



# Full lift safety valve with spring loading. (AIT)

Mod. 485 | ASME | SI



EP



AP



ES



CP

## Operation

The valve works as an automatic pressure releasing regulator activated by the static pressure existing at the entrance to the valve and is characterized by its ability to open instantly and totally.

## Regulation

- ASME II
- ASME VIII Div.1
- UNE-EN ISO 4126-1
- UNE-EN 12516-2
- UNE-EN 12266-1

## Specifications

### Size

- 3/4" x 1 1/4" to 1" x 1 1/2"

### Temperature range

- -29 °C to +450 °C

### Applications

- Gas, steam and liquids

### Materials

- Carbon steel
- Stainless steel

### Maximum pressure

- Up to 40 bar

## Certification

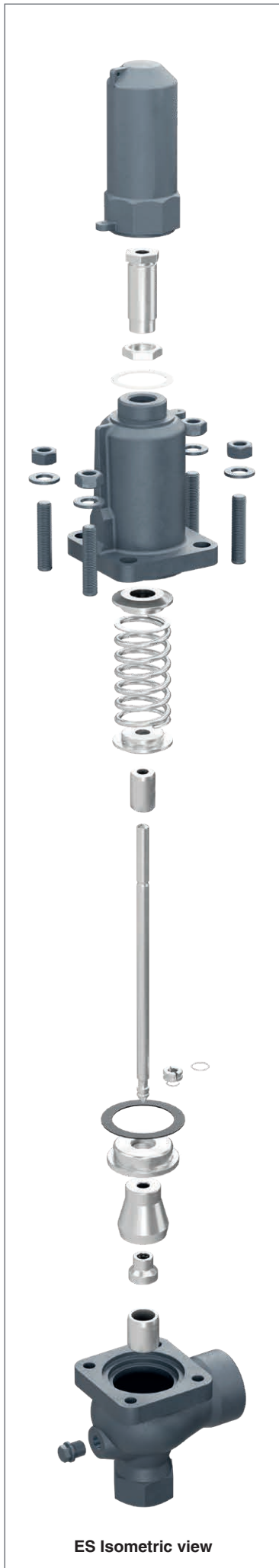


| N°. PIECE            | PIECE            | MATERIAL                                  |     |     |     |     |     |     |                                     |     |     |     |      |      |     |     |
|----------------------|------------------|-------------------------------------------|-----|-----|-----|-----|-----|-----|-------------------------------------|-----|-----|-----|------|------|-----|-----|
|                      |                  | CARBON STEEL                              |     |     |     |     |     |     | STAINLESS STEEL                     |     |     |     |      |      |     |     |
| 1                    | Body             | Carbon steel (ASTM A216 - WCB)            |     |     |     |     |     |     | Stainless steel (ASTM A 351 - CF8M) |     |     |     |      |      |     |     |
| 2                    | Closed bell      | Nodular iron (ASTM A536 65 - 45 -12)      |     |     |     |     |     |     | Stainless steel (ASTM A 351 - CF8M) |     |     |     |      |      |     |     |
| 3                    | Open bell        | Carbon steel (ASTM A 216 - WCB)           |     |     |     |     |     |     | Stainless steel (ASTM A 351 - CF8M) |     |     |     |      |      |     |     |
| 4                    | Hood             | Nodular iron (ASTM A 536 65 - 45 -12)     |     |     |     |     |     |     | Stainless steel (ASTM A 351 - CF8M) |     |     |     |      |      |     |     |
| 5                    | Elevator         | Nodular iron (ASTM A 536 65 - 45 -12) (1) |     |     |     |     |     |     | Stainless steel (ASTM A 351 - CF8M) |     |     |     |      |      |     |     |
| 6                    | Cam              | Carbon steel (ASTM A 570 - 36) (3)        |     |     |     |     |     |     | Stainless steel (AISI 304)          |     |     |     |      |      |     |     |
| 7                    | Lever            | Carbon steel (ASTM A 570 - 36)            |     |     |     |     |     |     | Carbon steel (ASTM A 570 - 36)      |     |     |     |      |      |     |     |
| 8                    | Seating          | Stainless steel (AISI 420)                |     |     |     |     |     |     | Stainless steel (AISI 630)          |     |     |     |      |      |     |     |
| 9                    | Plug             | Stainless steel (AISI 420)                |     |     |     |     |     |     | Stainless steel (AISI 630)          |     |     |     |      |      |     |     |
| 10                   | Lead             | Stainless steel (AISI 420)                |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 11                   | Spring press     | Carbon steel (AISI 1045)                  |     |     |     |     |     |     | Stainless steel (AISI 303)          |     |     |     |      |      |     |     |
| 12                   | Separator        | Stainless steel (AISI 420)                |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 13                   | Rod              | Stainless steel (AISI 420)                |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 14                   | Lever shaft      | Carbon steel (AISI 1045)                  |     |     |     |     |     |     | Stainless steel (AISI 303)          |     |     |     |      |      |     |     |
| 15                   | Gudgeon          | Carbon steel (AISI 1070)                  |     |     |     |     |     |     | Stainless steel (AISI 301)          |     |     |     |      |      |     |     |
| 16                   | Ring             | Stainless steel (AISI 420)                |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 17                   | Safety ring      | Stainless steel (AISI 301)                |     |     |     |     |     |     | Stainless steel (AISI 301)          |     |     |     |      |      |     |     |
