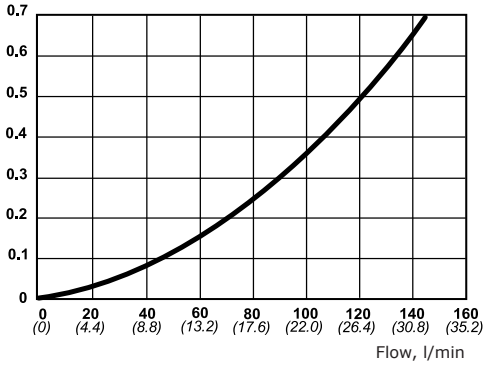
DN 10

Pressure drop, MPa



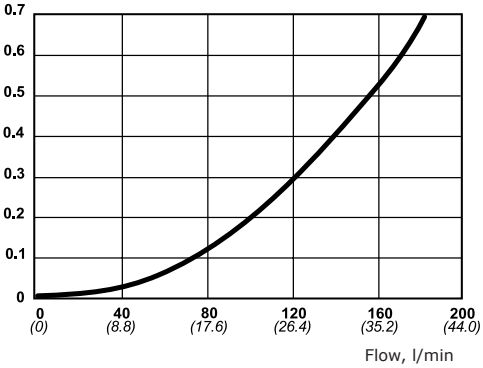
DN 12

Pressure drop, MPa



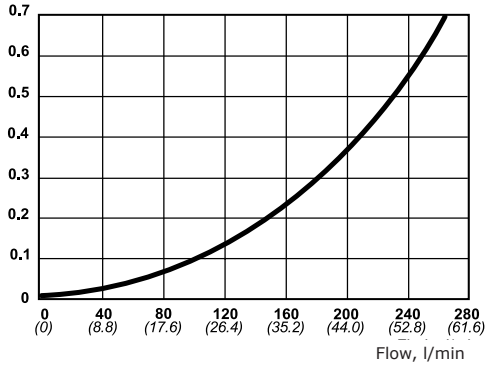
DN 16

Pressure drop, MPa



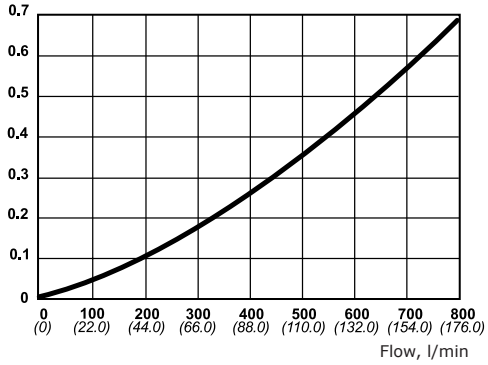
DN 19

Pressure drop, MPa



DN 25

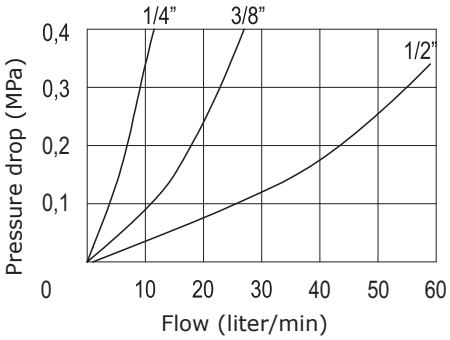
Pressure drop, MPa



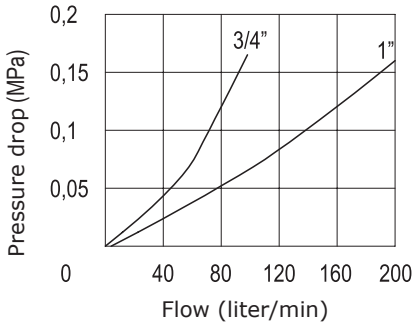
The flow capacity is measured at 0,1 MPa (1 bar) pressure drop

Pressure drop graph quick release fittings

ISO A 1/4" – 1/2"

