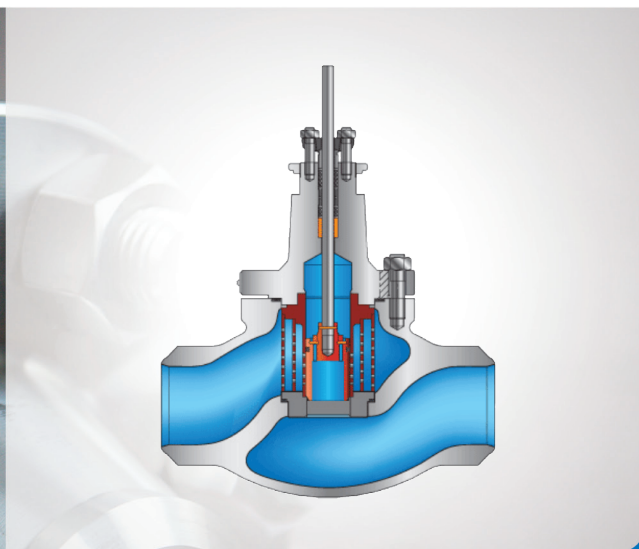


CONTROL VALVE

SERIES BR12B®

 **VALVEA**



version 06/2020



BR 12B - DIRECT CONTROL VALVE

Nominal dimensions

- DN 25 - DN 250
- 1" - 10"

Nominal pressure

- PN 10 - 400
- Class 150 - Class 2500

Construction

- single seat valve with option of balanced plug and multi-step reduction of pressure drop
- metal or soft seat

Working temperature range

- -180°C to +650°C

Flow characteristic, Kvs value

- linear, equipercantage
- Kvs: 10 - 800 [m³/h]

Tightness class (IEC 60534 - 4)

- class IV - standard
- class V - optional increased
- class VI - on request (special design)

Body material

- grey cast iron, ductile iron, carbon steel, stainless steel according to EN, DIN or ASTM

Plug and seat material

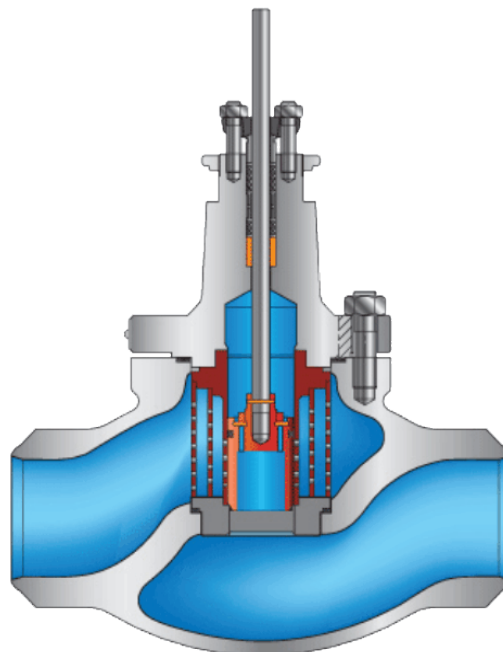
- stainless steel
- stellite or plasma nitridation possibility

End connection

- flanged
- welding

Actuators

- pneumatic with diaphragm
- electro-hydraulic
- electric
- hydraulic
- manual operated



USE

Single-ported globe control valves type BR12B are used in automatic and remote control installations as flow control elements to adjust flow of liquids, steam and gases. Wide range of materials, excellent pressure and temperature parameters, multiple design variants, meeting requirements of various processes make the valves applicable under the most demanding working conditions in power generation, petroleum chemistry, heating, chemical industry, metallurgy, etc.

FEATURES

- Various materials of valve body and internal parts, adapted to specific working conditions.
- Design provides noise reduction, enhanced resistance to cavitation and flashing, and elimination of choked flow.
- Wide range of nominal dimensions in from DN25 to DN250, for nominal pressures, PN10 to CL2500
- Wide flow ratio range and various control characteristics.
- Reduction in aggressive and toxic media emissions to environment by application of bellow seal bonnets or bonnet packings meeting requirements of TA - LUFT.
- Easy assembly and dismantling of valve internal parts for maintenance and service.
- High durability and reliability due to application of top-class materials and surface improvement processes (burnishing, stellite, heat treatment, CrN coating).
- Possibility of mating with reverse action P/R (column) and P1/R1 (cast yoke) multi-spring actuators, and changing the spring range without any extra parts (keeping the number of springs).
- Possibility of fitting actuators with side-mounted (P1/R1) or top-mounted (P/R) handwheel.
- Possibility of performing diagnostics of "valve - actuator" due to application of smart electro-pneumatic positioners.
- Wide range of electric actuators.
- Special designs option:
 - for oxygen
 - for liquid and gaseous fuels
 - for low temperature fluids (liquid oxygen, nitrogen etc.)
 - for acid gases containing H₂S
 - with heating jacket
 - for potentially explosive atmospheres as per ATEX Directive 94/9/EC - ATEX
- design and production process meet the requirements of Quality Management System ISO 9001 and Directive 97/23/EC, and regulations of AD2000 Merkblatt, designated for installation on pipelines.

BR 12B® – is a trademark registered by Patent Office.

DESIGN AND TECHNICAL SPECIFICATION

| | | |
|-----------------------|---|------------------------------|
| Valve body (1) | single-ported, cast | |
| Nominal size: | DN25; 40; 50; 80; 100; 150; 200; 250 | |
| Nominal pressure: | PN10; 16; 25; 40; 63; 100; 160; 250; 320; 400 as per EN 1092-1:2010 CL150; CL300; CL600; CL900; CL1500; CL2500 as per EN 1759-1:2005 | |
| divided as follows: | DN25...250 | PN10...110; CL150...CL600 |
| | DN25...150 | CL900; PN160 |
| | DN25...100 | PN250...400; CL1500...CL2500 |
| End connections: | – flanged: as per table 1. – butt welding ends BW, as per Table 12 and 13 – socket welding ends SW, as per Table 14 | |

Steel flanges CL150; CL300; CL600; CL900; CL1500; CL2500 are so designed that they can be assembled with flanges as per American standards ANSI/ASME B16.5 and MSS SP44. In American standards flanges are identified with nominal values in "Classes", to which nominal pressure (PN) values as per PN-ISO 7005-1:2002 correspond.

| | | | |
|---|---------------|----------------|----------------|
| Equivalent identifications as per PN are: | CL150: PN 20 | CL300: PN 50 | CL600: PN 110 |
| | CL900: PN 150 | CL1500: PN 260 | CL2500: PN 420 |

Table 1. - Flanged end connections

| Nominal pressure | Facing of flange types | | | |
|---|------------------------|------------------------|-----------------------|--------------|
| | Raised face | Groove | Recess | Ring - joint |
| | Identification | | | |
| PN10; 16; 25; 40; 63; 100; 160; 250; 320; 400 | B ³⁾ | D ¹⁾ | F ¹⁾ | - |
| CL150, 300 | B ³⁾ | DL (D1 ²⁾) | F (F1 ¹⁾) | J (RTJ) |
| CL600; 900; 1500; 2500 | B ³⁾ (RF) | DL (GF) | F (FF) | J (RTJ) |
| ¹⁾ - up to PN 160 ²⁾ - only for CL300 ³⁾ - B1, Ra=12,5µm, concentric surface structure "C", B2 – (Ra as agreed with the customer) (xxx) - identification of connections as per ASME B16.5 | | | | |
| Possible execution of flanges per specification and indicated standards. | | | | |

Construction length:

- flanged valves as per PN-EN 60534-3-1; PN-M-74005; ISA S75.16-1993 Fig. 5; Table 9; 10
- welding ends valves; Fig. 5; Tab. 11
- as per PN-EN 60534-3-3: for PN 10...100 and CL150...600
- as for flanged valves PN 160: for PN 160 and CL900
- as for flanged valves PN 400: for PN 250...400 and CL1500...2500

Materials:

- as per Table 2; Relationship between working pressure and temperature as per Table 3.1 - 3.7

Bonnet (2):

- standard
- extended
- bellows (PN10...40; CL150...300)

Plug (3a, b, c):

- type: piston, sleeve guided, hard. Rangeability 50:1
- variants: unbalanced
- balanced (from DN40 / Kvs25)
- balanced with pilot (DN50 / Kvs40)
- flow characteristics: equal percentage - P
- linear - L

Seat (4):

- fitted-in and sealed with body, hard (tight seat after consulting the manufacturer)

Plug stem (5):

- burnished, polished sealing face

Control cage (6A):

- perforated element executing preset flow characteristics and fixing the seat.