| 18                   | Spring           | Chrome vanadium steel (AISI 6150)(2)      |     |     |     |     |     |     | Stainless steel (AISI 301)          |     |     |     |      |      |     |     |
| 19                   | Gland            | Carbon steel (AISI 1045)                  |     |     |     |     |     |     | Stainless steel (AISI 303)          |     |     |     |      |      |     |     |
| 20                   | Hollow screw     | Stainless steel (AISI 303)                |     |     |     |     |     |     | Stainless steel (AISI 303)          |     |     |     |      |      |     |     |
| 21                   | Hollow screw nut | Stainless steel (AISI 303)                |     |     |     |     |     |     | Stainless steel (AISI 303)          |     |     |     |      |      |     |     |
| 22                   | Buffer Nut       | Stainless steel (AISI 303)                |     |     |     |     |     |     | Stainless steel (AISI 303)          |     |     |     |      |      |     |     |
| 23                   | Rod check nut    | Carbon steel (AISI 1015)                  |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 24                   | Nut              | Carbon steel (AISI 1015)                  |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 25                   | Washer           | Carbon steel (AISI 1015)                  |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 26                   | Stud             | Carbon steel (AISI 1035)                  |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 27                   | Screw            | Carbon steel (AISI 1045)                  |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 28                   | Cap              | Carbon steel (AISI 1035)                  |     |     |     |     |     |     | Stainless steel (AISI 316)          |     |     |     |      |      |     |     |
| 29                   | Joint            | Graphite                                  |     |     |     |     |     |     | PTFE (Teflon)                       |     |     |     |      |      |     |     |
| 30                   | Joint            | PTFE (Teflon)                             |     |     |     |     |     |     | PTFE (Teflon)                       |     |     |     |      |      |     |     |
| 31                   | Seal             | Graphite                                  |     |     |     |     |     |     | PTFE (Teflon)                       |     |     |     |      |      |     |     |
| FNPT1 x FNPT2        |                  | 3/4" x 1 1/4" to 1" x 1 1/2"              |     |     |     |     |     |     |                                     |     |     |     |      |      |     |     |
| Class [lbs]          |                  | 150                                       |     |     |     |     |     |     |                                     |     |     |     |      |      |     |     |
| OPERATING CONDITIONS | PS [bar]         | 16                                        | 14  | 12  | 10  | 8   | 7   | 5   | 16                                  | 15  | 14  | 12  | 10,2 | 8    | 7   |     |
|                      | MAX. TEMP. [°C]  | 150                                       | 200 | 250 | 300 | 350 | 400 | 450 | 100                                 | 150 | 200 | 250 | 300  | 350  | 400 |     |
|                      | MIN. TEMP. [°C]  | -29                                       |     |     |     |     |     |     | -29                                 |     |     |     |      |      |     |     |
| Class [lbs]          |                  | 300                                       |     |     |     |     |     |     |                                     |     |     |     |      |      |     |     |
| OPERATING CONDITIONS | PS [bar]         | 40                                        |     | 38  |     | 35  |     | 23  |                                     | 40  | 39  | 36  | 33   | 31,6 | 30  | 29  |
|                      | MAX. TEMP. [°C]  | 300                                       |     | 350 |     | 400 |     | 450 |                                     | 130 | 150 | 200 | 250  | 300  | 350 | 400 |
|                      | MIN. TEMP. [°C]  | -29                                       |     |     |     |     |     |     | -29                                 |     |     |     |      |      |     |     |