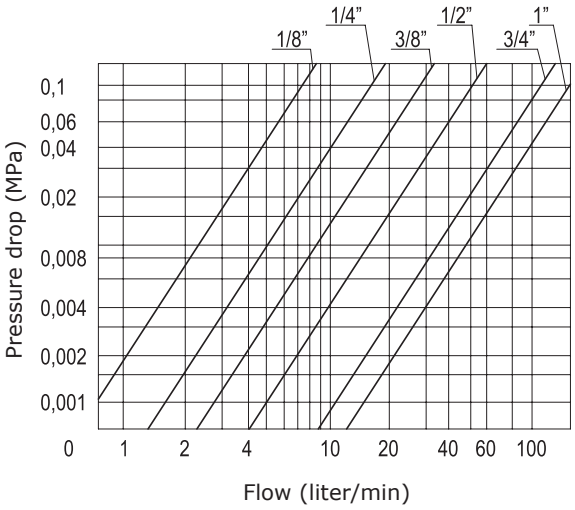


ISO A 3/4" – 1"

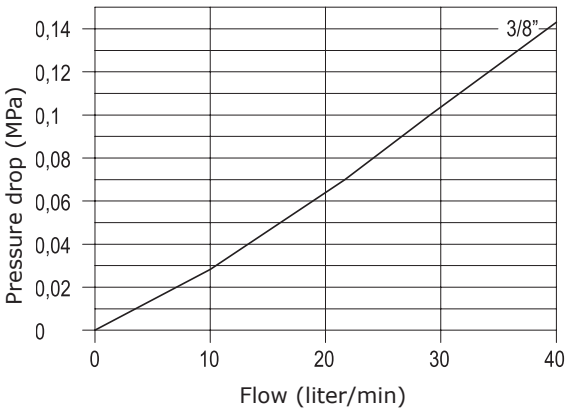


Mineral oil
Viscosity: 80 Centistokes

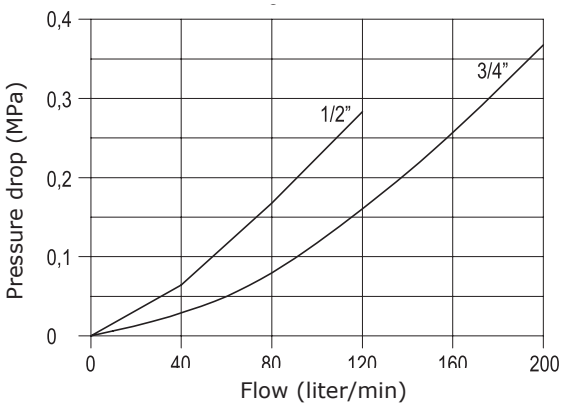
HANSEN Design HK



Brunning FF 370



Brunning FF 500 & 750

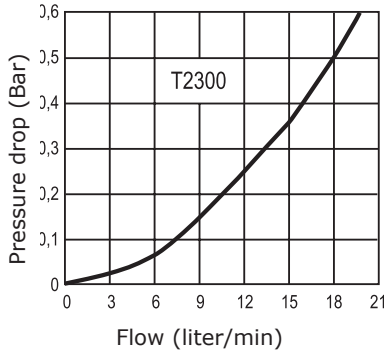


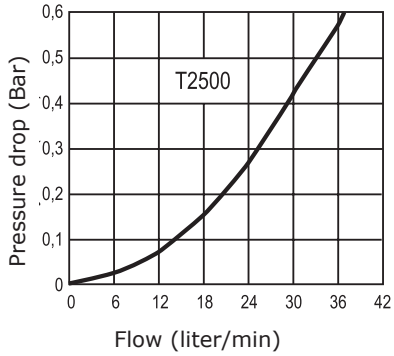
Mineral oil
According to MIL-H 5606
Temperature: 38°C

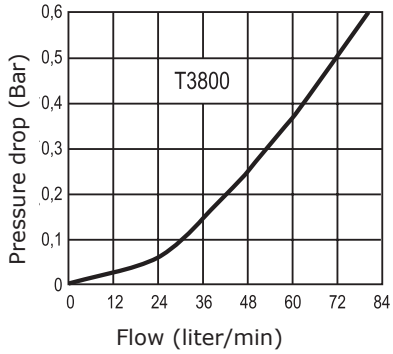
Pressure drop graph quick release fittings

