

HANDBOOK
VALVES

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 **Castel**[®]
Italian technology

CHAPTER 4 ■ VALVES WITH BALL SHUTTER

FOR REFRIGERATION PLANTS THAT USE HCFC, HFC OR HFO REFRIGERANTS



APPLICATIONS

The 2-ways valves with ball shutter 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, or R452A)

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, the same valves with ball shutter, up to DN 25, that is models 6570/9 and 6571/11, can also be installed on systems using the following refrigeration fluids:

- HFC (R32)
- HFO (R1234yf)

classified as A2L in the ASHRAE 34-2013 standard, and 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.

CONSTRUCTION

The specific design of Castel valves with ball shutter:

- ensures the internal pressure equilibrium when the valve is closed,
- permits the two-directional flow of the refrigerant
- prevents any risk of ejection or explosion of the spindle.

The electric welding of the body and the seal gaskets, assembled on the spindle, ensure perfect hermetic seal of the valve.

Valves with ball shutter are available in the following two types:

- Valves in series 6570 - 6590 (full port) and in series 6571 - 6591 (reduced port) without access fitting.
- Valves in series 6570/A - 6590/A (full port) and in series 6571/A - 6591/A (reduced port) with access

fitting. These taps are equipped with mechanism 8395/A1 and cap 8392/A.

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

- Hot forged brass EN 12420 – CW 617N for the body
- Hot forged brass EN 12420 – CW 617N, chromium plated, for the ball
- Copper pipe EN 12735-1 – Cu--DHP for solder connections
- Steel, with proper surface protection, for the spindle.
- Chloroprene rubber (CR) for outlet seal gaskets
- P.T.F.E. for the ball seat gaskets
- Hot forged brass EN 12420 – CW 617N for the protective cap of the spindle,

INSTALLATION

The valves with ball shutter can be installed in all sections of a refrigerating system, in compliance with the limits and capacities indicated in Table 28. Table 27 shows the following functional characteristics of a valve with ball shutter.

- PS
- TS
- Kv factor

Brazing of the valves with ball shutter with solder connections should be carried out with care, using a low melting point filler material (min. 5% Ag). It is important to avoid direct contact between the torch flame and the valve body, which could be damaged and compromise the proper functioning of the entire valve.

CERTIFICATIONS

Valves with ball shutter in series: 6570, 6571, 6590, and 6591 (with the exclusion of models 6570(M64A and greater and models 6571/24A and greater) have been approved by the American certification authority, Underwriters Laboratories Inc. These taps are **UL Listed** certified for the USA with file SA33319, in compliance with American standard UL 207.

TABLE 27: General characteristics of ball valves, UL approved

Catalogue Number		Connections		Ball Port Ø [mm]	Kv Factor [m³/h]	PS [bar]	TS [°C]		TA [°C]		Risk Category according to PED Recast	
without access fitting	with access fitting	ODS					min.	max.	min.	max.		
		Ø [in.]	Ø [mm]									
6570/M6	6570/M6A	–	6	10	0,8	45 (1)	-40	+150	-40	+50	Art. 4.3	
6570/2	6570/2A	1/4"	–		3							
6570/3	6570/3A	3/8"	–									5
6570/M10	6570/M10A	–	10									
6570/M12	6570/M12A	–	12									
6570/4	6570/4A	1/2"	–		15							17
6570/M15	6570/M15A	–	15									
6570/5	6570/5A	5/8"	16									
6570/M18	6570/M18A	–	18									
6570/6	6570/6A	3/4"	–	19	29							
6570/7	6570/7A	7/8"	22									
6570/M28	6570/M28A	–	28	25	51							
6570/9	6570/9A	1.1/8"	–									
6590/11	6590/11A	1.3/8"	35	32	86							
6590/13	6590/13A	1.5/8"	–									
6590/M42	6590/M42A	–	42	38	117							
6590/17	6590/17A	2.1/8"	54									
6570/M64 (2)	6570/M64A (2)	–	64	60	380							
–	6570/21A (2)	2.5/8"	–									
	6570/24A (2)	3"	76	73	550							
	6570/25A (2)	3.1/8"	80									
	6570/28A (2)	3.1/2"	89	82	710							
	6570/29A (2)	3.5/8"	92									
6571/5	–	5/8"	16	10	5	45 (1)	-40	+150	-40	+50	Art. 4.3	
6571/7		7/8"	22									15
6571/M28		–	28	19	29							
6571/9		1.1/8"	–									25
6571/11		1.3/8"	35	32	86							
6591/13		1.5/8"	–									38
6591/M42		–	42	50	214							
6591/17		2.1/8"	54									
6591/M64		6591/M64A	–	64	50							214
6591/21		6591/21A	2.5/8"	–								
–	6571/24A (2)	3"	76	60	380							
	6571/25A (2)	3.1/8"	80									
	6571/28A (2)	3.1/2"	89	73	550							
	6571/29A (2)	3.5/8"	92									
	6571/33A (2)	4.1/8"	105	82	660							
6571/34A (2)	4.1/4"	108										