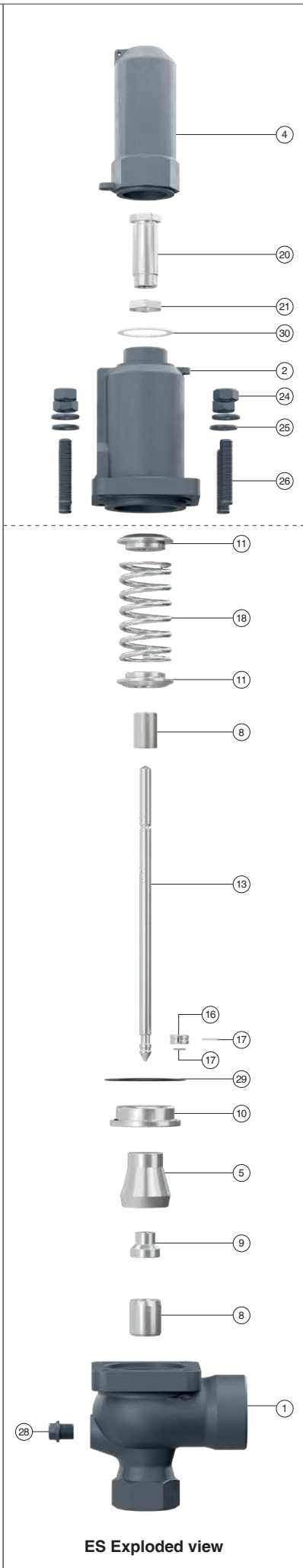
(1) 3/4" FNPT x 1 1/4" FNPT in Stainless steel (ASTM A351 CF8M)

(2) Maximum temperature EP, ES and CP 250 °C / AP 400 °C

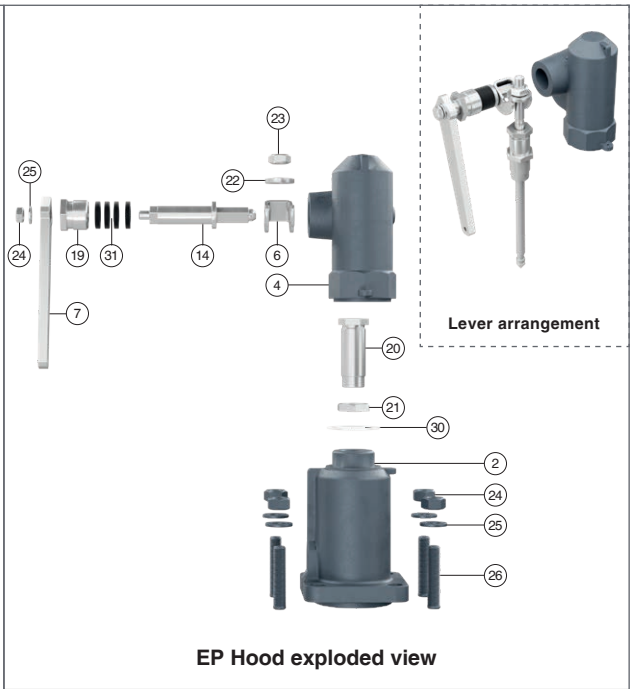
(3) 3/4" FNPT x 1 1/4" FNPT in Stainless steel (AISI 304)



