

HANDBOOK
VALVES

Ed. 2017

 **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" | – | | | | | | | | | |
| 6570/3 | 6570/3A | 3/8" | – | | | | | | | | | |
| 6570/M10 | 6570/M10A | – | 10 | | 3 | | | | | | | |
| 6570/M12 | 6570/M12A | – | 12 | | 5 | | | | | | | |
| 6570/4 | 6570/4A | 1/2" | – | | | | | | | | | |
| 6570/M15 | 6570/M15A | – | 15 | 15 | 17 | | | | | | | |
| 6570/5 | 6570/5A | 5/8" | 16 | | | | | | | | | |
| 6570/M18 | 6570/M18A | – | 18 | | | | | | | | | |
| 6570/6 | 6570/6A | 3/4" | – | | | | | | | | | |
| 6570/7 | 6570/7A | 7/8" | 22 | 19 | 29 | | | | | | | |
| 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" | – | 38 | 117 | | | | | | | |
| 6590/M42 | 6590/M42A | – | 42 | | | | | | | | | |
| 6590/17 | 6590/17A | 2.1/8" | 54 | 50 | 214 | | | | | | | |
| 6570/M64 (2) | 6570/M64A (2) | – | 64 | 60 | 380 | | | | | | | |
| – | 6570/21A (2) | 2.5/8" | – | 73 | 550 | | | | | | | |
| | 6570/24A (2) | 3" | 76 | | | | | | | | | |
| | 6570/25A (2) | 3.1/8" | 80 | 82 | 710 | | | | | | | |
| | 6570/28A (2) | 3.1/2" | 89 | | | | | | | | | |
| | 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 | 17 | | | | | | | |
| 6571/M28 | | – | 28 | 19 | 29 | | | | | | | |
| 6571/9 | | 1.1/8" | – | | | | | | | | | |
| 6571/11 | | 1.3/8" | 35 | 25 | 51 | | | | | | | |
| 6591/13 | | 1.5/8" | – | 32 | 86 | | | | | | | |
| 6591/M42 | | – | 42 | | | | | | | | | |
| 6591/17 | | 2.1/8" | 54 | 38 | 117 | | | | | | | |
| 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 | 73 | 550 | | | | | | | |
| | 6571/28A (2) | 3.1/2" | 89 | | | | | | | | | |
| | 6571/29A (2) | 3.5/8" | 92 | 82 | 660 | | | | | | | |
| | 6571/33A (2) | 4.1/8" | 105 | | | | | | | | | |
| | 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 | 9350 | 10065 | | 6545 | 9477 | 9444 | 6325 | | 8272 | 8608 | 8646 | 8751 | 6672 |
| | 6570/24A | | | | | | | | | | | | | |
| | 6570/25A | | | | | | | | | | | | | |
| | 6571/28A | | | | | | | | | | | | | |
| | 6571/29A | 12070 | 12993 | | 8449 | 12233 | 12191 | 8165 | | 10678 | 11112 | 11161 | 11296 | 8612 |
| | 6570/28A | | | | | | | | | | | | | |
| | 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 | 31 | 43 | 72 | 37 | 39 | 56 | 38 | 25 | 24 | 41 | 37 | 27 | 36 |
| 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 |
| | 6571/24A | | | | | | | | | | | | | |
| | 6571/25A | | | | | | | | | | | | | |
| | 6570/24A | 1001 | 1403 | | 1210 | 1249 | 1815 | 1227 | | 781 | 1320 | 1210 | 875 | 1161 |
| | 6570/25A | | | | | | | | | | | | | |
| | 6571/28A | | | | | | | | | | | | | |
| | 6571/29A | | | | | | | | | | | | | |
| | 6570/28A | 1292 | 1811 | | 1562 | 1612 | 2343 | 1583 | | 1008 | 1704 | 1562 | 1129 | 1498 |
| | 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]

