

HANDBOOK  
**VALVES FOR REFRIGERATING SYSTEMS**

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## APPLICATIONS

The check valves, shown in this chapter, are classified “Pressure accessories” in the sense of the Pressure Equipment Directive 97/23/EC, Article 1, Section 2.1.4 and are subject of Article 3, Section 1.3 of the same Directive.

They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, which use the following refrigerant fluids: R22, R134a, R404A, R407C, R410A; R507 proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC). For specific applications with refrigerant fluids not listed above, always proper to the Group II, please contact Castel Technical Department.

## MATERIALS

The main parts of the valves are made with the following materials:

- Hot forged brass EN 12420 – CW 617N for body and cover
- Copper tube EN 12735-1 – Cu-DHP for solder connections
- Austenitic stainless steel AISI 302 for the spring
- Chloroprene rubber (CR) for outlet seal gaskets. Metal-rubber laminated gaskets for the valves series 3122, 3142 and 3182
- P.T.F.E. for seat gasket

## INSTALLATION

The valves can be installed in any section of a refrigerating system, where it is necessary to avoid an inversion of the refrigerating flow, in compliance with the limits and capacities indicated in table 2. Table 1 shows the following functional characteristics of a check valve.

- PS
- TS
- Kv factor
- Minimum opening pressure differential, which is the minimum pressure differential between inlet and outlet at which a check valve can open and stay opened.

Before connecting the valve to the pipe it is advisable to make sure that the refrigerating system is clean. In fact the valves with P.T.F.E. gaskets are particularly sensitive to dirt and debris. Furthermore check that the flow direction in the pipe corresponds to the arrow stamped on the body of the valve.

The allowed operating positions are:

- types 3122 and 3142 with horizontal axis and valve cover facing upward
- types 3182 with inlet facing down and the valve cover facing upward
- types 3112, 3132 and 3133 preferably with vertical axis and arrow upward. Sloping axis, up to horizontal position, are tolerable.

The brazing of valves with solder connections should be carried out with care, using a low melting point filler material. Before starting to braze, it's necessary to disassemble the valves series 3122, while this operation is not necessary with solder connection valves. In any case, to avoid direct contact between the torch flame and the valve body, which could be damaged and compromise the proper functioning of the valve.

**TABLE 1: General Characteristics**

Catalogue Number	Connections					Kv Factor [m <sup>3</sup> /h]	Minimum Opening Pressure Differential [bar]	PED Directive			
	SAE Flare	ODS		ODM				TS [°C]		PS [bar]	Risk Category
		∅ [in.]	∅ [mm]	∅ [in.]	∅ [mm]			min.	max.		
3112/2	1/4"	-	-	-	-	0,5	0,1	- 40	+105	45	Art. 3.3
3112/3	3/8"										
3112/4	1/2"										
3112/5	5/8"										
3112/6	3/4"										
3122/M22	-					22					
3122/7	7/8"	-	1.1/8"	-	8,8	0,1	- 35	+160	45	Art. 3.3	
3122/M28	-	28	1.3/8"	35							
3122/9	1.1/8"	-	1.3/8"	35							
3122/11	1.3/8"	35	1.5/8"	-							15,2
3122/13	1.5/8"	-	2"								25
3122/M42	-	42	2"								40
3122/17	2.1/8"	54	-	-	0,5	0,1	- 40	+105	45	Art. 3.3	
3132/2	1/4"	-									
3132/3	3/8"	-									
3132/M10	-	10									
3132/M12	-	12									
3132/4	1/2"	-									
3132/5	5/8"	16									
3132/M18	-	18									
3132/6	3/4"	-									
3132/7	7/8"	22									
3133/M10	-	10									
3133/M12	-	12									
3133/5	5/8"	16									
3133/7	7/8"	22									
3142/7	7/8"	22									
3142/M28	-	28									
3142/9	1.1/8"	-									
3142/11	1.3/8"	35									
3142/13	1.5/8"	-									
3142/M42	-	42									
3142/17	2.1/8"	54									
3142/21	2.5/8"	-									
3142/25	3.1/8"	-									
3182/7	7/8"	22									
3182/M28	-	28									
3182/9	1.1/8"	-									
3182/11	1.3/8"	35									
3182/13	1.5/8"	-									
3182/M42	-	42									
3182/17	2.1/8"	54									
					45,4	0,1	+35	+160	45	Art. 3.3	
											I