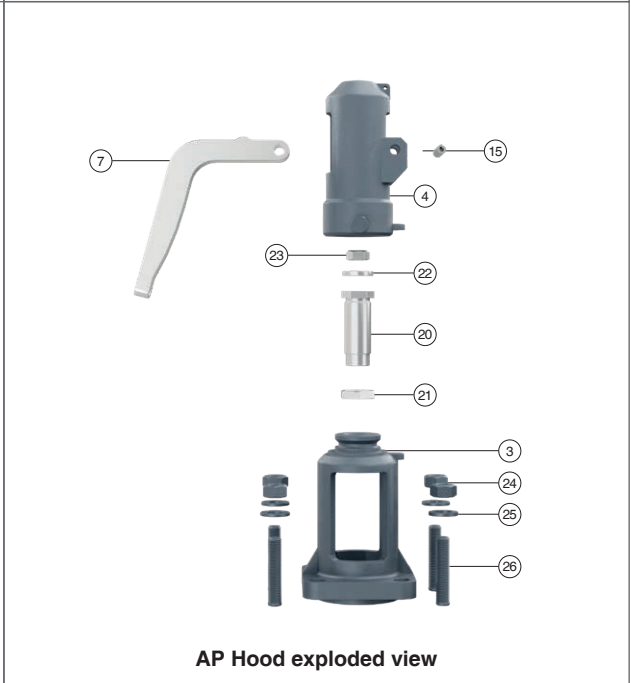
ES Isometric view



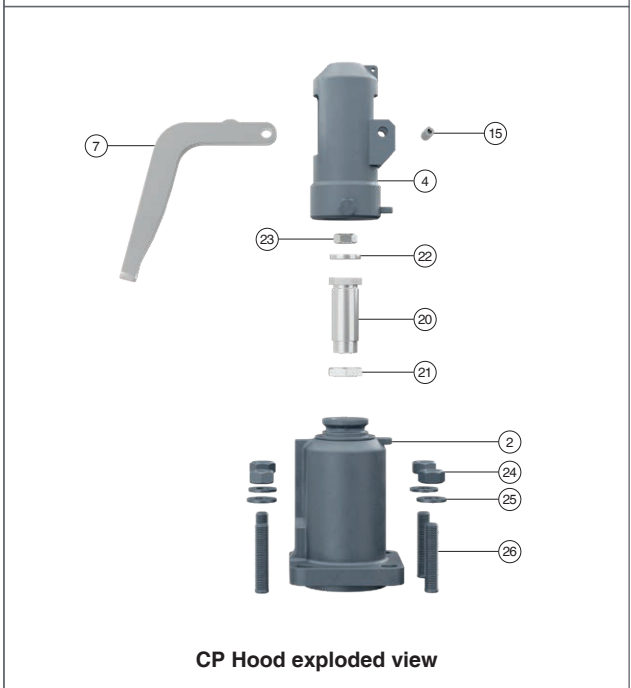
ES Exploded view



EP Hood exploded view

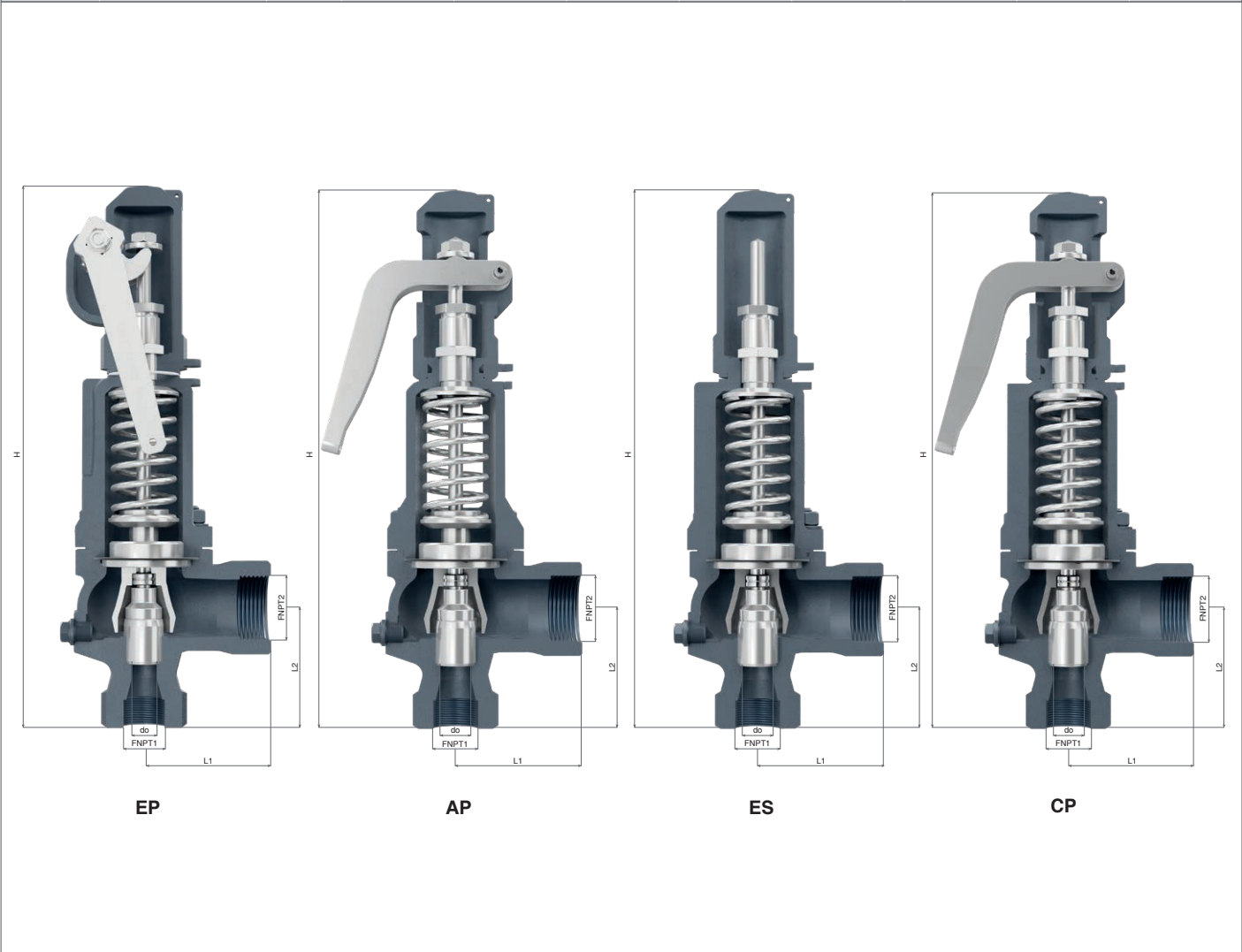


AP Hood exploded view



CP Hood exploded view

| FNPT1 x FNPT2                                      |                                 |         | 3/4" x 1 1/4"                                               |        |        |         | 1" x 1 1/2" |        |        |        |
|----------------------------------------------------|---------------------------------|---------|-------------------------------------------------------------|--------|--------|---------|-------------|--------|--------|--------|
| CONEXIONES                                         |                                 |         | Female thread NPT ASME B1.20.1                              |        |        |         |             |        |        |        |
| API ORIFICE LETTER                                 |                                 |         | D-E                                                         |        |        |         | F           |        |        |        |
| do [mm]                                            |                                 |         | 16                                                          |        |        |         | 20          |        |        |        |
| Ao = $\frac{\pi \cdot do^2}{4}$ [mm <sup>2</sup> ] |                                 |         | 201                                                         |        |        |         | 314         |        |        |        |
| H [mm]                                             |                                 |         | 320                                                         |        |        |         | 370         |        |        |        |
| h1 [mm]                                            |                                 |         | 112                                                         |        |        |         | 129         |        |        |        |
| L1 [mm]                                            |                                 |         | 80                                                          |        |        |         | 85          |        |        |        |
| L2 [mm]                                            |                                 |         | 65                                                          |        |        |         | 80          |        |        |        |
