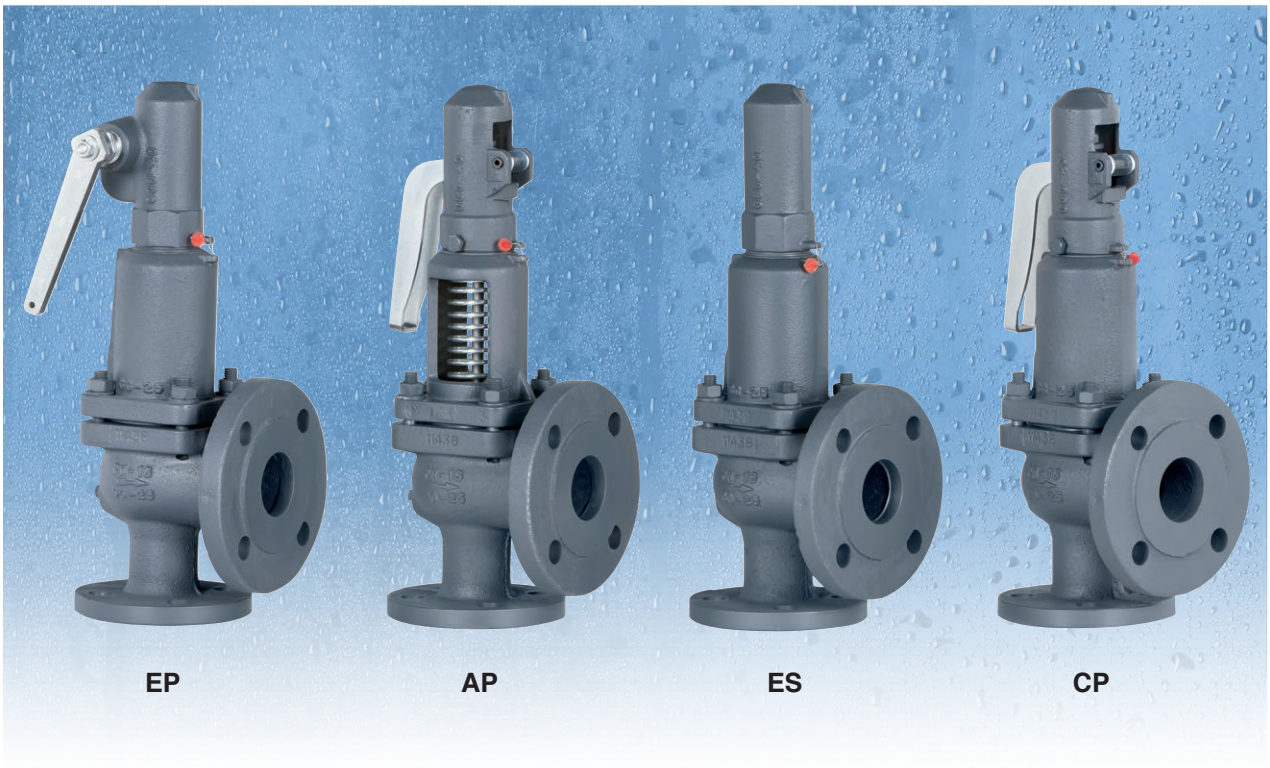
# Normal safety valve with spring loading. (AN)

Model 494

EN




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, at the first proportional to the pressure increase, and after instantly and totally.

Design in accordance with “Internatinal Standard ISO 4126 -1 Safety Valves”.
In accordance with the requirements of the pressure equipment directive 2014/68/EU.
EC valve verification certified by: TÜV Internacional Grupo TÜV Rheinland, S.L. EC 0035.
Type (Module D) EC examination report nº 33530455 certified by: TÜV Internacional Grupo TÜV Rheinland, S.L.
In compliance with the ATEX 2014/34/EU directive “Protective equipment and systems for use in potentially explosive atmospheres”.
Other authorisations: ISCIR, ITI, NASTHOL,EAC,...etc.

**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.

IMPORTANT

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.

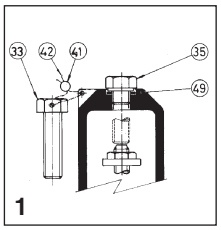
3.- Fluorelastomer (Vitón) seals, Silicone's rubber, PTFE (Teflón)... etc., achieving leakage levels less than:

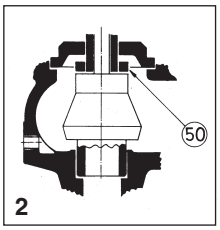
$$0{,}3 \times 10^{-3} \frac{\text{Pa cm}^3}{\text{seg.}}$$

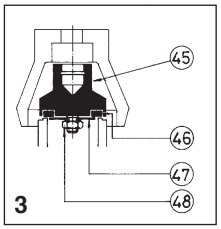
The ranges of application allow certain flexibility although we recommend limiting them to:

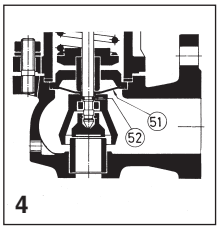
| RANGE OF APPLICATION FOR THE SEALS | | | | | |
|---|---|---|---|---|---|
| FLUID | | SET PRESSURE IN bar | | | |
| | | 0,2 — 1,8 — 4,0 — 4,8 — 7,0 — 30 — 40,0 | | | |
| Saturated steam | | S | V | T | |
| Liquids and gases | | S | V | T | |
| SEALS | | TEMPERATURE IN °C | | | |
| | | ACCORDING TO MANUFACTURERS | | RECOMMENDED BY VYC | |
| | | MINIMUM | MAXIMUM | MINIMUM | MAXIMUM |
| Silicone's rubber | S | -60 | +200 | -50 | +115 |
| Fluorelastomer (Vitón) | V | -40 | +250 | -30 | +150 |
| PTFE (Teflón) | T | -265 | +260 | -80 | +230 (1) |

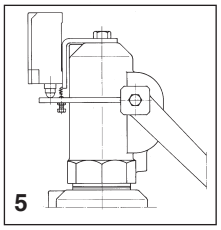
(1) For temperatures exceeding 230°C apply metallic seal only

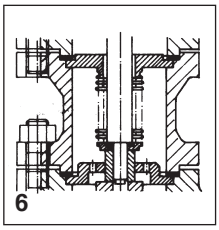



4.- Flourelastomer (Vitón) membrane and O-ring isolating the rotating or sliding parts from the working fluid.

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-Oxygen-VBG 62).