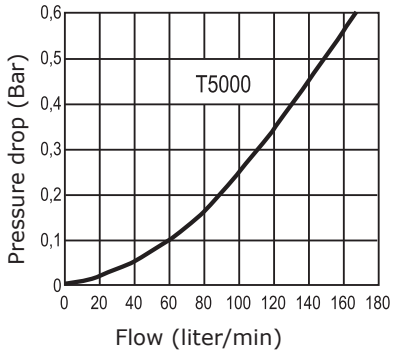
TEMA T-serie

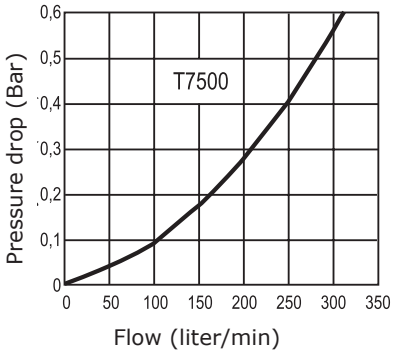
Viscosity 32cSt at 40°C
According to ISO 7241-2:2000

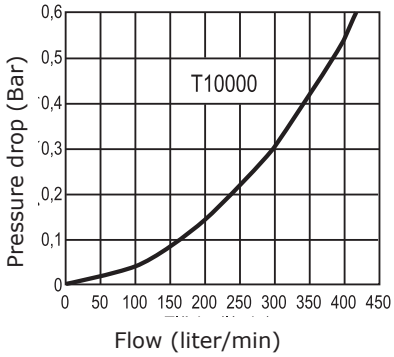


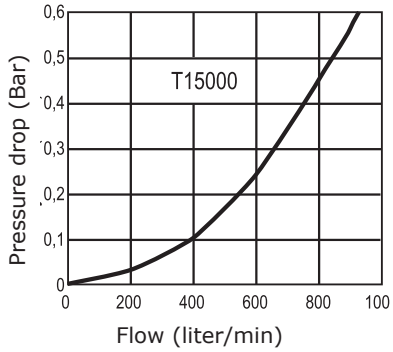


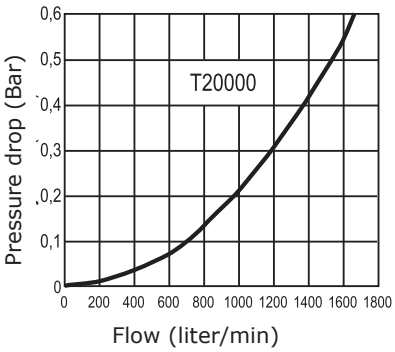