**TABLE 2: Refrigerant Flow Capacity [kW]**

Catalogue Number	Liquid line						Suction line						Hot Gas line					
	R134a	R22	R404A	R407C	R410A	R507	R134a	R22	R404A	R407C	R410A	R507	R134a	R22	R404A	R407C	R410A	R507
3112/2	8,5	9,2	6,0	8,6	8,6	5,8	0,9	1,3	1,1	1,1	1,5	1,1	4,3	5,4	4,8	5,8	6,8	4,8
3112/3	25,5	27,5	17,9	25,8	25,8	17,3	2,8	3,8	3,3	3,4	4,5	3,3	12,8	16,2	14,4	17,4	20,4	14,3
3112/4	30,6	32,9	21,4	31,0	30,9	20,7	3,4	4,6	4,0	4,1	5,4	4,0	15,3	19,4	17,3	20,9	24,5	17,2
3112/5	56,1	60,4	39,3	56,9	56,7	38,0	6,2	8,4	7,4	7,5	9,9	7,4	28,1	35,6	31,7	38,3	44,9	31,5
3112/6	85,0	91,5	59,5	86,2	85,9	57,5	9,5	12,8	11,2	11,4	15,0	11,2	42,5	54,0	48,0	58,1	68,0	47,7
3122/M22	112,2	120,8	78,5	113,7	113,3	75,9	12,5	16,8	14,7	15,0	19,8	14,7	56,1	71,3	63,4	76,7	89,8	63,0
3122/7																		
3122/M28	149,6	161,0	104,7	151,6	151,1	101,2	16,6	22,4	19,6	20,0	26,4	19,6	74,8	95,0	84,5	102,3	119,7	84,0
3122/9																		
3122/11	258,4	278,2	180,9	261,9	261,0	174,8	28,7	38,8	33,9	34,5	45,6	33,9	129,2	164,2	145,9	176,6	206,7	145,0
3122/13	425,0	457,5	297,5	430,8	429,3	287,5	47,3	63,8	55,8	56,8	75,0	55,8	212,5	270,0	240,0	290,5	340,0	238,5
3122/M42																		
3122/17	680,0	732,0	476,0	689,2	686,8	460,0	75,6	102,0	89,2	90,8	120,0	89,2	340,0	432,0	384,0	464,8	544,0	381,6
3132/2	8,5	9,2	6,0	8,6	8,6	5,8	0,9	1,3	1,1	1,1	1,5	1,1	4,3	5,4	4,8	5,8	6,8	4,8
3132/3	25,5	27,5	17,9	25,8	25,8	17,3	2,8	3,8	3,3	3,4	4,5	3,3	12,8	16,2	14,4	17,4	20,4	14,3
3132/M10																		
3132/M12	30,6	32,9	21,4	31,0	30,9	20,7	3,4	4,6	4,0	4,1	5,4	4,0	15,3	19,4	17,3	20,9	24,5	17,2
3132/4																		
3132/5	56,1	60,4	39,3	56,9	56,7	38,0	6,2	8,4	7,4	7,5	9,9	7,4	28,1	35,6	31,7	38,3	44,9	31,5