Choke cage (6B, C):

- perforated valve seat fixture, causing reduction in pressure drop between seat and plug.

Body gasket (7), Seat gasket (8) and Control cage gasket (9):

- spiral, graphite+1.4404 in all executions.

Stem packing (9):

- PTFE-V packing, compressed with spring bolt (Fig. 1e - item no 17)
- ring gaskets formed in braided packing cords (PTFE+GRAPHITE)
- graphite kits (expanded and silky graphite) or gaskets formed in braided graphite cords
- TA-LUFT sealing with PTFE-V packing kit or graphite kit; packing structure as per Fig. 1 and 2, range of applications as per Table 3

Leakage class:

(as per PN-EN 60534-4)

- basic: (class IV) less than 0,01% Kvs
 - enhanced: (class V) $3 \cdot 10^{-4} \cdot D \cdot \Delta p$ [cm³/min]
- where D (mm) - is seat diameter as per Table 5, Δp [MPa] - actual pressure drop in closed valve.

Fluid flow direction:

Under the plug for valves as per Fig. 1a and 1b, over the plug for valves as per Fig. 1 c

Flow coefficients:

- as per Table 4

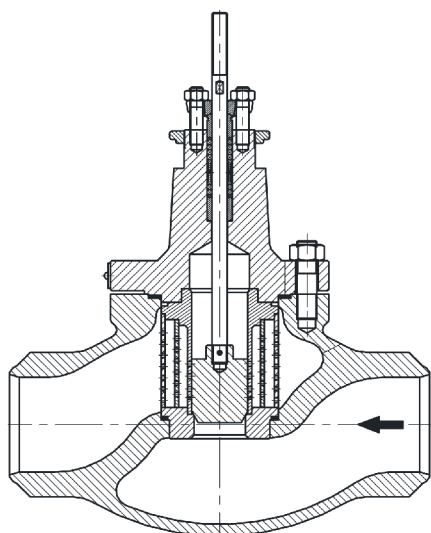


Fig. 1a. Valve BR 12B - unbalanced plug

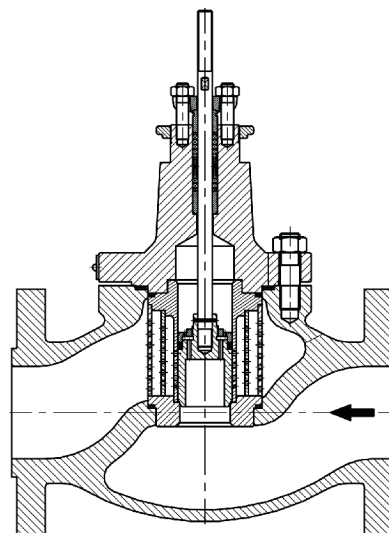


Fig. 1b. Valve BR 12B - balanced plug

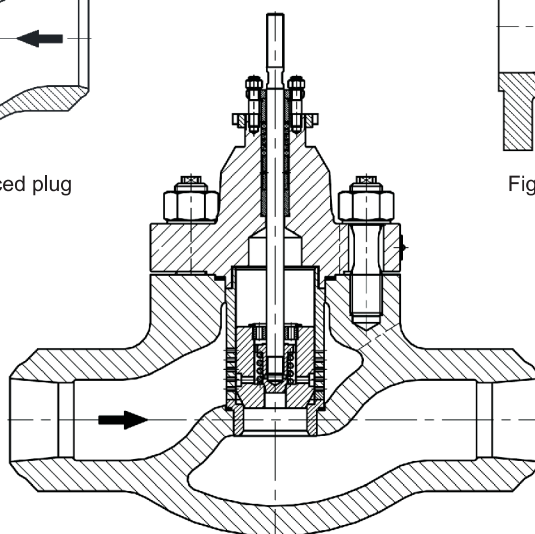


Fig. 1c. Valve BR12B balanced plug with pilot

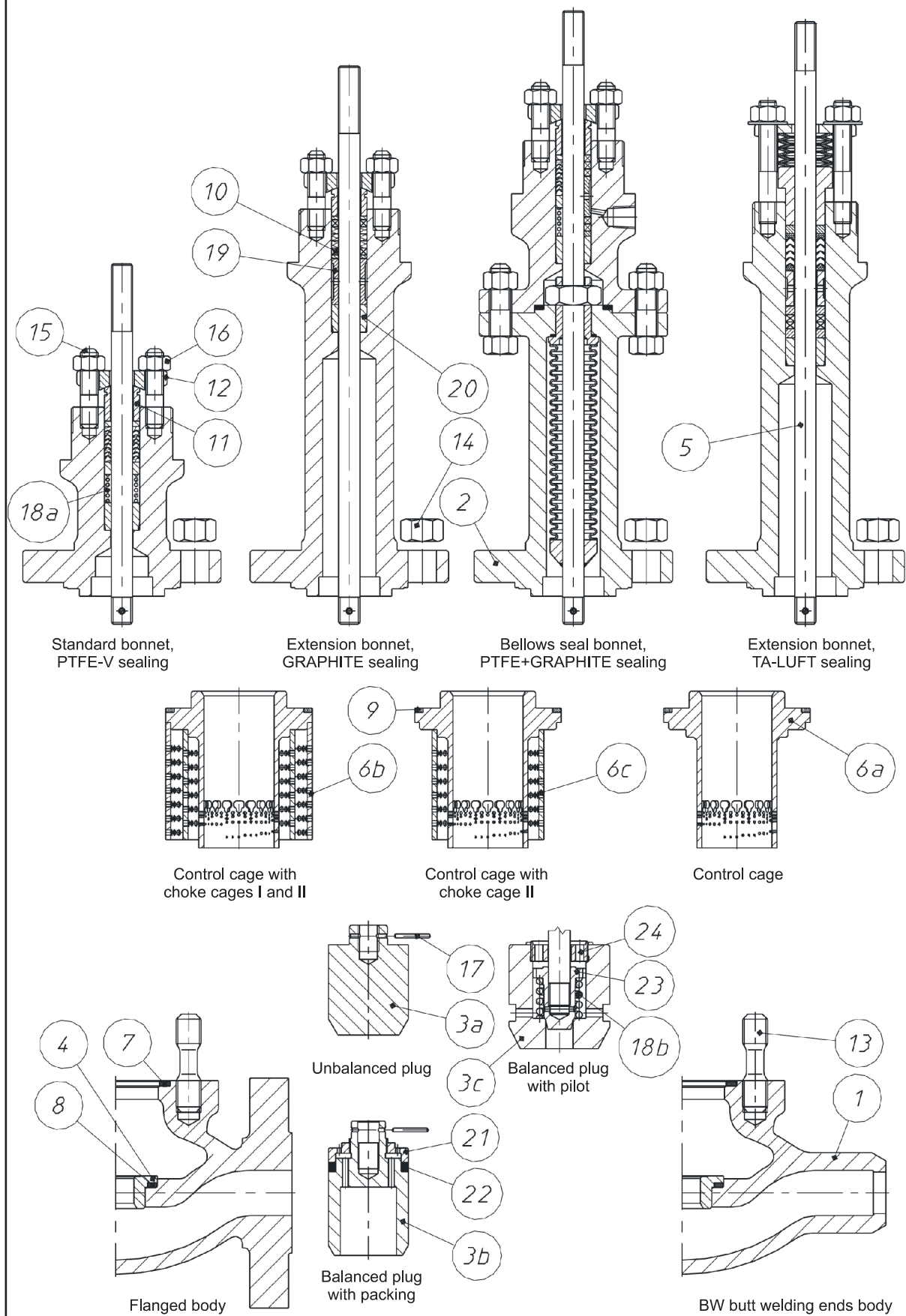




Table 2. Part list with materials.