(1) : MWP = 500 psi for 6570/.. and 6590/.. - MWP = 435 psi for 6571/.. and 6591/.. according to UL approval
 (2) : not UL approved

TABLE 28: Refrigerant flow capacity of ball valves [kW]

Catalogue Number		Liquid line												
without access fitting	with access fitting	R134a	R22	R32	R404A	R407C	R410A	R507	R1234yf	R1234ze	R448A	R449A	R450A	R452A
6570/M6	6570/M6A	13,6	14,6	20,1	9,5	13,8	13,7	9,2	10,1	12,0	12,5	12,6	12,7	9,7
6570/2	6570/2A													
6570/3	6570/3A	51	55	75	36	52	52	35	38	45	47	47	48	36
6570/M10	6570/M10A													
6570/M12	6570/M12A	85	92	126	60	86	86	58	63	75	78	79	80	61
6570/4	6570/4A													
6571/5	–													
6570/M15	6570/M15A	289	311	427	202	293	292	196	214	256	266	267	270	206
6570/5	6570/5A													
6570/M18	6570/M18A													
6570/6	6570/6A													
6571/7	–													
6570/7	6570/7A	493	531	729	345	500	498	334	365	436	454	456	461	352
6571/M28	–													
6571/9	–													
6570/M28	6570/M28A	867	933	1282	607	879	876	587	642	767	798	802	811	619
6570/9	6570/9A													
6571/11	–													
6590/11	6590/11A	1462	1574		1023	1482	1477	989		1293	1346	1352	1368	1043
6591/13	–													
6591/M42	–													
6590/13	6590/13A	1989	2141		1392	2016	2009	1346		1760	1831	1839	1861	1419
6590/M42	6590/M42A													
6591/17	–													
6590/17	6590/17A	3638	3916		2547	3687	3674	2461		3219	3349	3364	3405	2596
6591/M64	6591/M64A													
6591/21	6591/21A													
6570/M64	6570/M64A	6460	6954		4522	6547	6525	4370		5715	5947	5974	6046	4609
–	6570/21A													
	6571/24A													
	6571/25A													
	6570/24A	9350	10065		6545	9477	9444	6325		8272	8608	8646	8751	6672
	6570/25A													
	6571/28A													
6571/29A														
6570/28A	12070	12993		8449	12233	12191	8165		10678	11112	11161	11296	8612	
6570/29A														
6571/33A	11220	12078		7854	11372	11332	7590		9926	10329	10375	10501	8006	
6571/34A														

Standard rating conditions according to AHRI Standard 760-2007

Continued

Condensing temperature	110 °F	(43,3 °C)	Evaporator outlet temperature	50 °F	(9,9 °C)
Liquid temperature	100 °F	(37,8 °C)	Evaporator superheating	10 °R	(5,5 °K)
Subcooling	10 °R	(5,5 °K)	Suction line temperature	65 °F	(18,3 °C)
Evaporating temperature	40 °F	(4,4 °C)	Suction superheating	15 °R	(8,4 °K)
			Discharge temperature	160 °F	(71,1 °C)

TABLE 28: Refrigerant flow capacity of ball valves [kW]