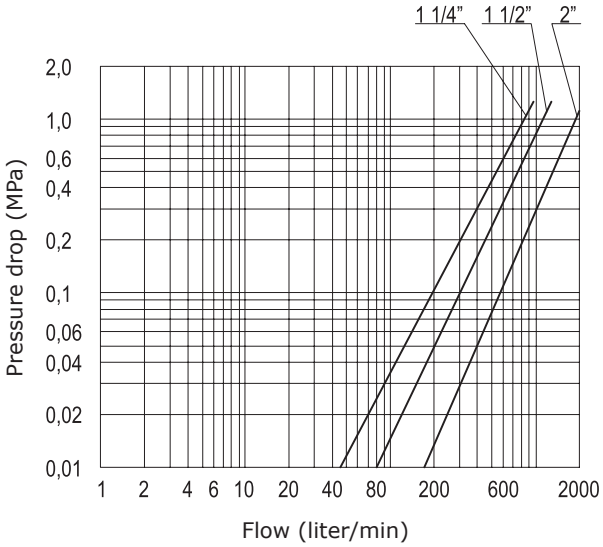




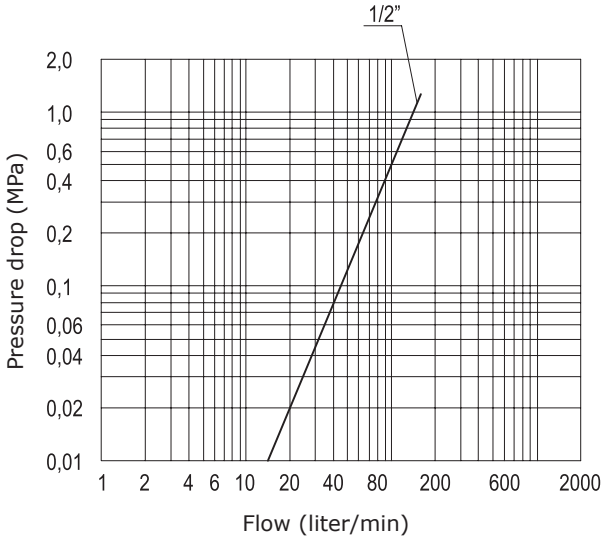




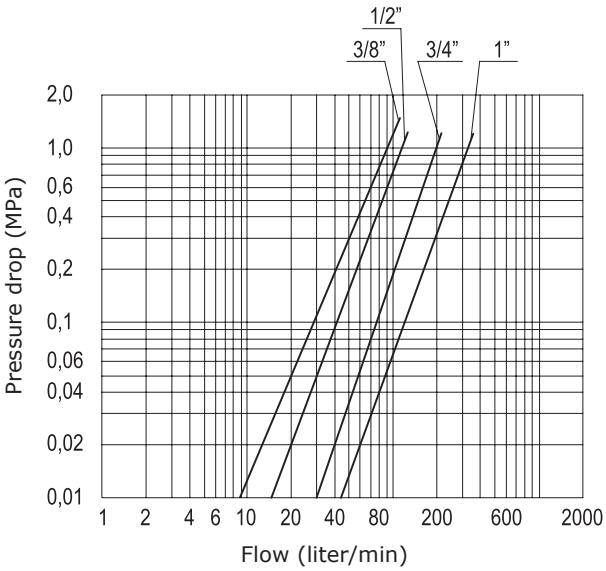
Pressure drop graph quick release fittings



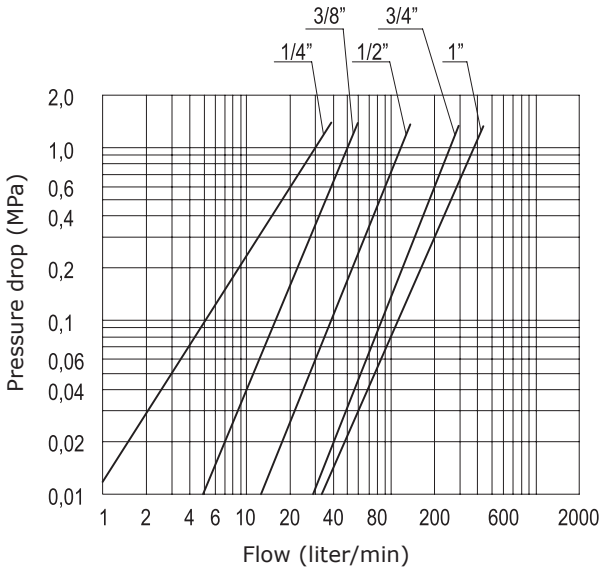
FASTER – NV
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C