| R [mm]                                             |                                 |         | 1/4"                                                        |        |        |         | 1/4"        |        |        |        |
|                                                    |                                 |         | Female thread Gas Whitworth Cylindrical ISO 228/1 (DIN-259) |        |        |         |             |        |        |        |
| MODEL                                              |                                 |         | EP                                                          | AP     | ES     | CP      | EP          | AP     | ES     | CP     |
| WEIGHT [kg]                                        | CARBON STEEL<br>STAINLESS STEEL |         | 5,65                                                        | 5,01   | 5,2    | 5,42    | 7,50        | 6,70   | 6,97   | 7,17   |
| CODE                                               | CARBON STEEL<br>2002 - 485.     | 300 lbs | 8344D                                                       | 83441D | 83442D | 83443 D | 8104F       | 81041F | 81042F | 81043F |
|                                                    | STAINLESS STEEL<br>2002 - 485.  | 300 lbs | 8342D                                                       | 83421D | 83422D | 83423 D | 8102F       | 81021F | 81022F | 81023F |



| REGULATION PRESSURES       |                                   |                    |               |  |  |  |             |  |  |  |
|----------------------------|-----------------------------------|--------------------|---------------|--|--|--|-------------|--|--|--|
| FNPT1 x FNPT2              |                                   |                    | 3/4" x 1 1/4" |  |  |  | 1" x 1 1/2" |  |  |  |
| REGULATION PRESSURES [bar] | MAXIMUM<br>(LIQUIDS<br>AND GASES) | 300 lbs.           | 40            |  |  |  | 40          |  |  |  |
|                            | MAXIMUM<br>(SATURATED<br>STEAM)   | 300 lbs.           | 32            |  |  |  | 32          |  |  |  |
|                            | MINIMUM                           | STEAM AND<br>GASES | 0,5           |  |  |  | 0,5         |  |  |  |
|                            |                                   | LIQUIDS            | 0,2           |  |  |  | 0,2         |  |  |  |