3132/M18	85,0	91,5	59,5	86,2	85,9	57,5	9,5	12,8	11,2	11,4	15,0	11,2	42,5	54,0	48,0	58,1	68,0	47,7
3132/6																		
3132/7																		
3133/M10	25,5	27,5	17,9	25,8	25,8	17,3	2,8	3,8	3,3	3,4	4,5	3,3	12,8	16,2	14,4	17,4	20,4	14,3
3133/M12	30,6	32,9	21,4	31,0	30,9	20,7	3,4	4,6	4,0	4,1	5,4	4,0	15,3	19,4	17,3	20,9	24,5	17,2
3133/5	56,1	60,4	39,3	56,9	56,7	38,0	6,2	8,4	7,4	7,5	9,9	7,4	28,1	35,6	31,7	38,3	44,9	31,5
3133/7	85,0	91,5	59,5	86,2	85,9	57,5	9,5	12,8	11,2	11,4	15,0	11,2	42,5	54,0	48,0	58,1	68,0	47,7
3142/7	112,2	120,8	78,5	113,7	113,3	75,9	12,5	16,8	14,7	15,0	19,8	14,7	56,1	71,3	63,4	76,7	89,8	63,0
3142/M28	149,6	161,0	104,7	151,6	151,1	101,2	16,6	22,4	19,6	20,0	26,4	19,6	74,8	95,0	84,5	102,3	119,7	84,0
3142/9																		
3142/11	258,4	278,2	180,9	261,9	261,0	174,8	28,7	38,8	33,9	34,5	45,6	33,9	129,2	164,2	145,9	176,6	206,7	145,0
3142/13	425,0	457,5	297,5	430,8	429,3	287,5	47,3	63,8	55,8	56,8	75,0	55,8	212,5	270,0	240,0	290,5	340,0	238,5
3142/M42																		
3142/17	680,0	732,0	476,0	689,2	686,8	460,0	75,6	102,0	89,2	90,8	120,0	89,2	340,0	432,0	384,0	464,8	544,0	381,6
3142/21																		
3142/25																		
3182/7	144,5	155,6	101,2	146,5	145,9	97,8	16,1	21,7	19,0	19,3	25,5	19,0	72,3	91,8	81,6	98,8	115,6	81,1
3182/M28	161,5	173,9	113,1	163,7	163,1	109,3	18,0	24,2	21,2	21,6	28,5	21,2	80,8	102,6	91,2	110,4	129,2	90,6
3182/9																		
3182/11	323,0	347,7	226,1	327,4	326,2	218,5	35,9	48,5	42,4	43,1	57,0	42,4	161,5	205,2	182,4	220,8	258,4	181,3
3182/13	629,0	677,1	440,3	637,5	635,3	425,5	69,9	94,4	82,5	84,0	111,0	82,5	314,5	399,6	355,2	429,9	503,2	353,0
3182/M42																		
3182/17	771,8	830,8	540,3	782,2	779,5	522,1	85,8	115,8	101,2	103,1	136,2	101,2	385,9	490,3	435,8	527,5	617,4	433,1

