



HANDBOOK
PIPING ACCESSORIES

Ed. 2017

 **Castel**[®]
Italian technology

CHAPTER 2

THREADED BRASS FITTINGS

FOR REFRIGERATION PLANTS THAT USE HCFC, HFC, HC, HFO,
OR R744 REFRIGERANTS



APPLICATIONS

The fittings illustrated in this chapter are designed for installation on commercial refrigeration systems and on civil and industrial air conditioning plants that use the following refrigerant fluids:

- HCFC (R22)
- HFC (R134a, R404A, R407C, R410A, or R507)
- HFO and HFO/HFC mixtures (R1234ze, R448A, R449A, R450A, and R452A)
- R744 subcritical and transcritical, limited to components with PS = 120 bar

belonging to Group 2, as defined in Article 13, Chapter 1, Point (b) of Directive 2014/68/EU, with reference to EC Regulation No. 1272/2008.

Furthermore, fittings up to DN 25, they can also be installed on systems that use the following refrigeration fluids:

- HFC (R32)
- HFO (R1234yf)
- HC (R290, R600, or R600a)

belonging to Group 1, as defined in Article 13, Chapter 1, Point (a) of Directive 2014/68/EU, with reference to EC Regulation No. 1272/2008.

For specific applications with refrigerant fluids not listed above, please contact Castel Technical Department.

OPERATION

The sealing system between the end of a male connection and a union in series 7010, 7020 and 7030 requires a special flaring of the end of copper pipe, the so-called flared connection.

The sealing system between the end of a male connection and a Flare-ODS adapter allows avoiding flaring the end of the copper pipe (national laws of some European countries do not accept this operation) as the end of the copper pipe is brazed into the adapter joint. We wish to remind our customers that perfect seal of the male connector / Flare-ODS adapter can only be ensured using the appropriate tapered gasket, 7580, supplied with the adapter.

The flange joints in series 7630 consist of two brass bushes for brazing to the copper pipes. Once this connection has been made, the joint seal is ensured by the compression of a gasket between the bushes. This compression occurs when the four flange screws are tightened.

CONSTRUCTION

All nuts from series 7010 to series 7050, and all the elbows, T and cross fittings, from series 7210 to series 7410, are manufactured with hot forged brass EN 12420 – CW 617N. All straight fittings, from series 7110 to series 7170, and all plugs, from series 7510 to series 7520, are machined from brass bars EN 12164 – CW 614N.

Caps in series 7560 and tapered gaskets in series 7580 are from copper Cu – ETP UNI 5649.

The main parts of the flanged joints in series 7630 are made with the following materials:

- Hot forged brass EN 12420 – CW 617N for bushes and flanges.
- Aramid fibres for flange gaskets.

TABLE 2: General characteristics of flange joints

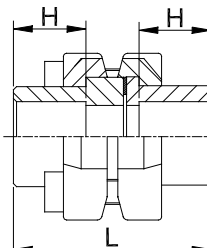
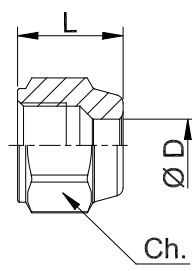
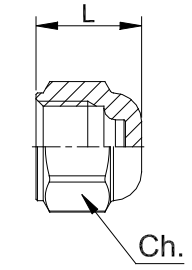
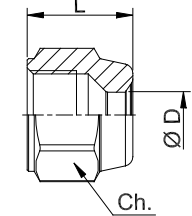
	Catalogue Number	Connections		PS [bar]	TS [°C]		TA [°C]		Dimensions [mm]		Wrench torque min/max [Nm]	Weight [g]
		ODS			min	max	min	max	H	L		
		Ø [in.]	Ø [mm]									
	7630/7	7/8"	–	45	-40	+130	-40	+50	22	63	20 / 24	612
	7630/9	1.1/8"	–						23			490
	7630/11	1.3/8"	35						42 / 50	1100		
	7630/13	1.5/8"	–							24	1412	
	7630/M42	–	42						68 / 80	2020		
	7630/17	2.1/8"	54								25	71

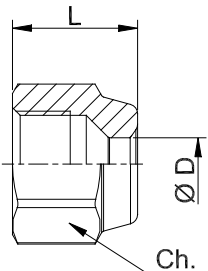
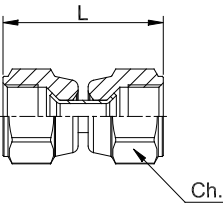
TABLE 3: General characteristics of unions