FASTER – PV
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

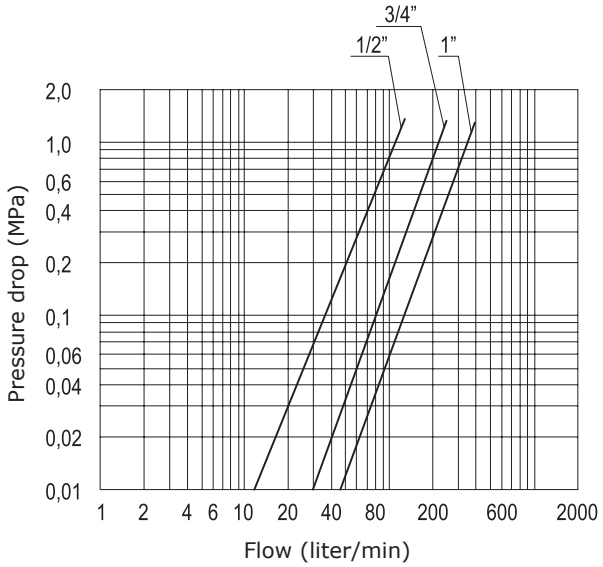


FASTER – FFN
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

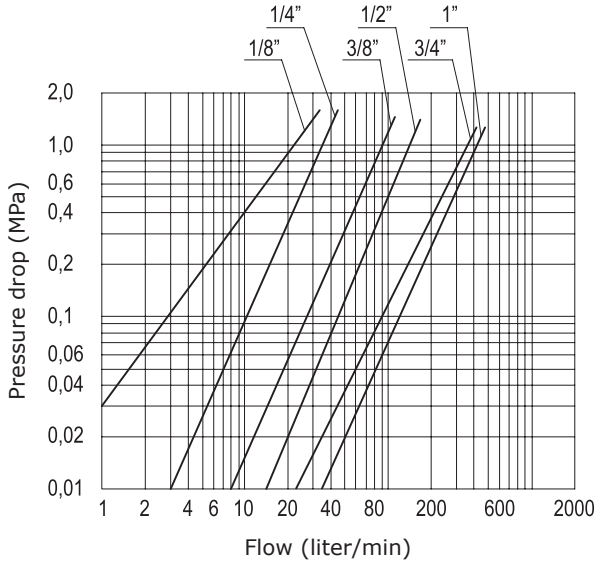


FASTER – VV
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

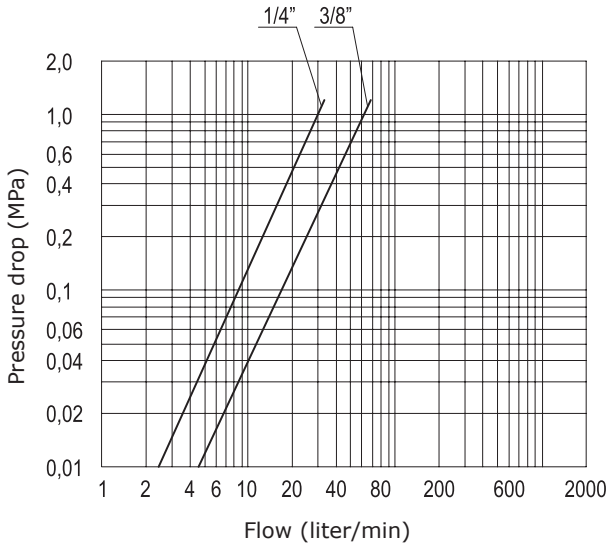
Pressure drop graph quick release fittings



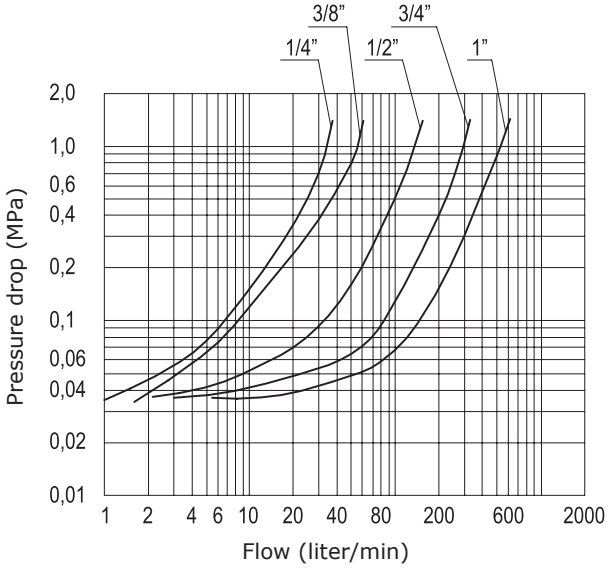
FASTER – FFV
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C



FASTER – HNV
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

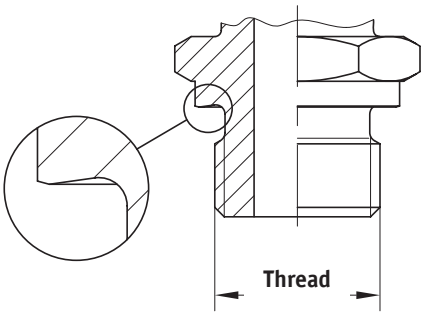


FASTER – PVVM
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

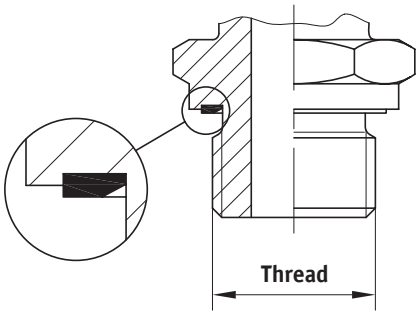


FASTER – Non-return valve
Mineral oil
Viscosity: 20 Centistokes
Temperature: 50°C