Catalogue Number		Suction line												
without access fitting	with access fitting	R134a	R22	R32	R404A	R407C	R410A	R507	R1234yf	R1234ze	R448A	R449A	R450A	R452A
6570/M6	6570/M6A	1,5	2,0	3,4	1,8	1,8	2,6	1,8	1,2	1,1	1,9	1,8	1,3	1,7
6570/2	6570/2A													
6570/3	6570/3A	5,5	7,7	12,8	6,6	6,8	9,9	6,7	4,4	4,3	7,2	6,6	4,8	6,3
6570/M10	6570/M10A													
6570/M12	6570/M12A	9,1	12,8	21,3	11,0	11,4	16,5	11,2	7,4	7,1	12,0	11,0	8,0	10,6
6570/4	6570/4A													
6571/5	–													
6570/M15	6570/M15A	31	43	72	37	39	56	38	25	24	41	37	27	36
6570/5	6570/5A													
6570/M18	6570/M18A													
6570/6	6570/6A													
6571/7	–													
6570/7	6570/7A	53	74	123	64	66	96	65	43	41	70	64	46	61
6571/M28	–													
6571/9	–													
6570/M28	6570/M28A	93	130	217	112	116	168	114	75	72	122	112	81	108
6570/9	6570/9A													
6571/11	–													
6590/11	6590/11A	157	219		189	195	284	192		122	206	189	137	181
6591/13	–													
6591/M42	–													
6590/13	6590/13A	213	298		257	266	386	261		166	281	257	186	247
6590/M42	6590/M42A													
6591/17	–													
6590/17	6590/17A	389	546		471	486	706	477		304	514	471	340	452
6591/M64	6591/M64A													
6591/21	6591/21A													
6570/M64	6570/M64A	692	969		836	863	1254	847		540	912	836	604	802
	6570/21A													
	6571/24A													
	6571/25A	1001	1403		1210	1249	1815	1227		781	1320	1210	875	1161
	6570/24A													
	6570/25A													
	6571/28A													
	6571/29A	1292	1811		1562	1612	2343	1583		1008	1704	1562	1129	1498
	6570/28A													
	6570/29A													
	6571/33A	1201	1683		1452	1498	2178	1472		937	1584	1452	1049	1393
	6571/34A													

Standard rating conditions according to AHRI Standard 760-2007

Continued

Condensing temperature	110 °F	(43,3 °C)	Evaporator outlet temperature	50 °F	(9,9 °C)
Liquid temperature	100 °F	(37,8 °C)	Evaporator superheating	10 °R	(5,5 °K)
Subcooling	10 °R	(5,5 °K)	Suction line temperature	65 °F	(18,3 °C)
Evaporating temperature	40 °F	(4,4 °C)	Suction superheating	15 °R	(8,4 °K)
			Discharge temperature	160 °F	(71,1 °C)

TABLE 28: Refrigerant flow capacity of ball valves [kW]