	Catalogue Number	International Reference	SAE Flare	Copper pipe		PS [bar]	Dimensions [mm]			Wrench torque min / max [Nm]	Weight [g]
				Ø [in.]	Ø [mm]		Ø D	L	Ch		
SAE-Flare nuts (inch tubing)											
	7010/22	NS4-4	1/4"	1/4"	6	45	6,5	15,5	17	11 / 14	19
	7010/33	NS4-6	3/8"	3/8"	–		9,7	19,5	22	20 / 25	36
	7010/44	NS4-8	1/2"	1/2"	–		13	22,5	25	34 / 47	50
	7010/55	NS4-10	5/8"	5/8"	16		16,2	25	28	54 / 75	66
	7010/66	NS4-12	3/4"	3/4"	–		19,4	29,5	33	68 / 71	99
	7010/77	NS4-14	7/8"	7/8"	22		22,5	36,5	41	90 / 120	194
	7010/88	NS4-16	1"	1"	–						
	SAE-Flare cap nuts										
	7020/20	N5-4 CAP NUT	1/4"	blind	blind	120	–	15	16	8,5 / 11,5	16
	7020/X02	N5-5 CAP NUT	5/16"								14
	7020/30	N5-6 CAP NUT	3/8"								14
	7020/40	N5-58 CAP NUT	1/2"								14
SAE-Flare reducing nuts (inch tubing)											
	7020/32	NRS4-64	3/8"	1/4"	6	45	6,5	19,5	22	20 / 25	38
	7020/43	NRS4-86	1/2"	3/8"	–		9,7	22,5	25	34 / 47	52
	7020/54	NRS4-108	5/8"	1/2"	–		13	25	28	54 / 75	71
	7020/65	NRS4-1210	3/4"	5/8"	16		16,2	29,5	33	68 / 71	104
	7020/87	NRS4-1614	1"	7/8"	22		22,5	36,5	41	120 / 150	160

(1) : shortened

Continued

TABLE 3: General characteristics of unions

	Catalogue Number	International Reference	SAE Flare	Copper pipe		PS [bar]	Dimensions [mm]			Wrench torque min / max [Nm]	Weight [g]
				Ø [in.]	Ø [mm]		Ø D	L	Ch		
SAE-Flare nuts (metric tubing)											
	7030/2M5	-	1/4"	-	5	45	5,2	15,5	17	11 / 14	19
	7030/3M8		3/8"		8		8,2	19,5	22	20 / 25	35
	7030/3M10		10		10,2		22,5	25	34 / 47	36	
	7030/4M10		10		10,2					52	
	7030/4M12		12		12,2		25	28	54 / 75	51	
	7030/X04 (1)		12		12,5					19,5	46
	7030/4M14		14		14,2		22,5	25	28	54 / 75	48
	7030/5M12		12		12,2		14,2				71
	7030/5M14		14		14,2		29,5	33	68 / 71	69	
	7030/6M14		14		14,2					107	
	7030/6M18		18		18,2		102				
	SAE-Flare twin nuts										
	7050/2	US4-4	1/4"	-	-	45	-	32	17	11 / 14	39
	7050/3	US4-6	3/8"					40	22	20 / 25	75
	7050/4	US4-8	1/2"					46	25	34 / 47	105
	7050/5	US4-10	5/8"					51	28	54 / 75	140