| Item | Part name | | Material | | | | |
|-------------------------------|------------------------------|---------------|---|--------------------------------|-------------------------------|--------------------------------------|--|
| 1 | Body | | GP 240 GH ; (1.0619) WCB | G17CrMo 9-10 ; (1.7379) WC9 | G20Mn5 ; (1.6220) | GX5CrNiMo 19-11-2 ; (1.4408) CF8M | |
| 2 | Bonnet | DN25...50 | S 355 J2G3 (1.0570) | 13CrMo4-4 ; (1.7335) | P355NL2 ; (1.1106) | X6CrNiMoTi 17-12-2 ; (1.4571) | |
| | | DN80...250 | GP 240 GH ; (1.0619) WCB | G17CrMo 9-10 ; (1.7379) WC9 | G20Mn5 ; (1.6220) | | |
| 3a, b | Unbalanced and balanced plug | | X6CrNiMoTi 17-12-2; (1.4571) + stellite + CrN X17CrNi 16-2 ; (1.4057) + heat treatment | | | | |
| 3c | Balanced plug with pilot | | X17CrNi 16-2 ; (1.4057) + heat treatment | | | | |
| 4 | Seat | | X6CrNiMoTi 17-12-2; (1.4571) X6CrNiMoTi 17-12-2; (1.4571) + stellite X17CrNi 16-2; (1.4057) + heat treatment | | | | |
| 5 | Stem | | X6CrNiMoTi 17-12-2; (1.4571) X6CrNiMoTi 17-12-2; (1.4571) + stellite + CrN X17CrNi 16-2 ; (1.4057) + heat treatment | | | | |
| 6A | Control cage | | X6CrNiMoTi 17-12-2; (1.4571) X17CrNi 16-2; (1.4057) + heat treatment | | | | |
| 6B | Choke cage I | | | | | | |
| 6C | Choke cage II | | | | | | |
| 7 | Body gasket | | GRAPHITE (98%) + 1.4404 (spiral) | | | | |
| 8 | Seat gasket | | | | | | |
| 9 | Control cage gasket | | | | | | |
| 10 | Packing kit | | PTFE + GRAPHITE | | | | |
| | | | PTFE „V” (rings) | | | | |
| | | | GRAPHITE | | | | |
| 11 | Pressing sleeve | | X6CrNiMoTi 17-12-2; (1.4571) | | | | |
| 12 | Pressing lever | | S 355 J2G3 ; (1.0570) | | | | |
| 13 | Body screw | PN10...CL300 | 8.8 | A4 - 70 *) | | | |
| | | PN63...CL2500 | 42CrMo4 (1.7225) | 21CrMoV5-7 (1.7709) | X6NiCrTiMoVB 25-15-2 (1.4980) | | |
| 14 | Body nut | PN10...CL300 | 8.8 | A4 - 70 *) | | | |
| | | PN63...CL2500 | 42CrMo4 (1.7225) | 21CrMoV5-7 (1.7709) | X6NiCrTiMoVB 25-15-2 (1.4980) | | |
| 15 | Bonnet screw | | 8.8 | A4 - 70 *) | | | |
| 16 | Bonnet nut | | 8.8 | A4 - 70 *) | | | |
| 17 | Notched pin | | X6CrNiMoTi 17-12-2; (1.4571) | | | | |
| 18a, b | Spring | | 12R10 (SANDVIK), 9Ru10; ((1.4568) (SANDVIK)); Nimonic 90; (2.4969) | | | | |
| 19 | Spacer sleeve | | X6CrNiMoTi 17-12-2; (1.4571) | | | | |
| 20 | Guide bushing | | X6CrNiMoTi 17-12-2; (1.4571) + stellite + CrN X17CrNi 16-2 ; (1.4057) + heat treatment | | | | |
| 21 | Plug nut | | X6CrNiMoTi 17-12-2; (1.4571) | | | | |
| 22 | Plug sealing ring | | Expanded graphite | | | | |
| 23 | Pilot | | X105CrMo17; (1.4125) | | | | |
| 24 | Back nut | | X6CrNiMoTi 17-12-2; (1.4571) | | | | |
| Material | | | Relevant material standard | | | | |
| GP 240 GH ; (1.0619) | | | EN 10213-2 | | | | |
| WCB | | | ASTM A 216 | | | | |
| G20Mn5 ; (1.6220) | | | EN 10213-3 | | | | |
| G17CrMo 9-10 ; (1.7379) | | | EN 10213-2 | | | | |
| WC9 | | | ASTM A 217 | | | | |
| GX5CrNiMo 19-11-2 ; (1.4408) | | | EN 10213-4 | | | | |
| CF8M | | | ASTM A 351 | | | | |
| S 355 J2G3 ; (1.0570) | | | EN 10025 | | | | |
| P355 NL2 ; (1.1106) | | | EN 10028-3 | | | | |
| 13CrMo4-4; (1.7335) | | | EN 10028 | | | | |
| X6CrNiMoTi 17-12-2 ; (1.4571) | | | EN 10088 | | | | |
| X17CrNi 16-2 ; (1.4057) | | | EN 10088 | | | | |
| X105CrMo17; (1.4125) | | | EN 10088 | | | | |
| C45 (1.0503) | | | EN 10083-1 | | | | |
| X30Cr13 (1.4028) | | | EN 10088 | | | | |
| 8.8 | | | EN 20898-1 | | | | |
| A4-70 *) | | | EN ISO 3506-2 | | | | |
| 42CrMo4 (1.7225) | | | EN 10269 | | | | |
| 21CrMoV5-7 (1.7709) | | | EN 10269 | | | | |
| X6NiCrTiMoVB 25-15-2 (1.4980) | | | EN 10269 | | | | |

Note:

*) to be applied for nominal pressures PN10...CL600

Hardening of valve internal surfaces comprises:

a) stelliting – padding of surfaces with stellite: ~40HRC

b) CrN coating – introducing chromium nitride to external layer of detail, to the depth of ca.0.1 mm:~950HV

c) heat treatment: valve plug (~45HRC), valve seat (~35HRC), stem (~35HRC), cages (~35HRC), guide sleeve (~45HRC), pilot (~55HRC)



Tables 3.1 - 3.7, MAX Allowable working overpressure for materials at proper temperatures.

Table 3.1

| Material: GP240GH (1.0619) as per EN 10213-2 | | | | | | | | | |
|--|-----------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|
| PN/CL | Standard | Temperature [°C] | | | | | | | |
| | | -10...50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 |
| | | Maximum working pressure [bar] | | | | | | | |
| PN10 | EN 1092-1 | 10 | 9,2 | 8,8 | 8,3 | 7,6 | 6,9 | 6,4 | 5,9 |
| PN16 | | 16 | 14,8 | 14 | 13,3 | 12,1 | 11 | 10,2 | 9,5 |
| CL150 | EN 1759-1 | 17,3 | 15,4 | 14,6 | 13,8 | 12,1 | 10,2 | 8,4 | 6,5 |
| PN25 | EN 1092-1 | 25 | 23,2 | 22 | 20,8 | 19 | 17,2 | 16 | 14,8 |
| PN40 | | 40 | 37,1 | 35,2 | 33,3 | 30,4 | 27,6 | 25,7 | 23,8 |
| CL300 | EN 1759-1 | 45,3 | 40,1 | 38,1 | 36 | 32,9 | 29,8 | 27,8 | 25,7 |
| PN63 | EN 1092-1 | 63 | 58,5 | 55,5 | 52,5 | 48 | 43,5 | 40,5 | 37,5 |
| PN100 | | 100 | 92,8 | 88 | 83,3 | 76,1 | 69 | 64,2 | 59,5 |
| CL600 | EN 1759-1 | 90,5 | 80,2 | 76,1 | 72 | 65,8 | 59,7 | 55,5 | 51,4 |
| CL900 | | 136 | 120 | 114 | 108 | 98,7 | 89,5 | 83,3 | 77,1 |
| PN160 | EN 1092-1 | 160 | 148,5 | 140,9 | 133,3 | 121,9 | 110,4 | 102,8 | 95,2 |
| PN250 | | 250 | 232,1 | 220,2 | 208,3 | 190,4 | 172,6 | 160,7 | 148,8 |
| CL1500 | EN 1759-1 | 226 | 201 | 190 | 180 | 165 | 149 | 139 | 129 |
| PN320 | EN 1092-1 | 320 | 297,1 | 281,9 | 266,6 | 243,8 | 220,9 | 205,7 | 190,4 |
| PN400 | | 400 | 371,4 | 352,3 | 333,3 | 304,7 | 276,1 | 257,1 | 238 |
| CL2500 | EN 1759-1 | 377 | 334 | 317 | 300 | 274 | 249 | 231 | 214 |