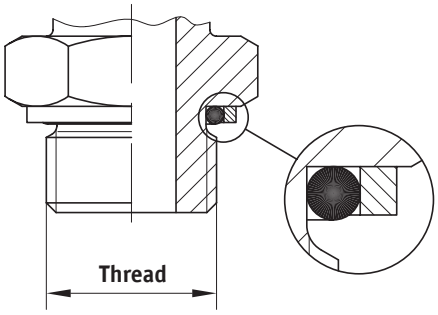
SEALING PRINCIPLES



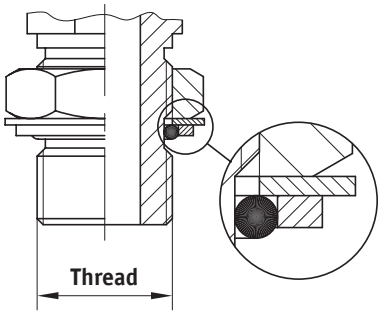
DIN 3852-2
DESIGN B
ISO 1179-4



DIN 3852-11
DESIGN E
ISO 1179-2



ISO 1179-3
DESIGN H



ISO 1179-4
DESIGN G

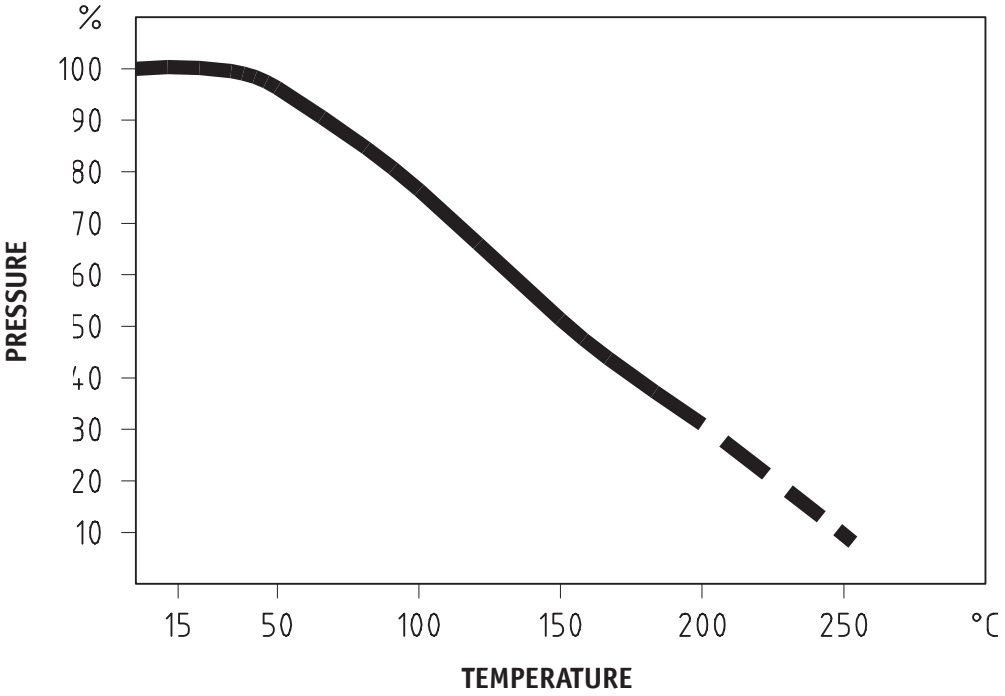
Tightening torque for connection end
Can not be applied on banjo fittings or conical threaded fittings.