9.- Special springs for critical temperatures.

| N°. PIECE | PIECE | MATERIAL | | | |
|---|---|---|---|---|---|
| | | CAST IRON | NODULAR IRON | CAST STEEL | STAINLESS STEEL |
| 1 | Body | Cast iron (EN-5.1301) | Nodular iron (EN-5.3106) | Cast steel (EN-1.0619+N) | Stainless steel (EN-1.4408) |
| 2 | Closed bell | Cast iron (EN-5.1301) | Nodular iron (EN-5.3106) | Nodular iron (EN-5.3106) | Stainless steel (EN-1.4408) |
| 3 | Open bell | Cast iron (EN-5.1301) | Nodular iron (EN-5.3106) | Cast steel (EN-1.0619+N) | Stainless steel (EN-1.4408) |
| 4, 5, 6 | Hood | Nodular iron (EN-5.3106) | Nodular iron (EN-5.3106) | Nodular iron (EN-5.3106) | Stainless steel (EN-1.4408) |
| 7 | Elevator | Nodular iron (EN-5.3106)(1) | Nodular iron (EN-5.3106)(1) | Nodular iron (EN-5.3106)(1) | Stainless steel (EN-1.4408)(5) |
| 8 | Cam | Carbon steel (EN-1.0037 St-37.2)(4) | Carbon steel (EN-1.0037 St-37.2)(4) | Carbon steel (EN-1.0037 St-37.2)(4) | Stainless steel (EN-1.4301) |
| 9, 10 | Lever | Carbon steel (EN-1.0037 St-37.2) | Carbon steel (EN-1.0037 St-37.2) | Carbon steel (EN-1.0037 St-37.2) | Carbon steel (EN-1.0037 St-37.2) |
| 11 | Seating | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4542) |
| 12 | Plug | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4542) |
| 13 | Lead | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4401) |
| 14 | Spring press | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Stainless steel (EN-1.4305) |
| 15 | Separator | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4401) |
| 16 | Rod | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4401) |
| 17 | Lever shaft | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Stainless steel (EN-1.4305) |
| 18 | Gudgeon | Carbon steel (EN-1.1231) | Carbon steel (EN-1.1231) | Carbon steel (EN-1.1231) | Stainless steel (EN-1.4310) |
| 19 | Ring | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4401) |
| 20, 21 | Safety ring | Stainless steel (EN-1.4310) | Stainless steel (EN-1.4310) | Stainless steel (EN-1.4310) | Stainless steel (EN-1.4310) |
| 22 | Spring | Vanadium-chrome steel (EN-1.8159)(2) | Vanadium-chrome steel (EN-1.8159) (2) | Vanadium-chrome steel (EN-1.8159) (2) | Stainless steel (EN-1.4310) (3) |
| 23 | Gland | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Stainless steel (EN-1.4305) |
| 24 | Hollow screw | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) |
| 25 | Hollow screw nut | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) |
| 26 | Buffer nut | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) | Stainless steel (EN-1.4305) |
| 27 | Rod check nut | Carbon steel (EN-1.1141) | Carbon steel (EN-1.1141) | Carbon steel (EN-1.1141 ) | Stainless steel (EN-1.4401) |
| 28, 29, 48 | Nut | Carbon steel (EN-1.1141) | Carbon steel (EN-1.1141) | Carbon steel (EN-1.1141) | Stainless steel (EN-1.4401) |
| 30, 31 | Washer | Carbon steel (EN-1.1141) | Carbon steel (EN-1.1141) | Carbon steel (EN-1.1141) | Stainless steel (EN-1.4401) |
| 32 | Stud | Carbon steel (EN-1.1181) | Carbon steel (EN-1.1181) | Carbon steel (EN-1.1181) | Stainless steel (EN-1.4401) |
| 33, 34, 35 | Screw | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Carbon steel (EN-1.1191) | Stainless steel (EN-1.4401) |
| 36 | Cap | Carbon steel (EN-1.1181) | Carbon steel (EN-1.1181) | Carbon steel (EN-1.1181) | Stainless steel (EN-1.4401) |
| 38 | Coupling | Graphite | Graphite | Graphite | PTFE (Teflon) |
| 39 | Coupling | PTFE (Teflon) | PTFE (Teflon) | PTFE (Teflon) | PTFE (Teflon) |
| 40 | Seal | Graphite | Graphite | Graphite | PTFE (Teflon) |
| 41 | Seal | Plastic | Plastic | Plastic | Plastic |
| 42 | Sealing wire | Sealing wire | Sealing wire | Sealing wire | Sealing wire |
| 43 | Characteristic plate | Stainless steel (EN-1.4301) | Stainless steel (EN-1.4301) | Stainless steel (EN-1.4301) | Stainless steel (EN-1.4301) |
| 45 | Plug | Stainless steel (EN-1.4401) | Stainless steel (EN-1.4401) | Stainless steel (EN-1.4401) | Stainless steel (EN-1.4401) |
| 46 | Sealing disk | PTFE (Teflon) | PTFE (Teflon) | PTFE (Teflon) | PTFE (Teflon) |
| | | Silicone's rubber | Silicone's rubber | Silicone's rubber | Silicone's rubber |
| | | Fluorelastomer (Viton) | Fluorelastomer (Viton) | Fluorelastomer (Viton) | Fluorelastomer (Viton) |
| 47 | Washer | Stainless steel (EN-1.4401) | Stainless steel (EN-1.4401) | Stainless steel (EN-1.4401) | Stainless steel (EN-1.4401) |
| 49 | Coupling | Copper | Copper | Copper | PTFE (Teflon) |
| 50 | Limiter | Stainless steel (EN-1.4028) | Stainless steel(EN-1.4028) | Stainless steel (EN-1.4028) | Stainless steel (EN-1.4401) |
| 51 | Membrane | Fluorelastomer (Viton) | Fluorelastomer (Viton) | Fluorelastomer (Viton) | Fluorelastomer (Viton) |
| 52 | O-ring | Fluorelastomer (Viton) | Fluorelastomer (Viton) | Fluorelastomer (Viton) | Fluorelastomer (Viton) |
| $DN_1$ x $DN_2$ | | 20 x 25 to 200 x 200 | | | |

| PN | | 16 | | | | 40 | | | | | 40 | | | | | | | 40 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPERATING CONDITIONS | PRESSURE IN bar | 16 | 13 | 13 | 13 | 40 | 35 | 32 | 28 | 24 | 40 | 35 | 32 | 28 | 24 | 21 | 20 | 40 | 34 | 32 | 29 |
| | MAX. TEMP. IN °C | 120 | 200 | 250 | 300 | 120 | 200 | 250 | 300 | 350 | 120 | 200 | 250 | 300 | 350 | 400 | 450 | 120 | 200 | 250 | 300 |
| | MIN. TEMP. IN °C | -10 | | | | -10 | | | | | -10 | | | | | | | -60 | | | |

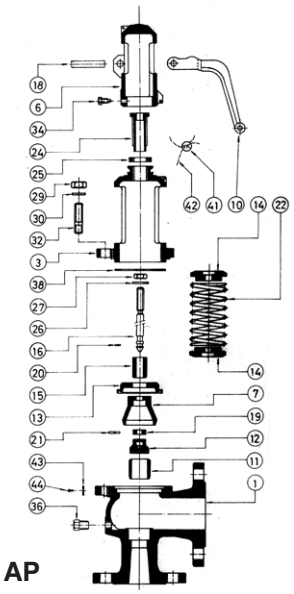
(1) DN-25x25 in stainless steel (EN-1.4408).

(2) Spring steel (EN-10270-1-SH) for wire spring Ø < 10 mm. Maximum temperature EP, ES and CP 250°C / AP 400ºC.