Table 3.2

| Material: G17CrMo 9-10 (1.7379) as per EN 10213-2 | | | | | | | | | | | | | | | | | | |
|---|-----------|--------------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PN/CL | Standard | Temperature [°C] | | | | | | | | | | | | | | | | |
| | | -10..50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 425 | 450 | 475 | 500 | 510 | 520 | 530 | 540 | 550 |
| | | Maximum working pressure [bar] | | | | | | | | | | | | | | | | |
| PN10 | EN 1092-1 | 10 | 10 | 10 | 10 | 10 | 10 | 9,7 | 9,2 | 9 | 8,8 | 7,6 | 6,4 | 5,6 | 4,9 | 4,2 | 3,7 | 3,2 |
| PN16 | | 16 | 16 | 16 | 16 | 16 | 16 | 15,6 | 14,8 | 14,4 | 14 | 12,1 | 10,2 | 8,9 | 7,8 | 6,8 | 5,9 | 5,1 |
| CL150 | EN 1759-1 | 19,5 | 17,7 | 15,8 | 14 | 12,1 | 10,2 | 8,4 | 6,5 | 5,6 | 4,7 | 3,7 | 2,8 | 2,4 | 2 | 1,7 | 1,4 | - |
| PN25 | EN 1092-1 | 25 | 25 | 25 | 25 | 25 | 25 | 24,4 | 23,2 | 22,6 | 22 | 19 | 16 | 14 | 12,2 | 10,7 | 9,2 | 8 |
| PN40 | | 40 | 40 | 40 | 40 | 40 | 40 | 39 | 37,1 | 36,1 | 35,2 | 30,4 | 25,7 | 22,4 | 19,6 | 17,1 | 14,8 | 12,9 |
| CL300 | EN 1759-1 | 51,7 | 51,5 | 50,2 | 48,3 | 46,3 | 42,8 | 40,2 | 36,6 | 35,1 | 33,8 | 31,7 | 28,2 | 26,6 | 23,5 | 20,6 | 17,8 | 15,5 |
| PN63 | EN 1092-1 | 63 | 63 | 63 | 63 | 63 | 63 | 61,5 | 58,5 | 57 | 55,5 | 48 | 40,5 | 35,4 | 30,9 | 27 | 23,4 | 20,4 |
| PN100 | | 100 | 100 | 100 | 100 | 100 | 100 | 97,6 | 92,8 | 90,4 | 88 | 76,1 | 64,2 | 56,1 | 49 | 42,8 | 37,1 | 32,3 |
| CL600 | EN 1759-1 | 103 | 103 | 100 | 96,7 | 92,6 | 85,7 | 80,4 | 73,1 | 70,2 | 67,6 | 63,3 | 56,4 | 53,3 | 47,1 | 41,1 | 35,7 | 31,1 |
| CL900 | | 155 | 155 | 151 | 145 | 139 | 129 | 121 | 110 | 105 | 101 | 95 | 84,6 | 79,9 | 70,6 | 61,7 | 53,5 | 46,6 |
| PN160 | EN 1092-1 | 160 | 160 | 160 | 160 | 160 | 160 | 156,1 | 148,5 | 144,7 | 140,9 | 121,8 | 102,8 | 88,9 | 78,4 | 68,5 | 59,4 | 51,8 |
| PN250 | | 250 | 250 | 250 | 250 | 250 | 250 | 244 | 232,1 | 226,1 | 220,2 | 190,4 | 160,7 | 140,4 | 122,6 | 107,1 | 92,8 | 80,9 |
| CL1500 | EN 1759-1 | 259 | 258 | 251 | 242 | 232 | 214 | 201 | 183 | 175 | 169 | 158 | 141 | 133 | 118 | 103 | 89,1 | 77,7 |
| PN320 | EN 1092-1 | 320 | 320 | 320 | 320 | 320 | 320 | 312,3 | 297,1 | 289,5 | 281,9 | 243,7 | 205,7 | 179,8 | 156,9 | 137,1 | 118,8 | 103,6 |
| PN400 | | 400 | 400 | 400 | 400 | 400 | 400 | 390,4 | 371,4 | 361,8 | 352,3 | 304,7 | 257,1 | 224,7 | 196,1 | 171,4 | 148,5 | 129,5 |
| CL2500 | EN 1759-1 | 431 | 429 | 418 | 403 | 386 | 357 | 335 | 305 | 292 | 282 | 264 | 235 | 222 | 196 | 171 | 149 | 130 |



Table 3.3

| Material: GX5CrNiMo 19-11-2 (1.4408) as per PN-EN 10213-4 | | | | | | | | | | | | | | | | | | | |
|---|-----------|--------------------------------|------|-------|-------|-------|-------|-------|-------|------|-------|------|-------|------|------|------|------|-------|-------|
| PN/CL | Standard | Temperature [°C] | | | | | | | | | | | | | | | | | |
| | | -10..50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 425 | 450 | 475 | 500 | 510 | 520 | 530 | 540 | 550 | 600 |
| | | Maximum working pressure [bar] | | | | | | | | | | | | | | | | | |
| PN10 | EN 1092-1 | 10 | 10 | 9 | 8,4 | 7,9 | 7,4 | 7,1 | 6,8 | - | 6,7 | - | 6,6 | - | - | - | - | 6,5 | 5,6 |
| PN16 | | 16 | 16 | 14,5 | 13,4 | 12,7 | 11,8 | 11,4 | 10,9 | - | 10,7 | - | 10,5 | - | - | - | - | 10,4 | 8,9 |
| CL150 | EN 1759-1 | 17,9 | 16,3 | 14,9 | 13,5 | 12,1 | 10,2 | 8,4 | 6,5 | 5,6 | 4,7 | 3,7 | 2,8 | 2,4 | 2 | 1,7 | 1,4 | - | - |
| PN25 | EN 1092-1 | 25 | 25 | 22,7 | 21 | 19,8 | 18,5 | 17,8 | 17,1 | - | 16,8 | - | 16,5 | - | - | - | - | 16,3 | 14 |
| PN40 | | 40 | 40 | 36,3 | 33,7 | 31,8 | 29,7 | 28,5 | 27,4 | - | 26,9 | - | 26,4 | - | - | - | - | 26 | 22,4 |
| CL300 | EN 1759-1 | 63 | 63 | 57,3 | 53,1 | 50,1 | 46,8 | 45 | 43,2 | - | 42,4 | - | 41,7 | - | - | - | - | 41,1 | 35,4 |
| PN100 | 100 | 100 | 100 | 90,9 | 84,2 | 79,5 | 74,2 | 71,4 | 68,5 | - | 67,3 | - | 66,1 | - | - | - | - | 65,2 | 56,1 |
| CL600 | EN 1759-1 | 93,4 | 85 | 77,8 | 70,6 | 65,8 | 61 | 57,6 | 55,2 | 54,5 | 53,8 | 53,3 | 52,8 | 52,6 | 44,9 | 44,8 | 44,6 | 44,4 | - |
| CL900 | | 140 | 127 | 117 | 106 | 98,6 | 91,4 | 86,4 | 82,8 | 81,7 | 80,6 | 79,9 | 79,2 | 78,9 | 67,4 | 67,1 | 66,9 | 66,7 | - |
| PN160 | EN 1092-1 | 160 | 160 | 145,5 | 134,8 | 127,2 | 118,8 | 114,2 | 109,7 | - | 107,8 | - | 105,9 | - | - | - | - | 104,3 | 89,9 |
| PN250 | | 250 | 250 | 227,3 | 210,7 | 198,8 | 185,7 | 178,5 | 171,4 | - | 168,4 | - | 165,4 | - | - | - | - | 163 | 140,4 |
| CL1500 | EN 1759-1 | 233 | 212 | 194 | 176 | 164 | 152 | 144 | 138 | 136 | 134 | 133 | 132 | 132 | 112 | 112 | 111 | 111 | - |
| PN320 | EN 1092-1 | 320 | 320 | 291 | 269,7 | 254,4 | 237,7 | 228,5 | 219,4 | - | 215,6 | - | 211,8 | - | - | - | - | 208,7 | 179,8 |
| PN400 | | 400 | 400 | 363,8 | 337,1 | 318 | 297,1 | 285,7 | 274,2 | - | 269,5 | - | 264,7 | - | - | - | - | 260,9 | 224,7 |
| CL2500 | EN 1759-1 | 389 | 354 | 324 | 294 | 274 | 254 | 240 | 230 | 227 | 224 | 222 | 220 | 219 | 187 | 187 | 186 | 185 | - |