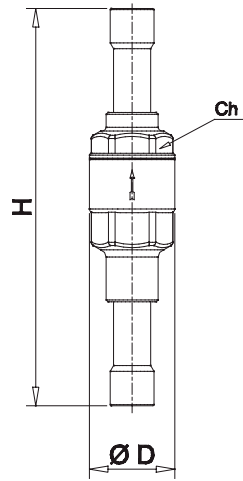
**Standard rating conditions according to AHRI Standard 760-2007**

Condensing temperature	110 °F	(43,3 °C)
Liquid temperature	100 °F	(37,8 °C)
Subcooling	10 °R	(5,5 °K)
Evaporating temperature	40 °F	(4,4 °C)
Suction temperature	65 °F	(18,3 °C)
Superheating	25 °R	(13,9 °K)
Discharge temperature	160 °F	(71,1 °C)

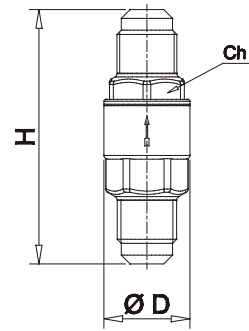
TABLE 3: Dimensions and Weights

Catalogue Number	Dimensions [mm]							Weight [g]											
	H	H <sub>1</sub>	L	L <sub>1</sub>	Q	Ø D	Ch												
3112/2	56	-	-		-	19	16	86											
3112/3	68					23	20	131											
3112/4	73					25	22	166											
3112/5	85					29	25	242											
3112/6	98					36	32	400											
3122/M22	84,5					28,5	100		60	-	-	1180							
3122/7		1090																	
3122/M28																			
3122/9																			
3122/11	101,5	34	118		68	-	-	1625											
3122/13	125,5	37	141		88			2955											
3122/M42					104			4225											
3122/17	142	42,5	173					104	4225										
3132/2	92	-	-		-	19	-	111											
3132/3	107					23		131											
3132/M10						132		25	171										
3132/M12	139							29	232										
3132/4								165	36	-	360								
3132/5																			
3132/M18																			
3132/6																			
3132/7	107					-		-		-	-	-	131						
3133/M10	132												25	171					
3133/M12	139	29	232																
3133/5	165	36	360																
3133/7	107	-	-		60		-						-	1320					
3142/7	84,5					28,5		170											
3142/M28								201											
3142/9	101,5					34		232		68	-	-			1885				
3142/11																			
3142/13															125,5	37	256	88	3315
3142/M42																			
3142/17	142					42,5		285	104	-	-	-			4875				
3142/21		329	5690																
3142/25		1280																	
3182/7	151	95	130,5	100,5	60	-	-	1295											
3182/M28																			
3182/9																			
3182/11	177	109,5	150	116	68	-	-	1855											
3182/13	221	123,5	195,5	143,5	104			3255											
3182/M42																			
3182/17								4780											