(3) Vanadium chrome steel (EN-1.8159) for wire spring Ø > 10 mm.

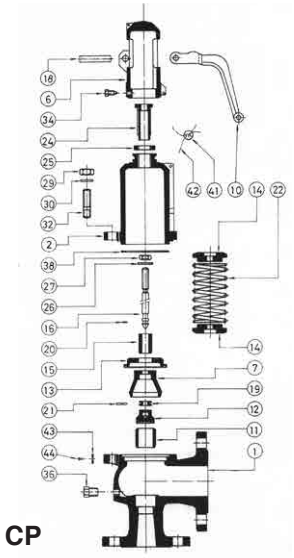
(4) DN-25 x 25 in stainless steel (EN-1.4301).

(5) DN-32 x 32 to DN-65x65 in stainless steel (EN-1.4401).



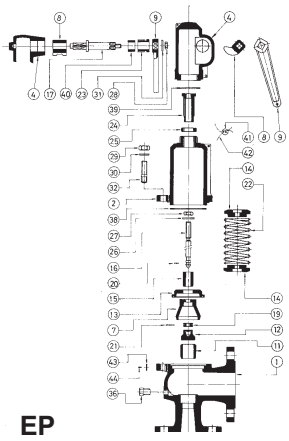
AP

**Normal safety valve with spring loading (AN) model 494 - AP and CP.**
**1. Disassembly and assembly.**
1.1 Disassembly.
To replace the spring (22) or clean any of the internal components of the valve, proceed in the following manner:
A - Withdraw the clip (18), using a punching tool, until the lever (10) comes free.
B - Loosen the screws (34) and take the cap (6) off.
C - Holding the spindle (16) steady, loosen the hollow screw nut (25) and the holow screw (24) until you note a realasing of the spring (22).
D - Mark on the spindle (16) the position of the spindle lock-nut (27) and the adjusting nut (26). Loosen them and remove them.
E - Unscrew the nuts (29) and remove them, together with the studs (32) and their washers (30).
F - Lift the cover (3) or (2) and you will have access to all of the components.
1.2 Assembly.
A - Place the safety-ring (20) on the spindle (16) and press it against the gasket (12).
B - In the spindle channel (16) connect the ring (19) and fix it to the security-ring (21). IIntroduce the elevator (7) into the upper part of the spindle (16) and press this against the previously described pieces.
C - Enter the guide (13), the separator (15), the spring-press (14), the spring (22), the spring-press (14) through the upper part of the spindle (16) and press this against the previously descrobed pieces.
D - Replace the assembly (38) and the cover (3) or (2).
E - Place the washers (30) on the studs (32) and make up the nuts (29) diagonally, checking the correct alignment of the cover (3) or (2).
F - Adjust the firing pressure with the hollow screw (24) and fix the adjustment position with the hollow screw nut (25).
G - Turn the spindle lock-nut (27) and the adjusting nut (26) to the position mrked (see 1.1.D) and make up against each other.
H - Introduce the cap (6) and tighten the screws (34).
I - Place the lever (10) and fix it with the fastener (18).
**2. Adjusting the firing pressure.**
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C.
B - Proceed according to points 1.2.F, 1.2.H, 1.2.I.



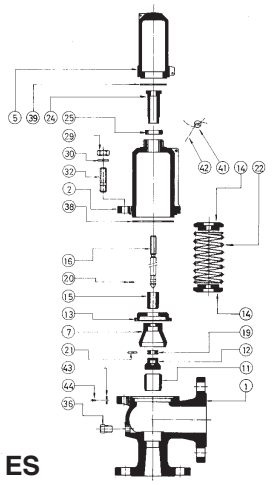
CP

**Normal safety valve with spring loading (AN) model 494 - EP.**
**1. Disassembly and assembly .**
1.1 Disassembly.
To replace the spring (22), or clean any of the internal components of the valve, proceed in the following manner:
A - Move the lever (9) in direction C as far as the constructive catcher.
B - Unscrew the cap (4) and remove.
C - Holding the spindle (16) steady, loosen the hollow screw nut (25) and the hollow screw (24) until you note a realeasing of the spring (22).
D - Mark on the spindle (16) the position of the spindle lock-nut (27) and the adjusting nut (26). Loosen them and remove them.
E - Unscrew the nuts (29) and remove them, together with the studs (32) and their washers (30).
F - Lift the cover (2) and you will have access to all of the components.
1.2 Assembly.
A - Place the safety-ring (20) on the spindle (16) and press it against the gasket (12).
B - In the spindle channel (16) connect the ring (19) and fix it to the security-ring (21). Introduce the elevator (7) into the upper part of the spindle (16) and press this against the previously described pieces.
C - Enter the guide (13), the separator (15), the spring-press (14), the spring (22), the spring-press (14) through the upper part of the spindle (16) in a correlative manner.
D - Replace the assembly (38) and the cover (2).
E - Place the washers (30) on the studs (32) and make up the nuts (29) diagonally, checking the correct alignment of the cover (2).
F - Adjust the firing pressure with the hollow screw (24) and fix the adjustment position with the hollow screw nut (25).
G - Turn the spindle lock-nut (27) and the adjusting nut (26) to the position marked (see 1.1.D) and make up against each other.
H - Change the coupling (39) and lightly tighten the cap (4). Move the lever (9) towards position A as far as the constructive catcher. Definitively tighten the cap (4).
**2. Adjustig the firing pressure.**
A - Proceed according to points 1.1.A, 1.1.B, 1.1.C.
B - Proceed according to points 1.2.F, 1.2.H.



EP

**Normal safety valve with spring loading (AN) model 494 - ES.**
**1. Disassembly and assembly.**
1.1 Disassembly.
To replace the spring (22), or clean any of the internal components of the valve, proceded in the following manner:
A - Unscrew the cap (5) and remove.
B - Holding the spindle (16) steady, loosen the hollow screw nut (25) and the hollow screw (24) until you note a realeasing of the spring (22).
C -Unscrew the nuts (29) and remove them, together with the studs (32) and their washers (30).
F - Lift the cover (2) and you will have access to all of the components.
1.2 Assembly.
A - Place the safety-ring (20) on the spindle (16) and press it against the gasket (12).
B - In the spindle channel (16) connect the ring (19) and fix it to the security-ring (21).
Introduce the elevator (7) into the upper part of the spindle (16) and press this against the previously described pieces.
C - Enter the guide (13), the separator (15), the spring-press (14), the spring (22), the spring-press (14) through the upper part of the spindle (16) in a correlative manner.
D - Replace the washers (38) and the cover (2).
E - Place the washers (30) on the studs (32) and make up the nuts (29) diagonally, checking the correct alignment of the cover (2).
F - Adjust the firing pressure with the hollow screw (24) and fix the adjustment position with the hollow screw nut (25).
G - Change the coupling (39) and tighten the cap (5).
2. Adjusting the firing pressure.
A - Proceed according to points 1.1.A, 1.1.B.
B - Proceed according to points 1.2.F, 1.2.G.