| RECOMMENDED RANGES OF APPLICATION              |                               |                       |       |    |       |
|------------------------------------------------|-------------------------------|-----------------------|-------|----|-------|
| MODEL                                          |                               | EP                    | AP(1) | ES | CP(1) |
| FLUID                                          | SATURATED STEAM               | *                     | *     |    | *     |
|                                                | GASES                         | *                     |       | *  |       |
|                                                | LIQUIDS                       | *                     |       | *  |       |
| PERMISSIBLE BACK PRESSURE IN % OF SET PRESSURE | INTERNAL OR GENERATED         | SATURATED STEAM GASES | 15    |    |       |
|                                                |                               | LIQUIDS               | —     |    |       |
|                                                | EXTERNAL VARIABLE (1)         | SATURATED STEAM       | 5     |    |       |
|                                                |                               | LIQUIDS               | —     |    |       |
|                                                | EXTERNAL CONSTANT (1) (2) (3) | SATURATED STEAM GASES | 50    |    |       |
|                                                |                               | LIQUIDS               | 90    |    |       |

| OPENING, OVERPRESSURE AND RESET PRESSURES |                                          |                                     |                                     |
|-------------------------------------------|------------------------------------------|-------------------------------------|-------------------------------------|
| FLUID                                     | OPENING PRESSURE                         | OVERPRESSURE                        | RESET PRESSURE                      |
| SATURATED STEAM AND GASES                 | The higher of $\pm 3\%$ or $\pm 0,1$ bar | The higher of $+10\%$ or $+0,1$ bar | The higher of $-15\%$ or $-0,3$ bar |
| LIQUIDS                                   | The higher of $\pm 3\%$ or $\pm 0,1$ bar | The higher of $+10\%$ or $+0,1$ bar | The higher of $-20\%$ or $-0,6$ bar |

- (1) With external constant backpressure, the spring is adjusted deducting the backpressure from the set pressure.
- (2) If the set pressure  $<3$  bar we must consider the total atmospheric pressure (1 bar) as external constant backpressure being freely released.

If  $p_b > 0,25 p_o$  we must limit plug speed with the consequent reduction of the ad coefficient of discharge  $k_d$ .

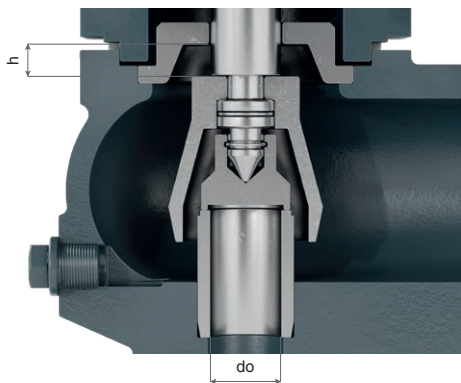
With the new reduced coefficient we determine the  $d_o$ , in order to remove the necessary volume.

$p_a$  = Backpressure permitted (bar) absolute.

$p_o$  = Set pressure (bar) absolute.

$k_d$  = Discharge coefficients.

| DISCHARGE COEFFICIENTS         |                            |               |             |
|--------------------------------|----------------------------|---------------|-------------|
| FNPT1 x FNPT2                  |                            | 3/4" x 1 1/4" | 1" x 1 1/2" |
| $d_o$ [mm]                     |                            | 16,0          | 20,1        |
| $h$ [mm]                       |                            | 4,6           | 5,6         |
| $h/d_o$ [mm]                   |                            | 0,28          | 0,28        |
| COEFFICIENT OF DISCHARGE [kdr] | SATURATED STEAM / GASES    | 0,78          |             |
|                                | LIQUIDS                    | 0,60          |             |
|                                | LIQUIDS WITH RAPID LIMITER | 0,36          |             |