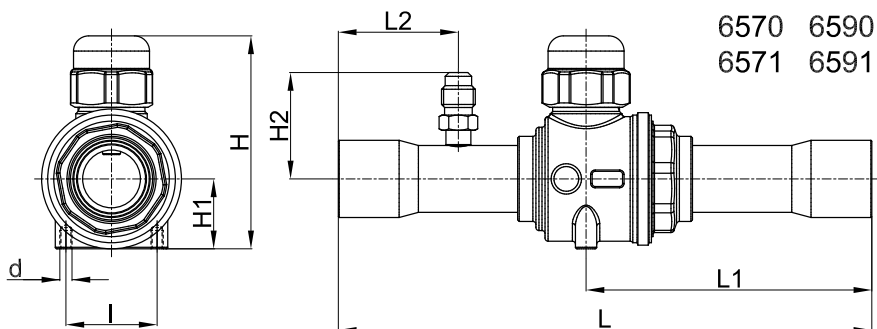
| Catalogue Number | | Hot Gas line | | | | | | | | | | | | | |
|------------------------|---------------------|--------------|------|------|-------|-------|-------|------|---------|---------|-------|-------|-------|-------|--|
| without access fitting | with access fitting | R134a | R22 | R32 | R404A | 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 | – | | | | | | | | | | | | | | |
| 6570/7 | 6570/7A | 247 | 325 | 527 | 278 | 345 | 394 | 277 | 193 | 199 | 342 | 313 | 222 | 289 | |
| 6571/M28 | – | | | | | | | | | | | | | | |
| 6571/9 | – | | | | | | | | | | | | | | |
| 6570/M28 | 6570/M28A | 434 | 571 | 926 | 490 | 607 | 694 | 487 | 339 | 349 | 602 | 550 | 390 | 509 | |
| 6570/9 | 6570/9A | | | | | | | | | | | | | | |
| 6571/11 | – | | | | | | | | | | | | | | |
| 6590/11 | 6590/11A | 731 | 963 | | 826 | 1023 | 1170 | 820 | | 589 | 1015 | 927 | 658 | 858 | |
| 6591/13 | – | | | | | | | | | | | | | | |
| 6591/M42 | – | | | | | | | | | | | | | | |
| 6590/13 | 6590/13A | 995 | 1310 | | 1123 | 1392 | 1591 | 1116 | | 801 | 1381 | 1261 | 895 | 1168 | |
| 6590/M42 | 6590/M42A | | | | | | | | | | | | | | |
| 6591/17 | – | | | | | | | | | | | | | | |
| 6590/17 | 6590/17A | 1819 | 2397 | | 2054 | 2547 | 2910 | 2042 | | 1466 | 2525 | 2307 | 1637 | 2136 | |
| 6591/M64 | 6591/M64A | | | | | | | | | | | | | | |
| 6591/21 | 6591/21A | | | | | | | | | | | | | | |
| 6570/M64 | 6570/M64A | 3230 | 4256 | | 3648 | 4522 | 5168 | 3625 | | 2603 | 4484 | 4096 | 2907 | 3792 | |
| – | 6570/21A | | | | | | | | | | | | | | |
| | 6571/24A | | | | | | | | | | | | | | |
| | 6571/25A | | | | | | | | | | | | | | |
| | 6570/24A | 4675 | 6160 | | 5280 | 6545 | 7480 | 5247 | | 3768 | 6490 | 5929 | 4208 | 5489 | |
| | 6570/25A | | | | | | | | | | | | | | |
| | 6571/28A | | | | | | | | | | | | | | |
| 6571/29A | | | | | | | | | | | | | | | |
| 6570/28A | 6035 | 7952 | | 6816 | 8449 | 9656 | 6773 | | 4864 | 8378 | 7654 | 5432 | 7086 | | |
| 6570/29A | | | | | | | | | | | | | | | |
| 6571/33A | 5610 | 7392 | | 6336 | 7854 | 8976 | 6296 | | 4521 | 7788 | 7115 | 5049 | 6587 | | |
| 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 | | | | | | | | | | | | | | |
| 6570/3 | 6570/3A | | | | | | | | | | | | | | |
| 6570/M10 | 6570/M10A | | | - | | | | | | 138 | 73,5 | - | - | - | 201 |
| 6570/M12 | 6570/M12A | | | | | | | | | | | | | | |
| 6570/4 | 6570/4A | | | | | | | | | | | | | | |
| 6571/5 | - | 55 | 19 | 32 | 139 | 73 | 30 | 25,5 | | 311 | | | | | |
| 6570/M15 | 6570/M15A | | | | | | | | | | | | | | |
| 6570/5 | 6570/5A | | | | | | | | | | | | | | |
| 6570/M18 | 6570/M18A | | | - | | | | | | 175 | 90,5 | - | - | - | 360 |
| 6570/6 | 6570/6A | | | | | | | | | | | | | | |
| 6571/7 | - | | | | | | | | | | | | | | |
| 6570/7 | 6570/7A | 70 | 23 | 34 | 175 | 94 | 40 | - | 570 | | | | | | |
| 6571/M28 | - | | | | | | | | | | | | | | |
| 6571/9 | - | | | | | | | | | | | | | | |
| 6570/M28 | 6570/M28A | 79 | 27 | 37 | 204 | 109 | 45 | - | 708 | | | | | | |
| 6570/9 | 6570/9A | | | | | | | | | | | | | | |
| 6571/11 | - | | | - | | | | | | 245 | 130 | - | - | - | 840 |
| 6590/11 | 6590/11A | | | | | | | | | | | | | | |
| 6591/13 | - | 117 | 37 | 45 | 210 | 112 | - | 30 | 1518 | | | | | | |
| 6591/M42 | - | | | | | | | | | | | | | | |
| 6590/13 | 6590/13A | | | | | | | | | | | | | | |
| 6590/M42 | 6590/M42A | 127 | 44 | 45 | 239 | 126 | 48 | - | M6 | 2470 | | | | | |
| 6591/17 | - | | | | | | | | | | | | | | |
| 6590/17 | 6590/17A | | | | | | | | | | | | | | |
| 6591/M64 | 6591/M64A | 148 | 54 | 53 | 275 | 149 | 58 | - | - | 4400 | | | | | |
| 6591/21 | 6591/21A | | | | | | | | | | | | | | |
| 6570/M64 | 6570/M64A | | | | | | | | | | 150 | 55 | 57 | 343 | 186 |
| - | 6570/21A | | | | | | | | | | | | | | |
| - | 6571/24A | 186,5 | 70 | 64 | 363 | 196 | 78 | 89 | M8 | 6240 | | | | | |
| - | 6571/25A | | | | | | | | | | | | | | |
| - | 6570/24A | | | | 365,5 | 196,5 | 69 | - | | - | - | - | 10735 | | |
| - | 6570/25A | | | | | | | | | | | | | | |
| - | 6571/28A | 381,5 | 204,5 | 77 | - | - | - | - | 11012 | | | | | | |
| - | 6571/29A | | | | | | | | | | | | | | |
| - | 6570/28A | 195 | 75 | 68 | 373 | 197,5 | 70,5 | 75 | M8 | 12789 | | | | | |
| - | 6570/29A | | | | | | | | | | | | | | |
| - | 6571/33A | | | | 405 | 213,5 | 86,5 | - | | - | - | - | 12807 | | |
| - | 6571/34A | | | | | | | | | | | | | | |
| - | 6571/34A | | | | | | | | | | | | | | |



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