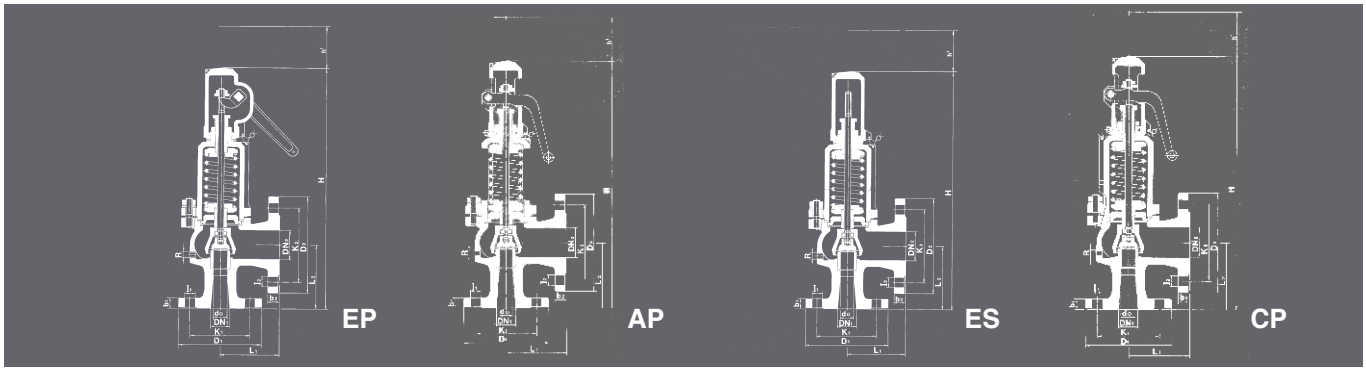
ES

| DN1 x DN2 | | | 25 x 25 | 32 x 32 | 40 x 40 | 50 x 50 | 65 x 65 | 80 x 80 | 100 x 100 | 125 x 125 | 150 x 150 | 200 x 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| do | | | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 77 | 93 | 110 |
| $Ao = \frac{\pi \cdot do^2}{4}$ | | | 201 | 314 | 491 | 804 | 1257 | 1964 | 3117 | 4657 | 6793 | 9503 |
| H | | | 350 | 390 | 420 | 495 | 550 | 655 | 705 | 810 | 850 | 990 |
| $h_1$ | | | 112 | 129 | 129 | 148 | 148 | 191 | 191 | 191 | 191 | 223 |
| $L_1$ | | | 100 | 105 | 115 | 125 | 145 | 155 | 175 | 200 | 225 | 225 |
| $L_2$ | | | 100 | 105 | 115 | 125 | 145 | 155 | 175 | 200 | 225 | 250 |
| R | | | 1/4" | 1/4" | 1/4" | 1/4" | 3/8" | 3/8" | 3/8" | 1/2" | 1/2" | 1/2" |
| | | | Whitworth gas-tight cylindrical female thread ISO 228/1 1978 (DIN-259) | | | | | | | | | |
| INTAKE FLANGE | PN-10/16 EN-1092-2 (2) | $D_1$ | 115 | 140 | 150 | 165 | 185 | 200 | 220 | 250 | 285 | 340 |
| | | $K_1$ | 85 | 100 | 110 | 125 | 145 | 160 | 180 | 210 | 240 | 295 |
| | | $I_1$ | 14 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 23 | 23 |
| | | $b_1$ | 16 | 18 | 18 | 20 | 20 | 22 | 24 | 26 | 26 | 26 |
| | | DRILLS N.° | 4 | 4 | 4 | 4 | 4 | 8 | 8 | 8 | 8 | 8 |
| | EN-1092-2 EN-1092-1 (3) PN-25/40 | $D_1$ | 115 | 140 | 150 | 165 | 185 | 200 | 235 | 270 | 300 | 360 |
| | | $K_1$ | 85 | 100 | 110 | 125 | 145 | 160 | 190 | 220 | 250 | 310 |
| | | $I_1$ | 14 | 19(18)* | 19(18)* | 19(18)* | 19(18)* | 19(18)* | 23(22)* | 28(26)* | 28(26)* | 28(26)* |
| | | $b_1$ | 18(16)• | 18 | 18(20)• | 20 | 22 | 24 | 24 | 26 | 28 | 30 |
| | | DRILLS N.° | 4 | 4 | 4 | 4 | 8 | 8 | 8 | 8 | 8 | 12 |
| ESCAPE FLANGE | EN-1092-2 (1) EN-1092-1 PN-10/6 | $D_2$ | 115 | 140 | 150 | 165 | 185 | 200 | 220 | 250 | 285 | 340 |
| | | $K_2$ | 85 | 100 | 110 | 125 | 145 | 160 | 180 | 210 | 240 | 295 |
| | | $I_2$ | 14 | 19(18)* | 19(18)* | 19(18)* | 19(18)* | 19(18)* | 19(18)* | 19(18)* | 23(22)* | 23(22)* |
| | | $b_2$ | 16 | 18 | 18 | 20 | 20(18)* | 22(20)•* | 24(22)•(20)* | 26(22)•* | 26(24)•(22)* | 26(24)•* |
| | | DRILLS N.° | 4 | 4 | 4 | 4 | 4 | 8 | 8 | 8 | 8 | 8 |