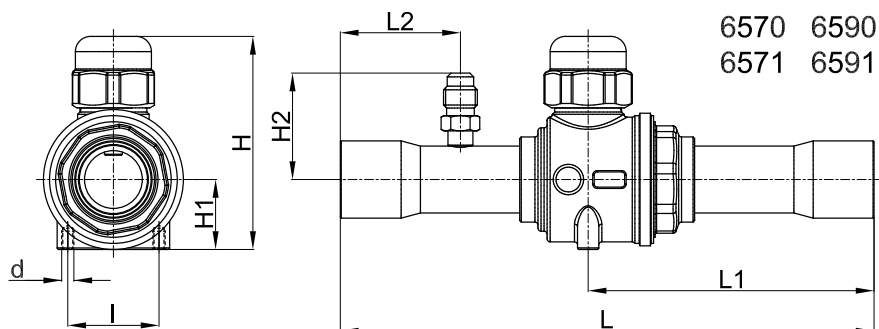
Catalogue Number		Hot Gas line													
without access fitting	with access fitting	R134a	R22	R32	R404A	R407C	R410A	R507	R1234yf	R1234ze	R448A	R449A	R450A	R452A	
6570/M6	6570/M6A	6,8	9,0	14,5	7,7	9,5	10,9	7,6	5,3	5,5	9,4	8,6	6,1	8,0	
6570/2	6570/2A														
6570/3	6570/3A	26	34	54	29	36	41	29	20	21	35	32	23	30	
6570/M10	6570/M10A														
6570/M12	6570/M12A	43	56	91	48	60	68	48	33	34	59	54	38	50	
6570/4	6570/4A														
6571/5	–														
6570/M15	6570/M15A	145	190	309	163	202	231	162	113	116	201	183	130	170	
6570/5	6570/5A														
6570/M18	6570/M18A														
6570/6	6570/6A														
6571/7	–	247	325	527	278	345	394	277	193	199	342	313	222	289	
6570/7	6570/7A														
6571/M28	–														
6571/9	–	434	571	926	490	607	694	487	339	349	602	550	390	509	
6570/M28	6570/M28A														
6570/9	6570/9A														
6571/11	–	731	963		826	1023	1170	820		589	1015	927	658	858	
6590/11	6590/11A														
6591/13	–														
6591/M42	–	995	1310		1123	1392	1591	1116		801	1381	1261	895	1168	
6590/13	6590/13A														
6590/M42	6590/M42A														
6591/17	–	1819	2397		2054	2547	2910	2042		1466	2525	2307	1637	2136	
6590/17	6590/17A														
6591/M64	6591/M64A														
6591/21	6591/21A	3230	4256		3648	4522	5168	3625		2603	4484	4096	2907	3792	
6570/M64	6570/M64A														
–	6571/24A														
–	6571/25A	4675	6160		5280	6545	7480	5247		3768	6490	5929	4208	5489	
–	6570/24A														
–	6570/25A														
–	6571/28A	6035	7952		6816	8449	9656	6773		4864	8378	7654	5432	7086	
–	6571/29A														
–	6570/28A														
–	6570/29A	5610	7392		6336	7854	8976	6296		4521	7788	7115	5049	6587	
–	6571/33A														
–	6571/34A														

Standard rating conditions according to AHRI Standard 760-2007

Condensing temperature	110 °F	(43,3 °C)	Evaporator outlet temperature	50 °F	(9,9 °C)
Liquid temperature	100 °F	(37,8 °C)	Evaporator superheating	10 °R	(5,5 °K)
Subcooling	10 °R	(5,5 °K)	Suction line temperature	65 °F	(18,3 °C)
Evaporating temperature	40 °F	(4,4 °C)	Suction superheating	15 °R	(8,4 °K)
			Discharge temperature	160 °F	(71,1 °C)

TABLE 29: Dimensions and weights of ball valves

Catalogue Number		Dimensions [mm]							Weight [g]						
		H	H ₁	H ₂	L	L ₁	L ₂	l		d					
6570/M6	6570/M6A	48	15	29	121	65	25	18	M4	198					
6570/2	6570/2A									201					
6570/3	6570/3A														
6570/M10	6570/M10A														
6570/M12	6570/M12A														
6570/4	6570/4A														
6571/5	-			-	138	73,5	-			208					
6570/M15	6570/M15A	55	19	32	139	73	30	25,5	M4	311					
6570/5	6570/5A														
6570/M18	6570/M18A														
6570/6	6570/6A														
6571/7	-			-	175	90,5	-			360					
6570/7	6570/7A	70	23	34	175	94	40	30	M6	570					
6571/M28	-			206	109	-	601								
6571/9	-														
6570/M28	6570/M28A	79	27	37	204	109	45	30	M6	708					
6570/9	6570/9A														
6571/11	-										-	245	130	-	840
6590/11	6590/11A										45	210	112	43	1518
6591/13	-	117	37	-	-										
6591/M42	-														
6590/13	6590/13A	127	44	45	239	126	48	30	M6	2470					
6590/M42	6590/M42A														
6591/17	-										-	253	133	-	4360
6590/17	6590/17A	148	54	53	275	149	58	30	M6	4400					
6591/M64	6591/M64A														
6591/21	6591/21A														
6570/M64	6570/M64A	150	55	57	343	186	68	75	M8	6000					
-	6570/21A				6240										
-	6571/24A				6410										
-	6571/25A				6580										
-	6570/24A	186,5	70	64	365,5	196,5	69	89	M8	10735					
-	6570/25A				10790										
-	6571/28A				11012										
-	6571/29A				11013										
-	6570/28A	195	75	68	373	197,5	70,5	75	M8	12789					
-	6570/29A				12807										
-	6571/33A				13223										
-	6571/34A				13257										



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