Table 3.4

| Material: G20Mn5 (1.6220) as per PN-EN 10213-3 | | | | | | | |
|--|----------|--------------------------------|-----|------|-----|------|------|
| PN/CL | Standard | Temperature [°C] | | | | | |
| | | -10..50 | 100 | 150 | 200 | 250 | 600 |
| | | Maximum working pressure [bar] | | | | | |
| PN10 | - | 6 | 6 | 3,8 | 3,6 | 3,48 | 3,4 |
| PN16 | | 16 | 16 | 10,1 | 9,6 | 9,28 | 9,07 |
| PN25 | | 25 | 25 | 15,8 | 15 | 14,5 | 14,2 |
| PN40 | | 40 | 28 | 28 | 27 | 26 | 25 |
| PN 63 | | 63 | 59 | 58 | 55 | 53 | 51 |
| PN100 | | 100 | 95 | 92 | 87 | 85 | 82 |
| PN160 | | 160 | 152 | 148 | 140 | 136 | 132 |

Table 3.5

| Material: WCB as per ASTM A216 | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| PN/CL | Standard | Temperature [°C] | | | | | | | | |
| | | -10..50 | 100 | 150 | 200 | 250 | 300 | 350 | 375 | 400 |
| | | Maximum working pressure [bar] | | | | | | | | |
| PN10 | EN 1092-1 | 10 | 10 | 9,7 | 9,4 | 9 | 8,3 | 7,9 | 7,7 | 6,7 |
| PN16 | | 16 | 16 | 15,6 | 15,1 | 14,4 | 13,4 | 12,8 | 12,4 | 10,8 |
| CL150 | EN 1759-1 | 19,3 | 17,7 | 15,8 | 14 | 12,1 | 10,2 | 8,4 | 7,4 | 6,5 |
| PN25 | EN 1092-1 | 25 | 25 | 24,4 | 23,7 | 22,5 | 20,9 | 20 | 19,4 | 16,9 |
| PN40 | | 40 | 40 | 39,1 | 37,9 | 36 | 33,5 | 31,9 | 31,1 | 27 |
| CL300 | EN 1759-1 | 50 | 46,4 | 45,1 | 43,9 | 41,8 | 38,9 | 36,9 | 36,6 | 34,6 |
| PN63 | EN 1092-1 | 63 | 63 | 61,5 | 59,6 | 56,8 | 52,7 | 50,3 | 49 | 42,5 |
| PN100 | | 100 | 100 | 97,7 | 94,7 | 90,1 | 83,6 | 79,8 | 77,8 | 67,5 |
| CL600 | EN 1759-1 | 100,1 | 92,8 | 90,6 | 87,8 | 83,6 | 77,5 | 74 | 72,9 | 69,1 |
| CL900 | | 150,1 | 139,2 | 135,7 | 131,4 | 125,1 | 116,1 | 110,8 | 109,5 | 103,4 |
| PN160 | | 159,2 | 147,6 | 143,9 | 139,4 | 132,7 | 123,1 | 117,5 | 116,1 | 109,7 |
| PN250 | | 241,4 | 223,5 | 217,8 | 211,2 | 201,1 | 186,6 | 178,1 | 175,8 | 166,2 |
| CL1500 | | 250,5 | 231,9 | 226 | 219,2 | 208,7 | 193,6 | 184,8 | 182,4 | 172,5 |
| PN320 | | 313 | 289,9 | 282,6 | 273,9 | 260,8 | 242 | 231 | 227,9 | 215,6 |
| PN400 | | 396,4 | 367,3 | 358 | 346,9 | 330,3 | 306,6 | 292,6 | 288,6 | 273,1 |
| CL2500 | | 417,2 | 386,6 | 376,9 | 365,1 | 347,7 | 322,7 | 308 | 303,8 | 287,5 |



Table 3.6

| Material: WC9 as per ASTM A217 | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|------|------|-------|
| PN/CL | Standard | Temperature [°C] | | | | | | | | | | | | | | | | | | |
| | | -10..50 | 100 | 150 | 200 | 250 | 300 | 350 | 375 | 400 | 425 | 450 | 475 | 500 | 510 | 520 | 525 | 530 | 540 | 550 |
| | | Maximum working pressure [bar] | | | | | | | | | | | | | | | | | | |
| PN10 | EN 1092-1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 9,9 | 9,7 | 9,5 | 7,3 | 5,5 | 5 | 4,4 | - | 3,9 | 3,4 | 2,9 |
| PN16 | | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 15,9 | 15,6 | 15,3 | 11,7 | 8,9 | 8 | 7,1 | - | 6,2 | 5,4 | 4,7 |
| CL150 | EN 1759-1 | 19,5 | 17,7 | 15,8 | 14 | 12,1 | 10,2 | 8,4 | 7,4 | 6,5 | 5,6 | 4,6 | 3,7 | 2,8 | - | - | 1,9 | - | 1,3 | - |
| PN25 | EN 1092-1 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24,8 | 24,4 | 23,9 | 18,3 | 14 | 12,6 | 11,2 | - | 9,8 | 8,5 | 7,4 |
| PN40 | | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 39,7 | 39 | 38,3 | 29,2 | 22,3 | 20,2 | 18 | - | 15,7 | 13,6 | 12 |
| CL300 | EN 1759-1 | 51,7 | 51,5 | 50,3 | 48,7 | 46,3 | 42,9 | 40,4 | 38,9 | 36,5 | 35,2 | 33,7 | 31,7 | 27,7 | - | - | 21,6 | - | - | 15,3 |
| PN63 | EN 1092-1 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 62,5 | 61,5 | 60,3 | 46 | 35,2 | 31,9 | 28,3 | - | 24,8 | 21,4 | 18,8 |
| PN100 | | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99,2 | 97,6 | 95,6 | 73,1 | 55,9 | 50,6 | 44,9 | - | 39,3 | 34 | 29,9 |
| CL600 | EN 1759-1 | 103,4 | 103,1 | 100,3 | 97,5 | 92,7 | 85,7 | 80,4 | 77,6 | 73,3 | 70,2 | 67,7 | 63,4 | 55,7 | - | - | 43,3 | - | - | 30,7 |
| CL900 | | 155,1 | 154,6 | 150,6 | 146,2 | 139 | 128,6 | 120,7 | 116,5 | 109,8 | 105,4 | 101,4 | 95,1 | 83,4 | - | - | 64,9 | - | - | 46 |
| PN16 | | 164,5 | 163,9 | 159,5 | 154,7 | 147,4 | 136,4 | 128 | 123,6 | 116,5 | 111,8 | 107,6 | 100,8 | 87,3 | - | - | 68,9 | - | - | 48,8 |
| PN250 | | 249,2 | 248,1 | 239,8 | 231,2 | 222,6 | 206,6 | 193,8 | 187 | 176,4 | 169,2 | 162,9 | 152,5 | 122,2 | - | - | 104,4 | - | - | 74,1 |
| CL1500 | | 258,6 | 257,7 | 250,8 | 244 | 231,8 | 214,4 | 201,1 | 194,1 | 183,1 | 175,6 | 169,1 | 158,2 | 138,9 | - | - | 108,4 | - | - | 76,9 |
| PN320 | | 323,2 | 321,9 | 312,3 | 302,3 | 289,2 | 268 | 251,4 | 242,5 | 228,8 | 219,4 | 211,4 | 197,8 | 165,7 | - | - | 135,4 | - | - | 96 |
| PN400 | | 409,4 | 408 | 397,1 | 385,7 | 366,8 | 339,4 | 318,5 | 307,1 | 289,7 | 277,9 | 267,7 | 250,7 | 218,5 | - | - | 171,5 | - | - | 121,5 |
| CL2500 | | 430,9 | 429,5 | 418,3 | 406,5 | 386,2 | 357,2 | 335,3 | 323,2 | 304,9 | 292,5 | 281,8 | 263,9 | 231,7 | - | - | 180,5 | - | - | 127,9 |