(1) : shortened

TABLE 4: General characteristics of unions

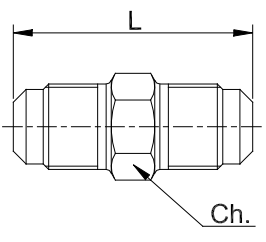
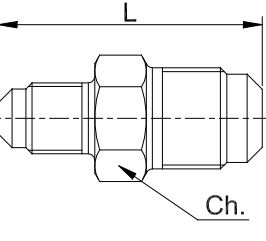
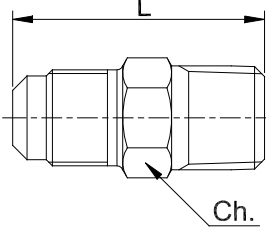
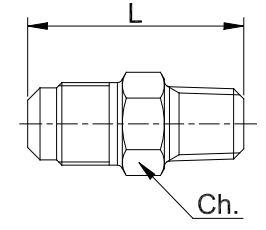
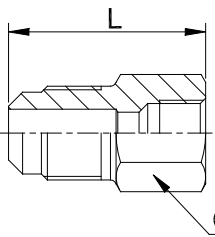
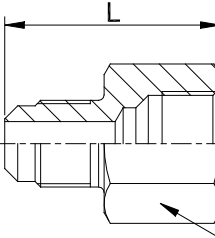
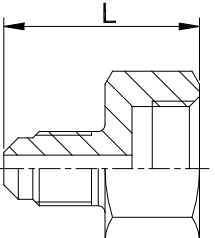
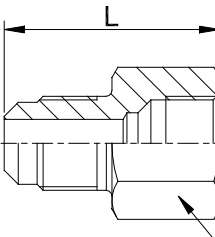
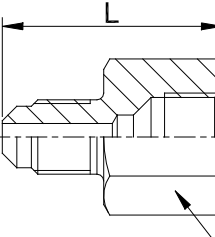
	Catalogue Number	International Reference	Connections		PS [bar]	Dimensions [mm]		Weight [g]
			SAE Flare	NPT		L	Ch	
SAE-Flare unions								
	7110/2	U2-4	1/4"	-	120	38	12	23
	7110/3	U2-6	3/8"			44	17	46
	7110/4	U2-8	1/2"			50	20	73
	7110/5	U2-10	5/8"			58	23	113
	7110/6	U2-12	3/4"			63	27	164
	7110/8	U2-16	1"			72	36	304
Reducing SAE-Flare unions								
	7120/23	UR2-64	1/4" x 3/8"	-	120	42	17	38
	7120/24	UR2-84	1/4" x 1/2"			45	20	58
	7120/34	UR2-86	3/8" x 1/2"			48		66
	7120/35	UR2-106	3/8" x 5/8"			52	23	89
	7120/45	UR2-108	1/2" x 5/8"			54	23	98
	7120/46	UR2-128	1/2" x 3/4"			57,5	27	136
	7120/56	UR2-1210	5/8" x 3/4"			61,5	27	150
SAE Flare / NPT unions								
	7130/2	U1-4B	1/4"	1/4"	120	38,1	14	32
	7130/3	U1-6C	3/8"	3/8"		41,2	17	48
	7130/4	U1-8D	1/2"	1/2"		49,8	22	92
	7130/6	U1-12F	3/4"	3/4"		57,6	27	152
	7130/8	U1-16H	1"	1"		68	36	277
SAE Flare / NPT reducing unions								
	7140/21	U1-4A	1/4"	1/8"	120	32,9	12	20
	7140/32	U1-6B	3/8"	1/4"		41,1	17	39
	7140/34	U1-6D	3/8"	1/2"		45,8	22	77
	7140/43	U1-8C	1/2"	3/8"		45,2	20	63
	7140/54	U1-10D	5/8"	1/2"		53,8	23	102

TABLE 5: General characteristics of unions

	Catalogue Number	International Reference	Connections						PS [bar]	Dimensions [mm]		Weight [g]	
			SAE Flare		NPT	GAS	ODS			L	Ch		
			m	f			Ø [in.]	Ø [mm]					
Male/female reducing unions (reduced female)													
	7150/21	U3-4A	1/4"	-	1/8" f					120	29	14	21
	7150/32	UR3-46	3/8"	1/4"							33	17	38
	7150/42	UR3-48	1/2"	1/4"							35	22	75
	7150/43	UR3-68	1/2"	3/8"	-	-	-	-			38	22	66
	7150/54	UR3-810	5/8"	1/2"							45	25	99
	7150/64	UR3-812	3/4"	1/2"							46,5	27	132
	7150/65	UR3-1012	3/4"	5/8"							49,5	30	157
Male/female reducing unions (reduced male)													
	7150/X29	-	-	1/4"	1/8"					120	24	17	24
	7150/X27	-	-	1/4"	1/4"						30	17	35
	7150/23	UR3-64	1/4"	3/8"							33	22	49
	7150/24	UR3-84	1/4"	1/2"							36	25	66
	7150/34	UR3-86	3/8"	1/2"							39		74
	7150/45	UR3-108	1/2"	5/8"							44	30	125
	7150/46	UR3-128	1/2"	3/4"							45	34	142
	7150/56	UR3-1210	5/8"	3/4"							49	34	157
Cylinder adaptors													
	7154/2		1/4"	20 - 14 left thread, female					45	29	25	46	
	7156/2		1/4"	W 21,8 - 14 right thread, female							27	52	
Male/female unions													
	7160/2		1/4"	1/4"						45	30,5	17	31
	7160/3		3/8"	3/8"							36	22	57
	7160/4		1/2"	1/2"							41	25	84
Unions SAE-Flare to BSP													
	7164/2		1/4"	-		G1/4" f				45	32,5	20	45
	7166/2		-	1/4"		G1/4" m					32	17	25