| MODEL | | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP | EP | AP | ES | CP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WEIGHT IN kgs. | CAST IRON | 8,00 | 7,40 | 7,60 | 7,80 | 9,60 | 8,88 | 9,12 | 9,38 | 13,87 | 12,82 | 13,17 | 13,43 | 20,27 | 18,74 | 19,25 | 19,68 | 26,68 | 24,67 | 25,34 | 25,77 | 39,48 | 36,52 | 37,50 | 38,10 | 55,48 | 51,32 | 52,70 | 53,30 | 82,15 | 75,98 | 78,04 | 78,64 | 94,50 | 88,64 | 92,80 | 93,33 | 138,10 | 130,80 | 135,10 | 136,37 |
| | NODULAR IRON | 8,73 | 8,07 | 8,29 | 8,49 | 10,47 | 9,68 | 9,94 | 10,20 | 15,13 | 13,99 | 14,37 | 14,63 | 22,11 | 20,45 | 21,00 | 21,43 | 29,11 | 26,92 | 27,65 | 28,08 | 43,08 | 39,84 | 40,92 | 41,52 | 60,54 | 55,99 | 57,51 | 58,11 | 89,64 | 82,91 | 85,15 | 85,75 | 97,00 | 91,16 | 95,39 | 95,84 | 173,48 | 136,25 | 140,43 | 141,80 |
| | CAST STEEL STAINLESS STEEL | 8,50 | 7,86 | 8,07 | 8,27 | 10,60 | 9,80 | 10,07 | 10,33 | 14,87 | 13,75 | 14,12 | 14,38 | 21,27 | 19,67 | 20,20 | 20,63 | 28,68 | 26,52 | 27,24 | 27,67 | 41,48 | 38,36 | 39,40 | 40,00 | 58,48 | 54,09 | 55,55 | 56,15 | 87,15 | 80,61 | 82,79 | 83,39 | 104,38 | 97,86 | 102,65 | 103,10 | 152,10 | 144,48 | 149,30 | 180,65 |
| CODE | CAST IRON 2002-496. | 5106 | 51061 | 51062 | 51063 | 5146 | 51461 | 51462 | 51463 | 5126 | 51261 | 51262 | 51263 | 5206 | 52061 | 52062 | 52063 | 5226 | 52261 | 52262 | 52263 | 5306 | 53061 | 53062 | 53063 | 5406 | 54061 | 54062 | 54063 | 5506 | 55061 | 55062 | 55063 | 5606 | 56061 | 56062 | 56063 | 5806 | 58061 | 58062 | 58063 |
| | NODULAR IRON 2002-496. | 8106 | 81061 | 81062 | 81063 | 8146 | 81461 | 81462 | 81463 | 8126 | 81261 | 81262 | 81263 | 8206 | 82061 | 82062 | 82063 | 8226 | 82261 | 82262 | 82263 | 8306 | 83061 | 83062 | 83063 | 8406 | 84061 | 84062 | 84063 | 8506 | 85061 | 85062 | 85063 | 8606 | 86061 | 86062 | 86063 | 8806 | 88061 | 88062 | 88063 |
| | CAST STEEL 2002-496. | 8104 | 81041 | 81042 | 81043 | 8144 | 81441 | 81442 | 81443 | 8124 | 81241 | 81242 | 81243 | 8204 | 82041 | 82042 | 82043 | 8224 | 82241 | 82242 | 82243 | 8304 | 83041 | 83042 | 83043 | 8404 | 84041 | 84042 | 84043 | 8504 | 85041 | 85042 | 85043 | 8604 | 86041 | 86042 | 86043 | 8804 | 88041 | 88042 | 88043 |
| | STAINLESS STEEL 2002-496. | 8102 | 81021 | 81022 | 81023 | 8142 | 81421 | 81422 | 81423 | 8122 | 81221 | 81222 | 81223 | 8202 | 82021 | 82022 | 82023 | 8222 | 82221 | 82222 | 82223 | 8302 | 83021 | 83022 | 83023 | 8402 | 84021 | 84022 | 84023 | 8402 | 84021 | 84022 | 84023 | 8602 | 86021 | 86022 | 86023 | 8802 | 88021 | 88022 | 88023 |

(1) From DN-200x200 PN-10.
(2) DN-200x200 PN-10.
(3) DN-200x200 PN-25.

* Cast steel (EN-1.0619) and Stainless (EN-1.4408).
• Nodular Iron (EN-JS1030).




| 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 GASES | — | | | |
| | | LIQUIDS | — | | | |
| | EXTERNAL CONSTANT (1)(2)(3) | SATURATED STEAM GASES | 50 | | | |
| | | LIQUIDS | 90 | | | |
| % OVERPRESSURE | | SATURATED STEAM GASES | 10 | | | |
| | | LIQUIDS | 25 | | | |

| OPEN AND CLOSED PRESSURES IN % OF SET PRESSURE | | | |
|---|---|---|---|
| FLUIDO | PRESSURE IN bar | OPENING PRESSURE | CLOSING PRESSURE |
| SATURATED STEAM | < 3 | + 10 % | - 0,3 bar |
| GASES | ≥ 3 | + 10 % | - 10 % |
| LIQUIDS | < 3 | + 10 % | - 0,6 bar |
| | ≥ 3 | + 10 % | - 20 % |

(1) If external backpressure exists, the AP and CP model cannot be used.

(2) With external constant backpressure, the spring is adjusted deducting the backpressure from the set pressure.

(3) If the set pressure < 3 bar we must consider the total atmospheric pressure (1 bar) as external constant backpressure being freely released.

If pa > 0,25p, we must limit plug speed with the consequent reduction of the $\alpha$d coefficient of discharge.
With the new reduced coefficient we determine the d0, in order to remove the necessary volume..

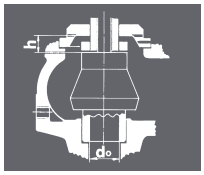
pa = Backpressure permitted [bar] absolute.
p = Set pressure [bar] absolute.
$\alpha$d = Coefficient of discharge.