Table 3.7

| Material: CF8M as per ASTM A351 | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|----------|--------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|------|------|-------|-------|-------|-------|-------|
| PN/CL | Standard | Temperature [°C] | | | | | | | | | | | | | | | | | | | | | | |
| | | -10..50 | 100 | 150 | 200 | 250 | 300 | 350 | 375 | 400 | 425 | 450 | 475 | 500 | 510 | 520 | 525 | 540 | 540 | 550 | 575 | 600 | 625 | 649 |
| | | Maximum working pressure [bar] | | | | | | | | | | | | | | | | | | | | | | |
| PN10 | EN1092-1 | 8,9e | 7,8 | 7,1 | 6,6 | 6,1 | 5,8 | 5,6 | 5,5 | 5,4 | 5,4 | 5,3 | 5,3 | 5,2 | 5,2 | 5,2 | - | 5,2 | 5,1 | 5,1 | 4,7 | 3,8 | - | - |
| PN16 | | 14,3 | 12,5 | 11,4 | 10,6 | 9,8 | 9,3 | 9 | 8,8 | 8,7 | 8,6 | 8,5 | 8,5 | 8,4 | 8,3 | 8,3 | - | 8,3 | 8,3 | 8,2 | 7,6 | 6,1 | - | - |
| CL150 | EN1759-1 | 18,4 | 16 | 14,8 | 13,6 | 12 | 10,2 | 8,4 | 7,4 | 6,5 | 5,6 | 4,6 | 3,7 | 2,8 | - | - | 1,9 | - | 1,4 | - | - | - | - | - |
| PN25 | EN1092-1 | 22,3 | 19,5 | 17,8 | 16,5 | 15,5 | 14,6 | 14,1 | 13,8 | 13,6 | 13,5 | 13,4 | 13,3 | 13,2 | 13,1 | 13,1 | - | 13 | 13 | 12,9 | 12 | 9,6 | - | - |
| PN40 | | 35,6 | 31,3 | 28,5 | 26,4 | 24,7 | 23,4 | 22,6 | 22,1 | 21,8 | 21,6 | 21,4 | 21,2 | 21 | 21 | 20,9 | - | 20,8 | 20,8 | 20,7 | 19,1 | 15,5 | - | - |
| CL300 | EN1759-1 | 48,1 | 42,3 | 38,6 | 35,8 | 33,5 | 31,6 | 30,4 | 29,6 | 29,3 | 29 | 29 | 28,7 | 27,3 | - | - | 25,2 | - | - | 24 | 22,9 | 19,9 | 15,7 | 12,8 |
| PN63 | EN1092-1 | 56,1 | 49,2 | 44,9 | 41,6 | 38,9 | 36,9 | 35,5 | 34,9 | 34,4 | 34 | 33,7 | 33,5 | 33,2 | 33 | 32,9 | - | 32,8 | 32,7 | 32,6 | 30,2 | 24,4 | - | - |
| PN100 | | 89,1 | 78,1 | 71,3 | 66 | 61,8 | 58,5 | 56,4 | 55,3 | 54,5 | 54 | 53,4 | 53,1 | 52,6 | 52,4 | 52,2 | - | 52,1 | 51,9 | 51,7 | 47,9 | 38,7 | - | - |
| CL600 | EN1759-1 | 96,3 | 84,5 | 77,1 | 71,2 | 66,7 | 63,1 | 61 | 59,8 | 58,9 | 58,3 | 57,7 | 57,3 | 54,8 | - | - | 50,6 | - | - | 47,8 | 45,5 | 39,8 | 31,7 | 25,5 |
| CL900 | | 144,4 | 126,8 | 115,6 | 107 | 100,2 | 95 | 91,3 | 89,7 | 88,2 | 87,3 | 86,6 | 86 | 82,1 | - | - | 75,9 | - | - | 71,8 | 68,3 | 59,7 | 47,5 | 38,3 |
| PN16 | | 153,1 | 134,4 | 122,6 | 113,5 | 106,3 | 100,7 | 96,8 | 95,1 | 93,6 | 92,6 | 91,8 | 91,2 | 87,1 | - | - | 80,5 | - | - | 76,2 | 72,5 | 63,3 | 50,4 | 40,3 |
| PN250 | | 231,9 | 203,3 | 185,4 | 171,9 | 160,9 | 152,4 | 146,7 | 143,9 | 141,7 | 140,3 | 139,1 | 138,1 | 131,7 | - | - | 121,8 | - | - | 115,4 | 109,8 | 95,9 | 76,3 | 61 |
| CL1500 | | 240,6 | 210,9 | 192,4 | 178,4 | 167 | 158,1 | 152,2 | 149,3 | 147,1 | 145,6 | 144,3 | 143,3 | 136,7 | - | - | 126,4 | - | - | 119,8 | 114 | 99,5 | 79,2 | 63,8 |
| PN320 | | 300,8 | 263,7 | 240,6 | 223 | 208,7 | 197,6 | 190,3 | 186,7 | 184 | 182,1 | 180,3 | 179,2 | 170,9 | - | - | 158 | - | - | 149,7 | 142,5 | 124,4 | 98,9 | 79,2 |
| PN400 | | 381 | 334,1 | 304,8 | 282,4 | 264,2 | 250,3 | 241,1 | 236,5 | 233,1 | 230,7 | 228,4 | 227 | 216,6 | - | - | 200,2 | - | - | 189,5 | 180,5 | 157,7 | 125,1 | 100,4 |
| CL2500 | | 401 | 351,7 | 320,8 | 297,2 | 278,1 | 263,5 | 253,8 | 249 | 245,4 | 242,9 | 240,4 | 238,9 | 228 | - | - | 210,7 | - | - | 199,5 | 190 | 166 | 131,7 | 106,5 |

DESIGN

Single-ported globe control valves BR 12B are recommended for application under heavy-duty working conditions, with excessive noise, flashing or choked flow. Selection of designs and materials depends on working conditions. It is based on computer-aided calculations of flow coefficients, noise level, fluid status, and effectiveness of such actions depend on data submitted by customer.

Application of perforated control elements allows noise reduction by 10dBA regarding execution with contoured plug. Further noise reduction (by 5 dBA) can be achieved by application of choke cage, which causes reduction in pressure drop between plug and seat. Such design is also recommended in case of choked flow, cavitation and flashing.

Perforated structures feature higher pressure recovery coefficient FL, which allows achievement of higher flow at same Kvs and Δp as in basic design. Customers shall also appreciate possibility of achieving maximum flow ratio for all nominal sizes and control characteristics, and reduction in actuator costs due to application of balanced plugs. In case of compressive media it is advisable to apply diffusers at the valve outlet. In justified cases (noise, choked flow) diffusers can be fitted with additional perforated choke structures in the form of plates assembled between flanges or welded in diffuser interior.

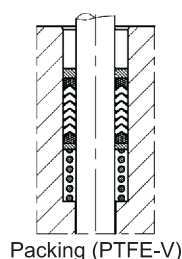
On customer's request, also when flow conditions justify such solution, special executions are recommended concerning materials, flow ratios, control characteristics, leakage class, etc.

Table 4 - Packing types with application ranges.

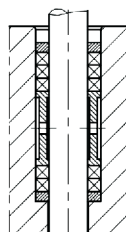
| Packing type | PN | Temperature [°C] | | |
|--------------------|-----------------|------------------|---------------------------|-------------|
| | | Bonnet type | | |
| | | Standard | Extended | Bellows |
| PTFE-V | up to CL600)* | -46...+200 | -198...-46 +200...+300 | -100...+200 |
| PTFE + Graphite | | | | |
| PTFE-V / TA-LUFT | | | | |
| Graphite | up to CL2500)* | +200...+300 | +300...+537 ,(+650)** | +200...+400 |
| Graphite / TA-LUFT | | | | |

)* PN10...40; CL150...3000 for below seal bonnet

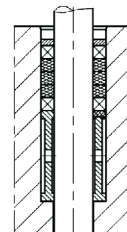
)** - for welding ends valves



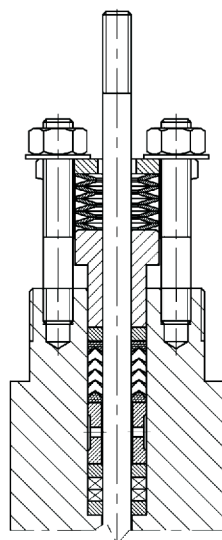
Packing (PTFE-V)



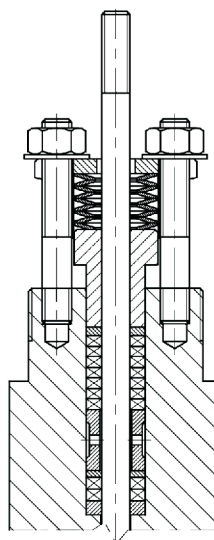
Packing
(PTFE+GRAPHITE)



Packing (GRAPHITE)