Continued

TABLE 5: General characteristics of unions

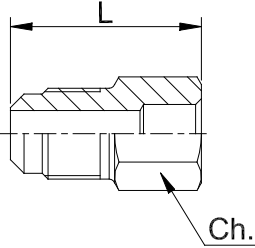
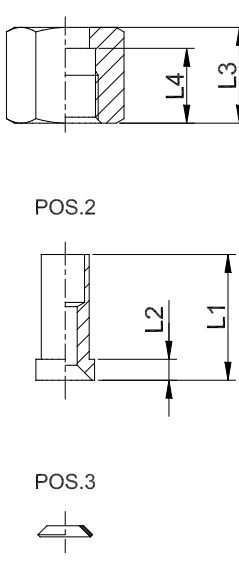
	Catalogue Number	International Reference	Connections					PS [bar]	Dimensions [mm]		Weight [g]	
			SAE Flare		NPT	GAS	ODS		L	Ch		
			m	f			Ø [in.]					Ø [mm]
Male SAE-Flare/solder unions												
	7170/22	US3-44	1/4"	-	-	-	1/4"	-	120	26,5	12	17
	7170/2M8	-					-	8				
	7170/33	US3-66	3/8"				3/8"	-		33	17	39
	7170/3M8	-					-	8				
	7170/3M10	-					-	10				
	7170/34	US3-68	1/2"				1/2"	-		35	20	53
	7170/44	US3-88					-	12				
	7170/4M12	-	5/8"				5/8"	16		42	23	82
	7170/55	US3-1010					-	18				
	7170/6M18	-					-	16		45,5	27	123
	7170/65	US3-1210	3/4"				5/8"	16		50	36	241
	7170/87	US3-1614					7/8"	22				

TABLE 6: General characteristics of unions

	Catalogue Number	Item Position	Connections			PS [bar]	Dimensions [mm]					Wrench torque min / max [Nm]	Weight [g]
			SAE Flare	ODS			L ₁	L ₂	L ₃	L ₄	Ch		
				Ø [in.]	Ø [mm]								
Flare / ODS adapters													
	9901/X11	1	1/4"	-	6	120	-	-	16	12,5	17	11 / 14	274
		2					21	3,5	-	-	-	-	
		3					-						
	9901/X12	1	3/8"	-	10		-	-	18,5	14,7	22	20 / 25	393
		2					23,5	4	-	-	-	-	
		3					-						
	9901/X13	1	1/2"	-	12		-	-	21	17	27	34 / 47	672
		2					26	4,5	-	-	-	-	
		3					-						
	9901/X14	1	5/8"	5/8"	16		-	-	22,5	18	30	54 / 75	511
		2					27,5	5	-	-	-	-	
		3					-						
9901/X15	1	3/4"	-	18	-	-	25	20	36	68 / 71	806		
	2				30	5	-	-	-	-			
	3				-								
9901/X16	1	1/4"	1/4"	-	-	-	16	12,5	17	11 / 14	274		
	2				21	3,5	-	-	-	-			
	3				-								
9901/X17	1	3/8"	3/8"	-	-	-	18,5	14,7	22	20 / 25	383		
	2				23,5	4	-	-	-	-			
	3				-								
9901/X18	1	1/2"	1/2"	-	-	-	21	17	27	34 / 47	672		
	2				26	4,5	-	-	-	-			
	3				-								
9901/X19	1	3/4"	3/4"	-	-	-	25	20	36	68 / 71	806		
	2				30	5	-	-	-	-			
	3				-								