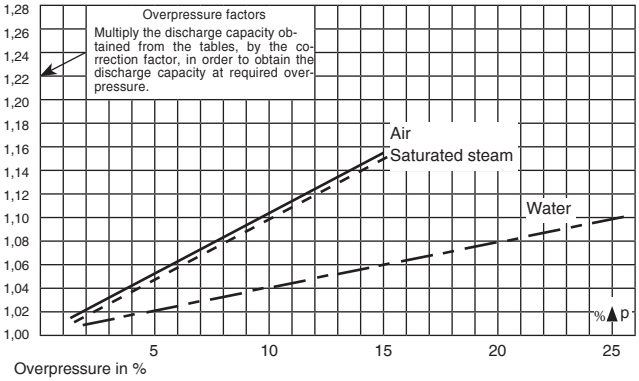
# SET PRESSURES AND REGULATING RANGES

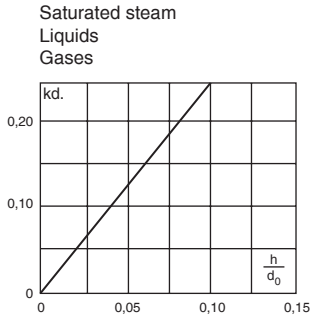
| | | | $DN_1$ x $DN_2$ | 25 x 25 | 32 x 32 | 40 x 40 | 50 x 50 | 65 x 65 | 80 x 80 | 100 x 100 | 125 x 125 | 150 x 150 | 200x200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SET PRESSURES IN bar | MAXIMUM (LIQUIDS AND GASES) | PN-16 | | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 12,5 | 10 |
| | | PN-40 | | 40 | 40 | 40 | 32 | 32 | 32 | 25 | 20 | 12,5 | 10 |
| | MAXIMUM (SATURATED STEAM) | PN-16 | | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 12,5 | 10 |
| | | PN-40 | | 32 | 32 | 30 | 24 | 22 | 24 | 20 | 18 | 12,5 | 10 |
| | MINIMUM | STEAM AND GASES | | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |
| | | LIQUIDS | | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 |
| SPRING REGULATING RANGE IN bar | 0,20 to 0,68 | CODE | | 56210<br>56390 | 56226<br>56406 | 56242<br>56422 | 56258<br>56438 | 56273<br>56453 | 56288<br>56468 | 56303<br>56483 | 56317<br>56497 | 56500 | 56511 |
| | 0,66 to 1,00 | CODE | | 56211<br>56391 | 56227<br>56407 | 56243<br>56423 | 56259<br>56439 | 56274<br>56454 | 56289<br>56469 | 56304<br>56484 | 56318 | 56501 | 56512 |
| | 0,95 to 1,40 | CODE | | 56212<br>56392 | 56228<br>56408 | 56244<br>56424 | 56260<br>56440 | 56275<br>56455 | 56290<br>56470 | 56305<br>56485 | 56319 | 56502 | 56513 |
| | 1,30 to 1,90 | CODE | | 56213<br>56393 | 56229<br>56409 | 56245<br>56425 | 56261<br>56441 | 56276<br>56456 | 56291<br>56471 | 56306<br>56486 | 56320 | 56503 | 56514 |
| | 1,80 to 2,60 | CODE | | 56214<br>56394 | 56230<br>56410 | 56246<br>56426 | 56262<br>56442 | 56277<br>56457 | 56292<br>56472 | 56307 | 56321 | 56504 | 56515 |
| | 2,50 to 3,60 | CODE | | 56215<br>56395 | 56231<br>56411 | 56247<br>56427 | 56263<br>56443 | 56278<br>56458 | 56293<br>56473 | 56308 | 56322 | 56505 | 56516 |
| | 3,50 to 5,00 | CODE | | 56216<br>56396 | 56232<br>56412 | 56248<br>56428 | 56264<br>56444 | 56279<br>56459 | 56294 | 56309 | 56323 | 56506 | 56517 |
| | 4,80 to 6,30 | CODE | | 56217<br>56397 | 56233<br>56413 | 56249<br>56429 | 56265<br>56445 | 56280<br>56460 | 56295 | 56310 | 56324 | 56507 | 56518 |
| | 6,00 to 8,00 | CODE | | 56218<br>56398 | 56234<br>56414 | 56250<br>56430 | 56266<br>56446 | 56281<br>56461 | 56296 | 56311 | 56325 | 56508 | 56519 |
| | 7,50 to 10,00 | CODE | | 56219<br>56399 | 56235<br>56415 | 56251<br>56431 | 56267<br>56447 | 56282<br>56462 | 56297 | 56312 | 56326 | 56509 | 56520 |
| | 9,50 to 12,50 | CODE | | 56220<br>56400 | 56236<br>56416 | 56252<br>56432 | 56268<br>56448 | 56283 | 56298 | 56313 | 56327 | 56510 | |
| | 12,00 to 16,00 | CODE | | 56221<br>56401 | 56237<br>56417 | 56253<br>56433 | 56269<br>56449 | 56284 | 56299 | 56314 | 56328 | | |
| | 15,00 to 20,00 | CODE | | 56222<br>56402 | 56238<br>56418 | 56254<br>56434 | 56270 | 56285 | 56300 | 56315 | 56329 | | |
| | 18,00 to 25,00 | CODE | | 56223<br>56403 | 56239<br>56419 | 56255<br>56435 | 56271 | 56286 | 56301 | 56316 | | | |
| | 23,00 to 32,00 | CODE | | 56224<br>56404 | 56240<br>56420 | 56256<br>56436 | 56272 | 56287 | 56302 | | | | |
| | 30,00 to 40,00 | CODE | | 56225<br>56405 | 56241<br>56421 | 56257<br>56437 | | | | | | | |

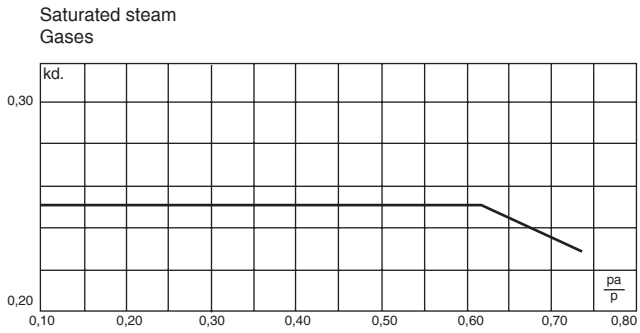
Spring steel (EN-10270-1-SH). Maximum temperature for EP, ES and CP models 250ºC / 400ºC.
Vanadium-chrome steel (EN-1.8159).
Stainless steel (EN-1.4310).

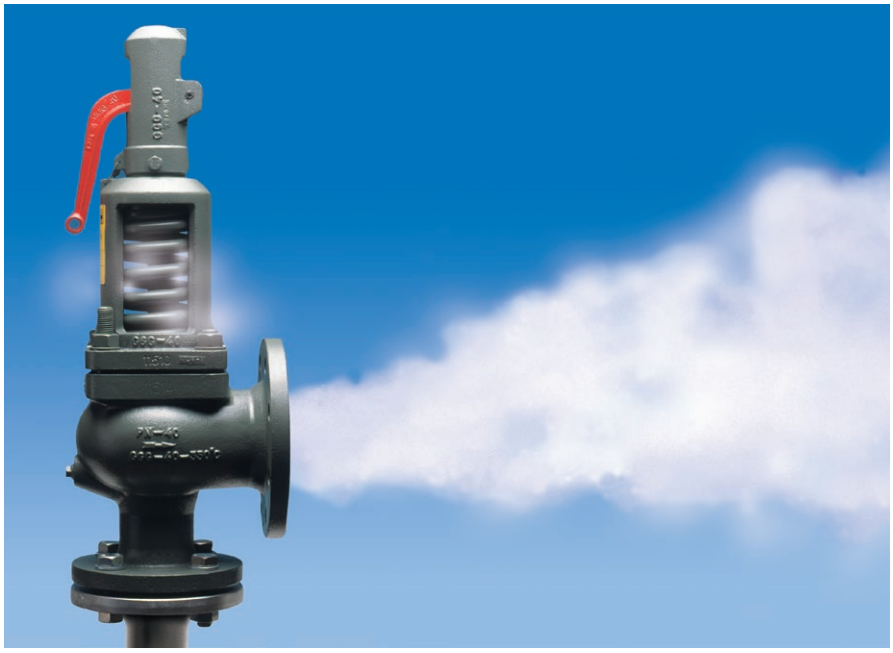
| COEFFICIENT OF DISCHARGE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN1 x DN2 | | 25 x 25 | 32 x 32 | 40 x 40 | 50 x 50 | 65 x 65 | 80 x 80 | 100 x 100 | 125x 125 | 150x150 | 200x200 |
| do | | 16 | 20 | 25 | 32 | 40 | 50 | 63 | 77 | 93 | 110 |
| h | | 2,00 | 2,00 | 2,50 | 3,50 | 4,00 | 5,00 | 6,50 | 8,00 | 9,50 | 11,00 |
| h/do | | 0,12 | 0,10 | 0,10 | 0,10 | 0,10 | 0,10 | 00,10 | 00,10 | 0,10 | 0,10 |
| COEFFICIENT OF DISCHARGE kd | SATURATED STEAM GASES | 0,25 | | | | | | | | | |
| | LIQUIDS | 0,25 | | | | | | | | | |