Packing kit TA-LUFT PTFE-V



Packing kit TA-LUFT
with graphite kit

Fig. 2. Bonnet packings



Table 5.: Flow ratios Kvs [m³/h]

| Kvs [m³/h] | | Stroke [mm] | Seat size D [mm] | A [cm³] | F _D [kN] | | | | | | | | | |
|-------------------------------------|---|----------------|------------------------|------------|---------------------|-------|----------|------|------|------|------|-----|-----|-----|
| L | P | | | | cl. IV | cl. V | 25 | 40 | 50 | 80 | 100 | 150 | 200 | 250 |
| 10 | | 20 | 20,64 | 3,3 | 0,33 | 2,1 | • K1 **) | K2 | K2 | | | | | |
| 16 | | | 25,25 | 5,0 | 0,4 | 2,6 | | K1 | K2 | | | | | |
| 25 | | | 31,72 | 7,9 | 0,5 | 3,3 | | • K1 | K1 | K2 | | | | |
| 40 | | 38 | 41,25 | 13,4 | 0,7 | 4,6 | | | • K1 | K2 | K2 | | | |
| 63 | | | 50,8 | 20,3 | 0,8 | 5,2 | | | | K1 | K2 | K2 | | |
| 94 | | | 66,7 | 34,9 | 1,1 | 7,2 | | | | • K0 | K1 | K2 | K2 | |
| 125 | | 50 | 88,9 | 62,1 | 1,4 | 9,1 | | | | | • K1 | K2 | K2 | K2 |
| 160 | | | | | | | | | | | • K1 | K2 | K2 | K2 |
| 200 | | 63 | 107,92 | 91,5 | 1,7 | 11 | | | | | | K1 | K2 | K2 |
| 250 | | | | | | | | | | | | | K1 | K2 |
| 320 | | 80 | 126,95 | 126,6 | 2,0 | 13 | | | | | | K1 | K2 | K2 |
| 500 | | 100 | 158,72 | 197,9 | 2,5 | 16 | | | | | | | K1 | K2 |
| 630 | | | 203,2 | 324,3 | 3,2 | 21 | | | | | | | | K1 |
| 800 | - | | | | | | | | | | | | | |
| Calculation coefficients: | | | | | | | | | | | | | | |
| FL=0,95 ; XT=0,78; Fd=0,1; xFz=0,75 | | | | | | | | | | | | | | |

Note:1.  - no executions for PN250...CL2500

2. **) – for PN10...50 - K0

3. „K” – maximum number of choke cages in valve:

4. The number of choked cages does not concern
the valves balanced by a pilot

K0 – no choke cages

K1 – one no choke cage

K2 – two choke cages

**ALLOWABLE PRESSURE DROPS.**

Pressure drops Δp [bar] apply to closed valve and they are calculated with account for the valve drive performance. Actual pressure drops should not exceed 70% of allowable working pressure for given nominal pressure, material execution and working temperature, as per tables 3.1 to 3.7.

$$\Delta p = \frac{10 (F_s - F_D)}{A}$$

where: Δp [MPa] – calculated pressure drop

F_s [kN] – actuator available force (tab. 6)

F_D [kN] – valve plug to valve seat pressure (tab. 5)

A – surface coefficient of seat diameter D [cm²];

D – seat diameter [mm] (tab. 5)

$$A = \frac{\pi D^2}{400} \text{ [cm}^2\text{]}$$

Note:

1. Valves with balanced plug and with gasket are manufactured only in leakage class IV. For balanced plugs assume the available force of F_S at least equal to F_D for class V (Table 5).
2. For valves relieved with a remote control, drive disposition forces need to be agreed on with the manufacturer.

Table 6. Available force F_s [kN] of pneumatic actuators

| Actuator size | Actuator with direct action P; P1 | | | Actuator with reverse action R | | | | | |
|---------------|-----------------------------------|------|------|--------------------------------|-----------------------|----------|----------|-----------|-----------|
| | Supply pressure [kPa] | | | Spring range [kPa] | | | | | |
| | 140 | 250 | 400 | 20 - 100 | 40 - 120; 40 - 200 | 60 - 140 | 80 - 240 | 120 - 280 | 180 - 380 |
| 160 | 0,64 | 2,4 | 4,8 | 0,32 | 0,64 | 0,96 | 1,28 | 1,92 | - |
| 250 | 1,0 | 3,8 | 7,5 | 0,5 | 1,0 | 1,5 | 2,0 | 3,0 | - |
| 400 | 1,6 | 6,0 | 12,0 | 0,8 | 1,6 | 2,4 | 3,2 | 4,8 | - |
| 630 | 2,5 | 9,5 | 18,9 | 1,3 | 2,5 | 3,8 | 5,0 | 7,6 | 11,3 |
| R-630T | - | - | - | 2,6 | 5,0 | 7,6 | 10,0 | 15,2 | 22,6 |
| 1000 | 4,0 | 15,0 | 30,0 | 2,0 | 4,0 | 6,0 | 8,0 | 12,0 | 18,0 |
| 1500 | 6,0 | 22,5 | 45,0 | 3,0 | 6,0 | 9,0 | 12,0 | 18,0 | 27,0 |
| 1500T | 12,0 | 45,0 | 90,0 | 6,0 | 12,0 | 18,0 | 24,0 | 36,0 | 54,0 |

Note:

1. For direct action actuators P, P1 adopted spring range is 20 - 100kPa.
2. For electric and other actuators, Δp value can be calculated from the above equation and from the data in tables 5 and 6 with the available force F_S provided to be the actuator capacity rating to its catalogue card.

Table 7. Pressure drops Δp [MPa] for valves with pneumatic actuators, seat leakage class IV and V.