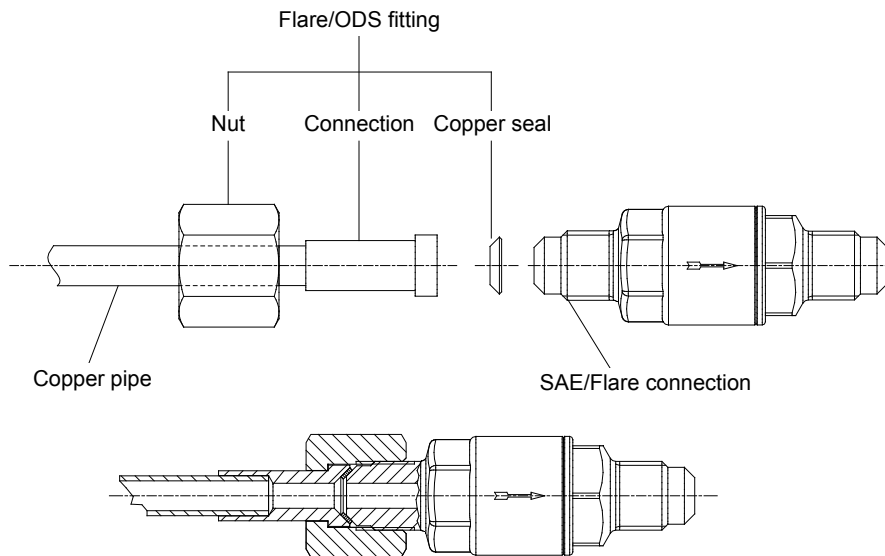


TABLE 7: General characteristics of unions

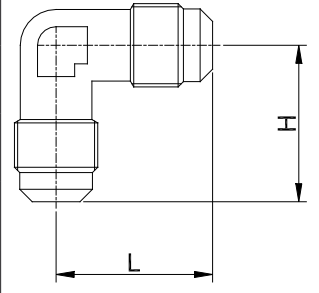
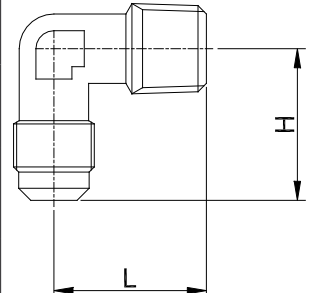
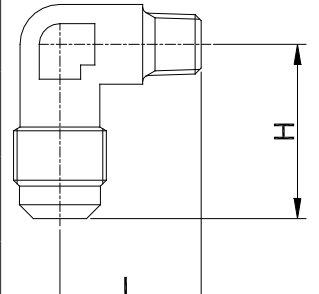
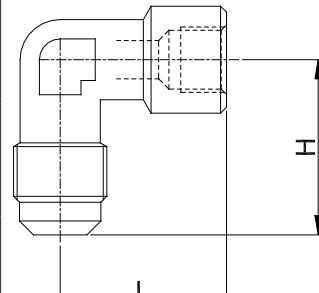
	Catalogue Number	International Reference	Connections			PS [bar]	Dimensions [mm]		Weight [g]
			SAE Flare		NPT		H	L	
			m	f					
SAE-Flare elbows									
	7210/2	E2-4	1/4"			120	24,5	24,5	24
	7210/3	E2-6	3/8"				29,5	29,5	60
	7210/4	E2-8	1/2"	-	-		32,5	32,5	80
	7210/5	E2-10	5/8"				36	36	116
	7210/6	E2-12	3/4"				42,5	42,5	192
SAE-Flare / NPT elbows									
	7220/2	E1-4B	1/4"		1/4"	120	26	24	33
	7220/3	E1-6C	3/8"		3/8"		29,5	28,5	54
	7220/4	E1-8D	1/2"	-	1/2"		32,5	32	91
	7220/6	E1-12F	3/4"		3/4"		42,5	39,5	183
SAE-Flare / reduced NPT elbows									
	7230/21	E1-4A	1/4"		1/8"	120	24,5	23,5	25
	7230/32	E1-6B	3/8"		1/4"		29,5	29,5	46
	7230/43	E1-8C	1/2"		3/8"		32,5	31	97
	7230/54	E1-10D	5/8"		1/2"		36	35	112
Male/female SAE-Flare elbows									
	7240/2		1/4"	1/4"		120	28,5	28	56
	7240/3	-	3/8"	3/8"	-		32	31	80
	7240/4		1/2"	1/2"			39,5	38	200