| DISCHARGE CAPACITY                      |               |      |       |             |      |       |
|-----------------------------------------|---------------|------|-------|-------------|------|-------|
| FNPT1 x FNPT2                           | 3/4" x 1 1/4" |      |       | 1" x 1 1/2" |      |       |
| API ORIFICE                             | D-E           |      |       | F           |      |       |
| $d_o$ [mm]                              | 16            |      |       | 20          |      |       |
| $A_0 = \frac{\pi \cdot d_o^2}{4}$ [mm²] | 201           |      |       | 314         |      |       |
| $p$ [bar]                               | I             | II   | III   | I           | II   | III   |
| 1,0                                     | 163           | 236  | 6457  | 255         | 369  | 10088 |
| 1,5                                     | 206           | 298  | 7908  | 322         | 466  | 12356 |
| 2,0                                     | 249           | 360  | 9131  | 388         | 563  | 14267 |
| 2,5                                     | 291           | 422  | 10209 | 455         | 659  | 15951 |
| 3,0                                     | 334           | 484  | 11183 | 522         | 756  | 17473 |
| 3,5                                     | 377           | 546  | 12079 | 589         | 853  | 18873 |
| 4,0                                     | 420           | 608  | 12913 | 656         | 949  | 20177 |
| 4,5                                     | 463           | 669  | 13696 | 723         | 1046 | 21400 |
| 5,0                                     | 505           | 731  | 14437 | 790         | 1143 | 22558 |
| 5,5                                     | 548           | 793  | 15142 | 857         | 1239 | 23659 |
| 6,0                                     | 591           | 855  | 15815 | 924         | 1336 | 24711 |
| 6,5                                     | 634           | 917  | 16461 | 991         | 1433 | 25720 |
| 7,0                                     | 677           | 979  | 17082 | 1058        | 1529 | 26691 |
| 7,5                                     | 720           | 1041 | 17682 | 1125        | 1626 | 27628 |
| 8,0                                     | 763           | 1103 | 18262 | 1192        | 1723 | 28534 |
| 9,0                                     | 849           | 1226 | 19369 | 1327        | 1916 | 30265 |
| 10,0                                    | 935           | 1350 | 20417 | 1461        | 2110 | 31902 |
| 11,0                                    | 1021          | 1474 | 21414 | 1596        | 2303 | 33459 |
| 12,0                                    | 1108          | 1598 | 22366 | 1731        | 2496 | 34947 |
| 13,0                                    | 1194          | 1721 | 23279 | 1865        | 2690 | 36374 |
| 14,0                                    | 1280          | 1845 | 24158 | 2000        | 2883 | 37747 |
| 15,0                                    | 1367          | 1969 | 25006 | 2136        | 3076 | 39072 |
| 16,0                                    | 1453          | 2093 | 25826 | 2271        | 3270 | 40353 |
| 17,0                                    | 1540          | 2216 | 26621 | 2406        | 3463 | 41595 |
| 18,0                                    | 1627          | 2340 | 27393 | 2542        | 3657 | 42801 |
| 20,0                                    | 1800          | 2588 | 28874 | 2813        | 4043 | 45116 |
| 22,0                                    | 1975          | 2835 | 30284 | 3085        | 4430 | 47318 |
| 24,0                                    | 2149          | 3083 | 31630 | 3358        | 4817 | 49422 |
| 25,0                                    | 2236          | 3206 | 32282 | 3494        | 5010 | 50441 |
| 26,0                                    | 2324          | 3330 | 32922 | 3631        | 5204 | 51440 |
| 28,0                                    | 2499          | 3578 | 34165 | 3905        | 5590 | 53382 |
| 30,0                                    | 2674          | 3825 | 35364 | 4179        | 5977 | 55256 |
| 32,0                                    | 2850          | 4073 | 36523 | 4454        | 6364 | 57068 |
| 34,0                                    |               | 4320 | 37647 |             | 6751 | 58824 |
| 36,0                                    |               | 4568 | 38739 |             | 7137 | 60530 |
| 38,0                                    |               | 4815 | 39800 |             | 7524 | 62188 |
| 40,0                                    |               | 5063 | 40834 |             | 7911 | 63804 |

I - Saturated steam in kg/h.

II - Air to 0°C and 1,013 bar in [Nm³/h].

III - Water to 20°C in l/h.

For other, not so dense liquids, other than water at 20 °C apply:

$$V_L = \sqrt{\frac{\rho_A}{\rho_L}} \cdot V_A \quad \text{ó} \quad V_A = V_L \cdot \sqrt{\frac{\rho_L}{\rho_A}}$$

$V_A$  = Water flow according to table.