| DN1 x DN2 | 25 x 25 | | | 32 x 32 | | |
|---|---|---|---|---|---|---|
| do | 16 | | | 20 | | |
| Ao= $\frac{\pi \cdot do^2}{4}$ | 201 | | | 314 | | |
| p [bar] | | | | | | |
| SET PRESSURE IN bar | I | II | III | I | II | III |
| 0,5 | 43 | 49 | 1804 | 66 | 77 | 2829 |
| 1,0 | 56 | 68 | 2551 | 87 | 107 | 4001 |
| 1,5 | 69 | 86 | 3124 | 108 | 134 | 4900 |
| 2,0 | 82 | 103 | 3607 | 128 | 160 | 5658 |
| 2,5 | 95 | 120 | 4033 | 148 | 187 | 6326 |
| 3,0 | 108 | 137 | 4418 | 169 | 214 | 6930 |
| 3,5 | 121 | 154 | 4772 | 189 | 241 | 7485 |
| 4,0 | 134 | 171 | 5102 | 209 | 267 | 8002 |
| 4,5 | 147 | 188 | 5411 | 229 | 294 | 8487 |
| 5,0 | 159 | 205 | 5704 | 249 | 321 | 8946 |
| 6,0 | 185 | 239 | 6248 | 289 | 374 | 9800 |
| 7,0 | 211 | 274 | 6749 | 329 | 428 | 10585 |
| 8,0 | 236 | 308 | 7215 | 369 | 481 | 11316 |
| 9,0 | 261 | 342 | 7652 | 408 | 535 | 12002 |
| 10,0 | 287 | 376 | 8066 | 448 | 588 | 12652 |
| 12,0 | 337 | 445 | 8836 | 527 | 695 | 13859 |
| 14,0 | 388 | 513 | 9544 | 606 | 802 | 14969 |
| 16,0 | 439 | 582 | 10203 | 685 | 909 | 16003 |
| 18,0 | 489 | 650 | 10822 | 764 | 1016 | 16974 |
| 20,0 | 539 | 718 | 11407 | 842 | 1123 | 17892 |
| 22,0 | 590 | 787 | 11964 | 921 | 1230 | 18765 |
| 24,0 | 640 | 855 | 12496 | 1000 | 1337 | 19600 |
| 26,0 | 691 | 924 | 13006 | 1080 | 1444 | 20400 |
| 28,0 | 742 | 992 | 13497 | 1160 | 1551 | 21170 |
| 30,0 | 794 | 1060 | 13971 | 1240 | 1658 | 21913 |
| 32,0 | 845 | 1129 | 14429 | 1320 | 1764 | 22632 |
| 34,0 | | 1197 | 14873 | | 1871 | 23328 |
| 36,0 | | 1266 | 15305 | | 1978 | 24005 |
| 38,0 | | 1334 | 15724 | | 2085 | 24662 |
| 40,0 | | 1403 | 16132 | | 2192 | 25303 |

## DISCHARGE CAPACITY

| 40 x 40 | 50 x 50 | 65 x 65 | 80 x 80 | 100 x 100 | 125 x 125 | 150 x 150 | 200 x 200 |
|---|---|---|---|---|---|---|---|
| 25 | 32 | 40 | 50 | 63 | 77 | 93 | 110 |
| 491 | 804 | 1257 | 1964 | 3117 | 4657 | 6793 | 9503 |

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

I - Saturated steam in kg/h.

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

III - Water at 20°C in l/h

$$\sqrt{\frac{\varrho_A}{\varrho_L}} \cdot V_A \text{ Ó } V_A = V_L \cdot \sqrt{\frac{\varrho_L}{\varrho_A}}$$

$V_A$ = Water flow according to table.
$V_L$ = Liquid flow.
$\varrho_A$ = Water density at a 20°C. ( $\varrho_A$ =998 kg/m³)
$\varrho_L$ = Liquid density.

| I | II | III | I | II | III | I | II | III | I | II | III | I | II | III | I | II | III | I | II | III | I | II | III |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104 | 120 | 4424 | 170 | 196 | 7244 | 266 | 307 | 11325 | 416 | 480 | 17695 | 660 | 762 | 28082 | 986 | 1138 | 41957 | 1438 | 2148 | 60957 | 2012 | 3005 | 85617 |
| 136 | 167 | 6256 | 223 | 274 | 10244 | 349 | 428 | 16016 | 545 | 669 | 25024 | 864 | 1062 | 39715 | 1291 | 1586 | 59336 | 1884 | 2994 | 86206 | 2635 | 4189 | 121080 |
| 168 | 209 | 7662 | 275 | 342 | 12546 | 431 | 535 | 19615 | 673 | 836 | 30648 | 1068 | 1327 | 48640 | 1596 | 1983 | 72672 | 2328 | 3743 | 105580 | 3256 | 5236 | 148293 |
| 200 | 251 | 8847 | 328 | 411 | 14487 | 513 | 642 | 22650 | 801 | 1003 | 35389 | 1271 | 1592 | 56165 | 1899 | 2379 | 83914 | 2770 | 4492 | 121913 | 3876 | 6283 | 171234 |
| 232 | 293 | 9892 | 380 | 479 | 16197 | 594 | 749 | 25323 | 928 | 1171 | 39566 | 1473 | 1858 | 62794 | 2200 | 2776 | 93819 | 3209 | 5240 | 136303 | 4490 | 7331 | 191445 |
| 264 | 334 | 10836 | 432 | 548 | 17743 | 675 | 856 | 27740 | 1055 | 1338 | 43343 | 1674 | 2123 | 68788 | 2501 | 3172 | 102773 | 3648 | 5989 | 149313 | 5104 | 8378 | 209717 |
| 295 | 376 | 11704 | 483 | 616 | 19165 | 756 | 963 | 29963 | 1181 | 1505 | 46815 | 1874 | 2388 | 74299 | 2800 | 3569 | 111008 | 4085 | 6737 | 161276 | 5714 | 9425 | 226521 |
| 327 | 418 | 12512 | 535 | 685 | 20488 | 836 | 1070 | 32032 | 1307 | 1672 | 50048 | 2074 | 2654 | 79429 | 3098 | 3965 | 118672 | 4519 | 7486 | 172411 | 6322 | 10472 | 242161 |
| 358 | 460 | 13271 | 586 | 753 | 21731 | 917 | 1177 | 33975 | 1433 | 1839 | 53084 | 2274 | 2919 | 84247 | 3397 | 4362 | 125871 | 4955 | 8234 | 182870 | 6932 | 11519 | 256850 |
| 389 | 502 | 13989 | 638 | 821 | 22906 | 997 | 1284 | 35812 | 1558 | 2007 | 55955 | 2473 | 3185 | 88805 | 3694 | 4758 | 132680 | 5388 | 8983 | 192762 | 7538 | 12567 | 270744 |
| 452 | 585 | 15324 | 740 | 958 | 25093 | 1157 | 1498 | 39231 | 1808 | 2341 | 61296 | 2869 | 3715 | 97280 | 4287 | 5551 | 145343 | 6253 | 10480 | 211160 | 8748 | 14661 | 296585 |
| 514 | 669 | 16552 | 842 | 1095 | 27103 | 1317 | 1712 | 42374 | 2058 | 2676 | 66207 | 3266 | 4246 | 105075 | 4879 | 6344 | 156989 | 7117 | 11977 | 228079 | 9956 | 16756 | 320349 |
| 577 | 752 | 17695 | 944 | 1232 | 28974 | 1476 | 1926 | 453004 | 2306 | 3010 | 70778 | 3660 | 4777 | 112330 | 5469 | 7137 | 167828 | 7977 | 13475 | 243826 | 11160 | 18850 | 342467 |
| 639 | 836 | 18768 | 1046 | 1369 | 30732 | 1635 | 2140 | 8047 | 2555 | 3344 | 75072 | 4054 | 5308 | 119144 | 6057 | 7930 | 178008 | 8836 | 14972 | 258617 | 12361 | 20945 | 363241 |
| 700 | 920 | 19783 | 1147 | 1506 | 32394 | 1793 | 2355 | 50646 | 2801 | 3679 | 79132 | 4446 | 5839 | 125589 | 6643 | 8723 | 187637 | 9689 | 16469 | 272606 | 13555 | 23039 | 382890 |
| 824 | 1087 | 21671 | 1350 | 1780 | 35486 | 2110 | 2783 | 55480 | 3297 | 4348 | 86685 | 5233 | 6900 | 137575 | 7818 | 10309 | 205546 | 11404 | 19463 | 298625 | | | |
| 945 | 1254 | 23408 | 1552 | 2054 | 38330 | 2426 | 3211 | 59926 | 3791 | 5017 | 93631 | 6016 | 7962 | 148598 | 8988 | 11895 | 222016 | | | | | | |
| 1068 | 1421 | 25024 | 1754 | 2327 | 40976 | 2742 | 3639 | 64063 | 4285 | 5685 | 100096 | 6800 | 9023 | 158858 | 10160 | 13481 | 237345 | | | | | | |
| 1192 | 1589 | 26542 | 1955 | 2601 | 43462 | 3057 | 4067 | 67949 | 4777 | 6354 | 106167 | 7581 | 10085 | 168495 | 11327 | 15067 | 251742 | | | | | | |
| 1315 | 1756 | 27978 | 2157 | 2875 | 45813 | 3372 | 4495 | 71625 | 5269 | 7023 | 111910 | 8362 | 11146 | 177609 | | 16653 | 265359 | | | | | | |
| 1439 | 1923 | 29343 | 2359 | 3149 | 48049 | 3688 | 4923 | 75121 | 5762 | 7692 | 117372 | | 12208 | 186278 | | | | | | | | | |
| 1563 | 2090 | 30648 | 2561 | 3423 | 50185 | | 5351 | 78461 | 6256 | 8361 | 122591 | | 13269 | 194561 | | | | | | | | | |
| 1688 | 2257 | 31899 | | 3697 | 52234 | | 5779 | 81665 | | 9030 | 127597 | | 14331 | 202505 | | | | | | | | | |
| 1813 | 2425 | 33103 | | 3970 | 54206 | | 6207 | 84748 | | 9699 | 132414 | | | | | | | | | | | | |
| 1938 | 2592 | 34265 | | 4244 | 56109 | | 6635 | 87722 | | 10368 | 137061 | | | | | | | | | | | | |
| | 2759 | 35389 | | 4518 | 57949 | | 7064 | 90599 | | 11036 | 141556 | | | | | | | | | | | | |
| | 2926 | 36478 | | | | | | | | | | | | | | | | | | | | | |
| | 3094 | 37536 | | | | | | | | | | Calculus according to ISO-4126-1:2004 "Safety valves". | | | | | | | | | | | |
| | 3261 | 38564 | | | | | | | | | | | | | | | | | | | | | |
| | 3428 | 39566 | | | | | | | | | | | | | | | | | | | | | |