TABLE 8: General characteristics of unions

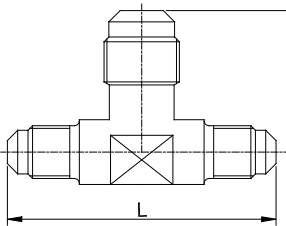
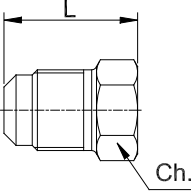
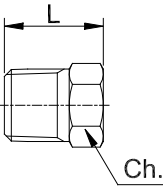
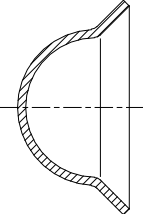

	Catalogue Number	International Reference	Connections					PS [bar]	Dimensions [mm]		Weight [g]
			SAE Flare				NPT (3)		H	L	
			(1)	(2)	(3)	(4)					
SAE-Flare TEE											
	7310/2	T2-4	1/4"	1/4"	1/4"	-	-	120	23,5	47	35
	7310/3	T2-6	3/8"	3/8"	3/8"				29	58	70
	7310/4	T2-8	1/2"	1/2"	1/2"				31,5	63	98
	7310/5	T2-10	5/8"	5/8"	5/8"				36	72	150
	7310/6	T2-12	3/4"	3/4"	3/4"				41,5	83	235
SAE-Flare reducing TEE (reduced side connections)											
	7320/223	TR2-46	1/4"	1/4"	3/8"	-	-	120	29	56	77
	7320/334	TR2-68	3/8"	3/8"	1/2"				32,5	63	95
	7320/445	TR2-810	1/2"	1/2"	5/8"				38	72	153
	7320/556	TR2-1012	5/8"	5/8"	3/4"				41,5	83	228
SAE-Flare reducing TEE (reduced central connection)											
	7320/332	TR2-64	3/8"	3/8"	1/4"	-	-	120	28	58	77
	7320/443	TR2-86	1/2"	1/2"	3/8"				32,5	63	101
	7320/554	TR2-108	5/8"	5/8"	1/2"				38	72	149
	7320/665	TR2-1210	3/4"	3/4"	5/8"				41,5	83	232
SAE-Flare / NPT TEE (taper central connection)											
	7330/221	T1-4A	1/4"	1/4"	-	-	1/8"	120	21	47	33
	7330/222	T1-4B	1/4"	1/4"			1/4"		24	51	45
	7330/332	T1-6B	3/8"	3/8"			1/4"		28	58	65
Male/female SAE-Flare TEE (female central connection)											
	7340/222	T6-4	1/4"	1/4"	1/4"	-	-	120	27,5	56	73
SAE-Flare / NPT TEE (taper central connection)											
	7410/2	C1-4	1/4"	1/4"	1/4"	1/4"	-	120	52	52	72

TABLE 9: General characteristics of unions

	Catalogue Number	International Reference	Connections		PS [bar]	Dimensions [mm]		Wrench torque min/max [Nm]	Weight [g]
			SAE Flare	NPT		L	Ch		
SAE-Flare plugs									
	7510/2	P2-4	1/4"	-	120	23	12	11 / 14	19
	7510/3	P2-6	3/8"			26	17	20 / 25	40
	7510/4	P2-8	1/2"			30	20	34 / 47	67
NPT plugs									
	7520/1	121-B-02	-	1/8"	120	15,9	12	10 / 13	12
	7520/2	121-B-04		1/4"		23,1	14	15 / 20	27
	7520/3	121-B-06		3/8"		23,2	17	17 / 22	43
	7520/4	121-B-08		1/2"		29,8	22	25 / 35	87
	7520/6	121-B-12		3/4"		32,1	27	30 / 40	149
	7520/8	121-B-16		1"		39	34	60 / 80	279
Copper seal caps									
	7560/2	B1-4	1/4"	-	45	-	-	-	0,5
	7560/3	B1-6	3/8"						1,1
	7560/4	B1-8	1/2"						2,5
	7560/5	B1-10	5/8"						2,6
	7560/6	B1-12	3/4"						3,7
	7560/7	B1-14	7/8"						5,3
Copper gaskets									
	7580/2	B2-4	1/4"	-	45	-	-	-	0,2
	7580/3	B2-6	3/8"						0,5
	7580/4	B2-8	1/2"						0,7
	7580/5	B2-10	5/8"						1,1
	7580/6	B2-12	3/4"						1,2

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