$V_L$  = Liquid flow

$\rho_A$  = Water density at 20 °C.  
( $\rho_A = 998 \text{ kg/m}^3$ )

$\rho_L$  = Liquid density

**ATTENTION:** Flow rates according to ASME VIII Div.1/API 520 with 10% overpressure.

## Depending on demand

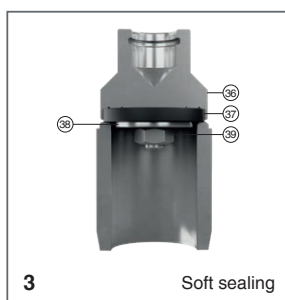
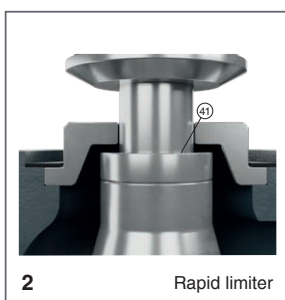
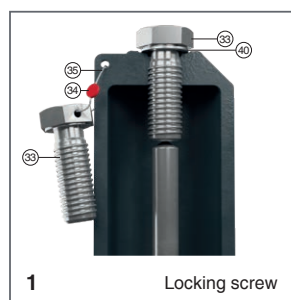
- 1.- Blocking screw which facilitates hydrostatic testing of the container which to be protected.
- 2.- Rapid limiter to reduce the coefficient of discharge.
- 3.- Fluorelastomer (Vitón) seals, Silicone's rubber, PTFE (Teflón) etc., achieving leakage levels less than:

$$0,3 \times 10^{-3} \frac{\text{Pa cm}^3}{\text{seg.}}$$

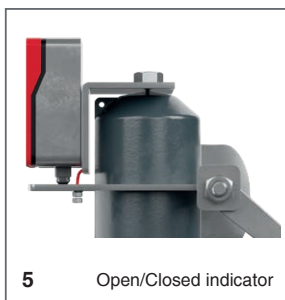
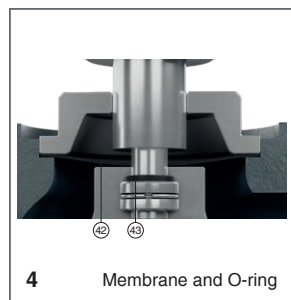
The ranges of application allow certain flexibility although we recommend limiting them to:

| SEALS                  |   | TEMPERATURE RANGE OF THE SEALS [°C] |         |
|------------------------|---|-------------------------------------|---------|
|                        |   | MINIMUM                             | MAXIMUM |
| SILICONE'S RUBBER      | S | -60                                 | 200     |
| FLUORELASTOMER (Vitón) | V | -20                                 | 200     |
| PTFE (Teflon)          | T | -200                                | 260     |

- 4.- Fluorelastomer (Vitón) membrane and O-ring isolating the rotating or sliding parts from the working fluid.
- 5.- Electrical contact indicating open/closed.
- 6.- Balance bellows to:
  - Protect the spring from atmospheric influences.
  - Ensure outside of valve body is totally tightness.
  - Level out external or self-generated back pressure.
- 7.- Possibility of manufacture in other types of material, for special operating conditions (high temperatures, fluids, etc.).
- 8.- Totally free of oil and grease, to work with oxygen, avoiding possible fire risks (UV-OxygenVBG 62).
- 9.- Special springs for critical temperatures.



|    |               |
|----|---------------|
| 33 | Screw         |
| 34 | Seal          |
| 35 | Sealing whire |
| 36 | Shutter       |
| 37 | Sealing disc  |
| 38 | Washer        |
| 39 | Nut           |
| 40 | Joint         |
| 41 | Limiter       |
| 42 | Membrane      |
| 43 | O-ring        |



## Specifications

- 90° angular flow.
- Activated by direct action helicoid spring.
- Simplicity of construction ensuring minimum maintenance.
- Materials carefully selected for their resistance to corrosion. With the exception of washers and couplings, the valves are free of non-ferric materials.
- Internal body designed to offer favourable flow profile.
- Sealing surfaces treated and balanced, making them extremely tightness, even exceeding EN 12266-1 requeriments.
- Great discharge capacity. For liquids typically used with openings similar to proportional safety valves.
- Equipped with draining screws for removing condensation.
- Auto-centering plug.
- Threaded shaft with lever positioner facilitating immediate manual action.
- Elevator, independent of the seal, designed facilitate sudden opening when the steam expands and, with any fluid, guarantees absolute opening and closing precision.
- All the valves are supplied sealed at the set pressure requested, simulating operational conditions, and are vigorously tested.
- All components are numbered, registered and checked. If requested in advance, material, casting, test and efficiency certificates will be enclosed with the valve, and the instruction manual, in accordance with P.E.D. 2014/68/EU.



[www.vycindustrial.com](http://www.vycindustrial.com)

+34 93 735 76 90 @ info@vycindustrial.com

Avenc del Daví, 22 | Pol. Ind. Can Petit | 08227 · Terrassa (Barcelona) España

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