# FACT LIST FOR SAFETY VALVE CALCULS

Calculus acording to ISO-4126-1:2004 "Safety valves" 1)

Customer:
Theme:
Leaf: Of:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | Consultation / Bid / Order | | | | | | | | | | |
| 2 | | Position N°. | | | | | | | | | | |
| 3 | | N°. of units | | | | | | | | | | |
| 4 | | Regulation | | | | | | | | | | |
| 5 | SERVICE CONDITIONS | Fluid | | | | | | | | | | |
| 6 | | Calculation temperature °C | | | | | | | | | | |
| 7 | | State at moment of dischar. l = liquid, s = steam, g = gas | | | | l ☐ s ☐ g ☐ | | | l ☐ s ☐ g ☐ | | | l ☐ s ☐ g ☐ |
| 8 | | Molecular mass kg/kmol | | | | | | | | | | |
| 9 | | Adiabatic exponent æ | Compressibility coe. Z | | | | | | | | | |
| 10 | | Density at moment of discharge kg/m³ | | | | | | | | | | |
| 11 | | Coefficients ψ max | χ | | | | | | | | | |
| 12 | | Viscosity cSt | cPs | | | | | | | | | |
| 13 | | Working pressure abs. bar | | | | | | | | | | |
| 14 | | Set pressure abs. bar | | | | | | | | | | |
| 15 | | External back pressure abs. | | | | | | | | | | |
| | | constant | variable bar | | | | | | | | | |
| 16 | | Rated pressure abs. bar | | | | | | | | | | |
| 17 | | Discharge | Required: kg/h, Nm³/h, l/h | | | | | | | | | |
| 18 | | capacity | Possible: 1) Kg/h, Nm³/h, l/h | | | | | | | | | |
| 19 | VALVE CONSTRUCTION | Opening: Full lift / Normal / Progressive | | | | | | | | | | |
| 20 | | Manufacturer type | | | | | | | | | | |
| 21 | | Materials | Body | | | | | | | | | |
| 22 | | | Seat | | | | | | | | | |
| 23 | | | Plug | | | | | | | | | |
| 24 | | | Spring | | | | | | | | | |
| 25 | | | Joint | | | | | | | | | |
| 26 | | Manual discharge action yes / no | | | | | | | | | | |
| 27 | | Cover Closed / Open | | | | | | | | | | |
| 28 | | Bellows si / no | | | | | | | | | | |
| 29 | | Body with drainage si / no | | | | | | | | | | |
| 30 | | Diameter of narrowest flow $d_0$ mm | | | | | | | | | | |
| 31 | | Section of narrowest | Necessary $A_0$ mm² | | | | | | | | | |
| 32 | | flow $A_0$ | Chosen $A_0$ mm² | | | | | | | | | |
| 33 | | Allowed discharge coefficient αd | | | | | | | | | | |
| 34 | CONNECTIONS | Input / Output | DN | Flange mm | | | | | | | | |
| 35 | | | | Thread inch | | | | | | | | |
| 36 | | | | Welding (soldering) ends | | | | | | | | |
| 37 | | | PN bar | | | | | | | | | |
| 38 | | | Shape of joint surfaces (DIN-2526) | | | | | | | | | |
| 39 | OBSERVA-TIONS | Unit weight approx. Kg | | | | | | | | | | |
| 40 | | | | | | | | | | | | |
| 41 | | | | | | | | | | | | |
| 42 | | | | | | | | | | | | |
| 43 | ACCEP-TANCE | Certificate according to EN-10204 2.2 | | | | | | | | | | |
| 44 | | Certificate according to EN-10204 3.2 | | | | | | | | | | |
| 45 | | | | | | | | | | | | |

Date:
Department:
Name:

VYC industrial, sa
Fundada en 1914

Folleto informativo, sin compromiso y sujeto a nuestras Condiciones Generales de Venta.

PandID®B.V. - t: +31 174 280 371 - f: +31 174 280 853 - i: www.pandid.nl - e: info@pandid.nl