BSP Thread	Torque (Nm) design B	Torque (Nm) design E,H,G
G 1/8"	20	
G 1/8"	20	20
G 1/4"	45	45
G 3/8"	70	70
G 1/2"	130	85
G 1/2"	130	85
G 3/4"	170	170
G 1"	330	330
G 1 1/4"	510	430
G 1 1/2"	600	510

Metric Thread	Torque (Nm) design B	Torque (Nm) design E,H,G
M 10x1.0	20	
M 10x1.0	20	20
M 12x1.5	30	30
M 14x1.5	45	45
M 16x1.5	60	55
M 18x1.5	80	70
M 22x1.5	130	120
M 26x1.5	180	170
M 42x2.0	470	430
M 48x2.0	600	510
M 14x1.5	55	55
M 20x1.5	150	105
M 27x2.0	200	170
M 33x2.0	390	330

UN/UNF Thread	Torque (Nm)
7/16"-20 UNF	20
1/2"-20 UNF	25
9/16"-18 UNF	30
3/4"-16 UNF	45
1 1/16"-12 UN	85
1 5/16"-12 UN	130
1 5/16"-12 UN	170
1 7/8"-12 UN	180
7/8"-14 UNF	55

Temperature effect on working pressure of the P.T.F.E. hose



Flow diameter

DETERMINING PIPE DIMENSION FOR HYDRAULIC SYSTEMS

For a smooth and trouble-free piping system, it is important to use the correct pipe dimension, type, material and connection type for the application. Choosing the correct pipe involves choosing the right quality and determine the optimal dimension (O.D. and wall thickness).

A pipe dimension that is too small causes high fluid velocity, which has many detrimental effects. In pressure lines, it causes high friction losses and turbulence, both resulting in high pressure drops and heat generation. High temperatures causes damage and wear in moving parts and rapid aging of seals and hoses.

DETERMINING RECOMMENDED FLOW DIAMETER

Use the table to determine recommended flow diameter for the required flow rate. The table is based on the following flow rates:

Pressure lines - 3 --> 5 $\left[\frac{m}{s}\right]$

Avoid flow rates > 8 m/s

The resulting forces are high and can damage the pipe.

Return lines - 2 --> 4 $\left[\frac{m}{s}\right]$

Suction lines - 1 $\left[\frac{m}{s}\right]$

	Flow diameter in millimeter		
Max flow l/min	5 m/s Pressure lines	3 m/s Pressure lines	1 m/s Pressure lines
1	2,1	2,7	4,6
2	2,9	3,8	6,5
3	3,6	4,6	8,0
4	4,1	5,3	9,2
5	4,6	6,0	10,3
6	5,1	6,5	11,3
7	5,5	7,0	12,2
8	5,8	7,5	13,0
9	6,2	8,0	13,8
10	6,5	8,4	14,6
12	7,1	9,2	16,0
14	7,7	10,0	17,2
16	8,2	10,6	18,4
18	8,7	11,3	19,6
20	9,2	11,9	20,6
22	9,7	12,5	21,6
24	10,1	13,0	22,6
26	10,5	13,6	23,5
28	10,9	14,1	24,4
30	11,3	14,6	25,3
32	11,7	15,1	26,1
34	12,0	15,5	26,9
36	12,4	16,0	27,7
38	12,7	16,4	28,4
40	13,0	16,8	29,2
45	13,8	17,9	30,9
50	14,6	18,8	32,6
55	15,3	19,7	34,2
60	16,0	20,6	35,7
65	16,6	21,5	37,2
70	17,2	22,3	38,6
75	17,9	23,1	39,9
80	18,4	23,8	41,2
85	19,0	24,5	42,5
90	19,6	25,3	43,7
95	20,1	25,9	44,9
100	20,6	26,6	46,1
110	21,6	27,9	48,4
120	22,6	29,2	50,5
130	23,5	30,3	52,6
140	24,4	31,5	54,5
150	25,3	32,6	56,5
160	26,1	33,7	58,3
170	26,9	34,7	60,1
180	27,7	35,7	61,8
190	28,4	36,7	63,5
200	29,2	37,6	65,2
220	30,6	39,5	68,4
240	31,9	41,2	71,4
260	33,2	42,9	74,3
280	34,5	44,5	77,1
300	35,7	46,1	79,8
320	36,9	47,6	82,5
340	38,0	49,1	85,0
360	39,1	50,5	87,5
380	40,2	51,9	89,9
400	41,2	53,2	92,2
450	43,7	56,5	97,8
500	46,1	59,5	103,1

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