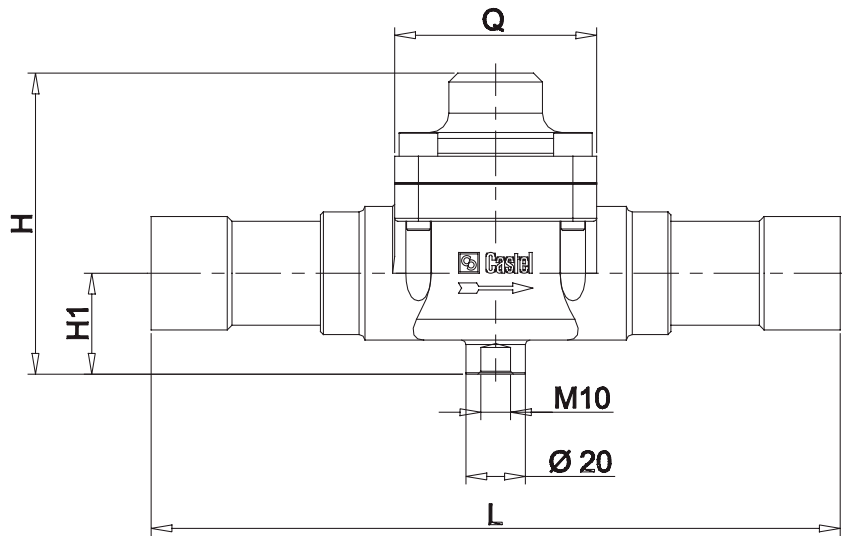
3132  
3133



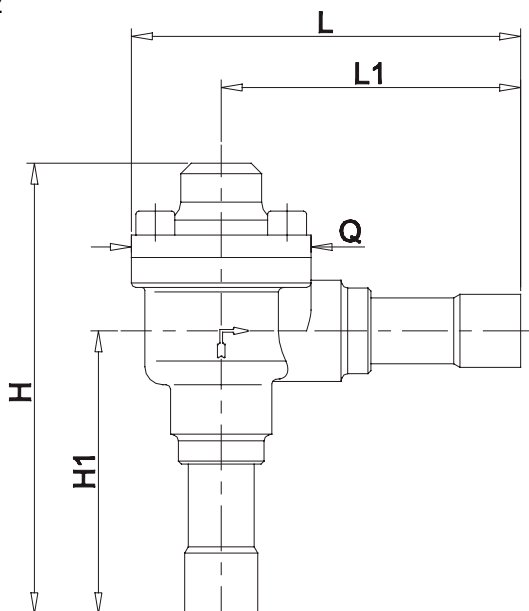
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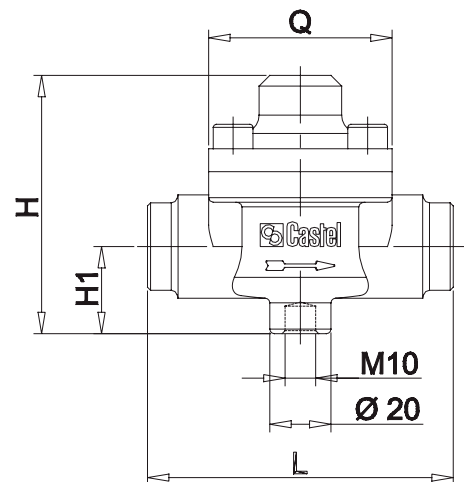
3142



3182



3122



**TABLE 1: General Characteristics**

Catalogue Number	Connections			Union code	Gasket code	Kv Factor [m <sup>3</sup> /h]	TS [°C]		PS [bar]	Risk Category secondo PED
	SAE Flare		Swivel nut (3)				min.	max.		
	(1)	(2)								
6310/2	1/4"	1/4"	3/4" UNF	7910/6	7990/6	0,46	-60	+110	45	Art. 3.3
6310/3		3/8"				1,35				
6310/4		1/2"								
6320/3		3/8"	1" UNS	7910/8	7990/8	1,40				
6320/4		1/2"				3,10				
6320/5		5/8"				3,4				
6320/6	3/4"									

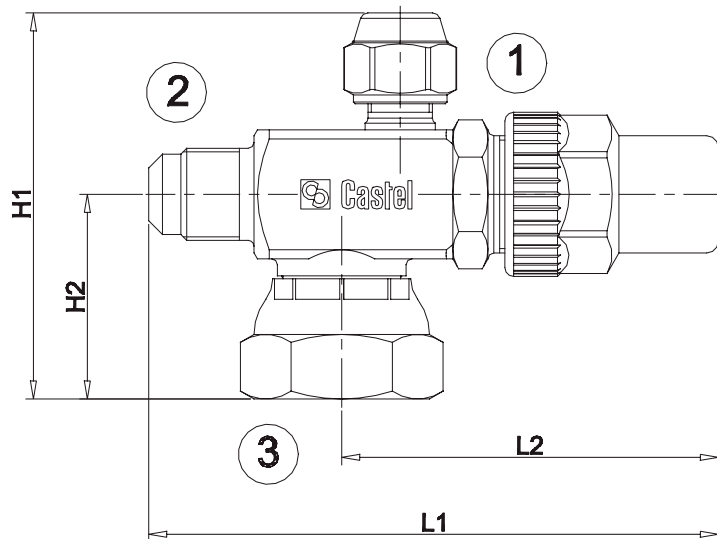
**TABLE 2: Dimensions and Weights**

Catalogue Number	Dimensions [mm]				Weight [g]
	H <sub>1</sub>	H <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	
6310/2	69	34	94	64	290
6310/3			97		300
6310/4					
6320/3	70	35	115	78	330
6320/4	72	37			400
6320/5					415
6320/6					117,5

**TABLE 3: Unions Dimensions and Weight**

Catalogue Number	Connections			L	Weight [g]	Gasket code
	Threaded	Solder [mm]				
		ODF	ODM			
7910/6	3/4" UNF	10	13	26	28	7990/6
7910/8	1" UNS	-	19		47	7990/8

6310  
6320





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