| Seat diameter [mm] | Actuator size | Air-to-close, actuators P/P1 Spring range 20...100 kPa | | | | | | Air-to-open, actuators R/R1 | | | | | | | | | | | |
|-----------------------|---------------|---|-----|-----|---------|-----|-----|-----------------------------|----------------------|----------|----------|-----------|-----------|--------------------|----------------------|----------|----------|-----------|-----------|
| | | Class IV | | | Class V | | | Class IV | | | | | | Class V | | | | | |
| | | Supply pressure [kPa] | | | | | | Spring range [kPa] | | | | | | Spring range [kPa] | | | | | |
| | | 140 | 250 | 400 | 140 | 250 | 400 | 20...100 | 40...120 40...200 | 60...140 | 80...240 | 120...280 | 180...380 | 20...100 | 40...120 40...200 | 60...140 | 80...240 | 120...280 | 180...380 |
| | | Δp [bar] | | | | | | | | | | | | | | | | | |
| 20,64 | 160 | 9 | 62 | 133 | - | 7 | 79 | - | 9 | 19 | 28 | 47 | - | - | - | - | - | - | - |
| | 250 | 20 | 100 | 210 | - | 48 | 159 | 5 | 20 | 34 | 49 | 78 | - | - | - | - | - | 26 | - |
| | 400 | 37 | 166 | 280 | - | 115 | 280 | 14 | 37 | 60 | 84 | 131 | - | - | - | 9 | 32 | 79 | - |
| | 630 | 65 | 272 | 280 | 11 | 218 | 280 | 27 | 65 | 103 | 140 | 216 | 280 | - | 11 | 49 | 86 | 162 | 274 |
| | R-630T | - | - | - | - | - | - | 65 | 140 | 216 | 280 | 280 | 280 | 11 | 86 | 162 | 237 | 280 | 280 |
| 25,25 | 160 | 4 | 40 | 87 | - | - | 43 | - | 4 | 11 | 17 | 30 | - | - | - | - | - | - | - |
| | 250 | 12 | 67 | 142 | - | 23 | 98 | 2 | 12 | 22 | 32 | 52 | - | - | - | - | - | 8 | - |
| | 400 | 24 | 112 | 232 | - | 68 | 188 | 8 | 24 | 40 | 56 | 88 | - | - | - | - | 12 | 44 | - |
| | 630 | 42 | 180 | 280 | - | 136 | 280 | 17 | 42 | 67 | 92 | 143 | 218 | - | - | 23 | 48 | 98 | 174 |
| | R-630T | - | - | - | - | - | - | 42 | 92 | 143 | 193 | 280 | 280 | - | 48 | 98 | 149 | 249 | 280 |
| 31,72 | 160 | 1,5 | 24 | 54 | - | - | 19 | - | 1 | 5 | 9 | 17 | - | - | - | - | - | - | - |
| | 250 | 6 | 41 | 88 | - | 5 | 53 | - | 6 | 12 | 19 | 31 | - | - | - | - | - | - | - |
| | 400 | 14 | 70 | 145 | - | 34 | 110 | 4 | 14 | 24 | 34 | 54 | - | - | - | - | - | 19 | - |
| | 630 | 25 | 113 | 232 | - | 78 | 197 | 10 | 25 | 41 | 57 | 90 | 137 | - | - | 6 | 21 | 54 | 101 |
| | R-630T | - | - | - | - | - | - | 25 | 57 | 89 | 121 | 185 | 280 | - | 22 | 54 | 85 | 149 | 245 |
| 41,25 | 160 | - | 13 | 31 | - | - | 3 | - | - | 2 | 4 | 9 | - | - | - | - | - | - | - |
| | 250 | 2 | 23 | 51 | - | - | 24 | - | 2 | 6 | 10 | 17 | - | - | - | - | - | - | - |
| | 400 | 7 | 40 | 84 | - | 12 | 57 | 1 | 7 | 13 | 19 | 31 | - | - | - | - | - | 3 | - |
| | 630 | 13 | 63 | 130 | - | 35 | 102 | 4 | 13 | 22 | 31 | 49 | 75 | - | - | - | 3 | 21 | 48 |
| | R-630T | - | - | - | - | - | - | 14 | 32 | 51 | 70 | 108 | 164 | - | 5 | 24 | 43 | 81 | 137 |
| 50,8 | 630 | 9 | 43 | 90 | - | 21 | 69 | 2,5 | 9 | 15 | 21 | 34 | 53 | - | - | - | - | 12 | 30 |
| | 1000 | 16 | 71 | 146 | - | 49 | 124 | 6 | 16 | 26 | 36 | 56 | 86 | - | - | 4 | 14 | 34 | 64 |
| | 1500 | 25 | 107 | 218 | 3 | 85 | 196 | 10 | 25 | 40 | 55 | 84 | 129 | - | 3 | 18 | 33 | 62 | 107 |
| 66,7 | 630 | 4 | 24 | 50 | - | 6 | 33 | - | 4 | 8 | 11 | 18 | 29 | - | - | - | - | - | 11 |
| | 1000 | 8 | 40 | 83 | - | 22 | 65 | 3 | 8 | 14 | 20 | 31 | 48 | - | - | - | 2 | 14 | 30 |
| | 1500 | 14 | 61 | 125 | - | 44 | 108 | 5 | 14 | 23 | 31 | 48 | 74 | - | - | 5 | 14 | 30 | 56 |
| 88,9 | 630 | 1,5 | 12 | 28 | - | - | 15 | - | 1 | 3 | 5 | 9 | 16 | - | - | - | - | - | 3 |
| | 1000 | 4 | 22 | 46 | - | 10 | 34 | 1 | 4 | 7 | 11 | 17 | 27 | - | - | - | - | 5 | 14 |
| | 1500 | 7 | 34 | 70 | - | 21 | 58 | 3 | 7 | 12 | 17 | 27 | 41 | - | - | - | 5 | 14 | 29 |
| 107,92 | 1000 | 3 | 14 | 30 | - | 4 | 20 | - | 3 | 5 | 7 | 11 | 18 | - | - | - | - | 1 | 8 |
| | 1500 | 5 | 23 | 47 | - | 13 | 37 | 1 | 5 | 8 | 11 | 18 | 28 | - | - | - | 1 | 8 | 17 |
| | 1500T | 11 | 48 | 96 | 1 | 37 | 86 | 5 | 11 | 18 | 24 | 37 | 57 | - | 1 | 8 | 14 | 27 | 47 |
| 126,95 | 1000 | 1,5 | 10 | 22 | - | 1 | 13 | - | 1 | 3 | 4 | 7 | 12 | - | - | - | - | - | 3 |
| | 1500 | 3 | 16 | 34 | - | 8 | 25 | - | 3 | 6 | 8 | 13 | 20 | - | - | - | - | 4 | 11 |
| | 1500T | 8 | 34 | 70 | - | 25 | 61 | 3 | 8 | 13 | 17 | 27 | 41 | - | - | 4 | 9 | 18 | 33 |
| 158,72 | 1000 | 0,5 | 6 | 13 | - | - | 6 | - | - | 1 | 2 | 4 | 7 | - | - | - | - | - | - |
| | 1500 | 2 | 10 | 21 | - | 3 | 14 | - | 2 | 3 | 5 | 8 | 12 | - | - | - | - | 1 | 6 |
| | 1500T | 5 | 21 | 44 | - | 14 | 37 | 2 | 5 | 8 | 10 | 17 | 26 | - | - | 1 | 4 | 10 | 19 |
| 195 | 1500 | - | 7 | 14 | - | - | 8 | - | 1 | 2 | 3 | 5 | 8 | - | - | - | - | - | 2 |
| | 1500T | 3 | 14 | 29 | - | 8 | 23 | 1 | 3 | 5 | 7 | 11 | 17 | - | - | - | 1 | 5 | 11 |
| 203,2 | 1500 | - | 6 | 13 | - | - | 7 | - | - | 2 | 3 | 4,5 | 7 | - | - | - | - | - | 2 |
| | 1500T | 3 | 13 | 27 | - | 7 | 21 | - | 3 | 4,5 | 6 | 10 | 16 | - | - | - | - | 5 | 10 |

Note:

1. In table theoretical acceptable pressure drops are included. Actual pressure drops with consideration of tolerance of spring manufacture and friction of internal parts of the actuator are lower than those given by 20%. Pressure drops chosen that way guarantee internal tightness of closing of the valves.
2. For valves with function "rising control pressure - valve opens" the actuator with springs ranged 40-120 kPa can be replaced with an actuator ranged 40-200 kPa, with the same pressure drops.
3. For reverse-working actuators (type R or R1), supply pressure should be higher than the upper spring range by at least 40kPa.

NOISE REDUCTION

The noise generated out of valve operation caused by cavitations or by aerodynamic effects exceeds the level acceptable by the client, it shall be reduced by means of the following solutions:

- perforated plugs (fig. 1 and tab. 5)
- silencer plates on the valve outlet and/or inside the reduction joint (fig. 3, 4 and tab. 8)
- reduction joints (diffusers) - (fig.4).

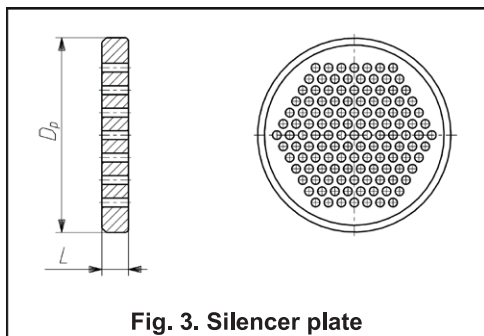


Fig. 3. Silencer plate

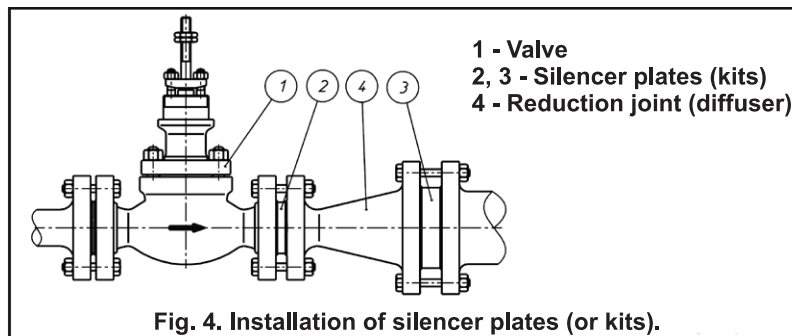


Fig. 4. Installation of silencer plates (or kits).

Table 8.: Dimensions and flow ratios of silencing plates.

| DN | 25 | 40 | 50 | 80 | 100 | 150 | 200 | 250 | 300 | 350 |
|---------|----|------|-----|-----|-----|-----|-----|-----|------|------|
| Kvs | 10 | 25 | 40 | 94 | 160 | 320 | 500 | 800 | 1000 | 1500 |
| | 9 | 22,5 | 36 | 84 | 144 | 288 | 450 | 720 | 900 | 1350 |
| | 8 | 20 | 32 | 75 | 128 | 256 | 400 | 640 | 800 | 1200 |
| | 7 | 17,5 | 28 | 66 | 112 | 224 | 350 | 560 | 700 | 1050 |
| L [mm] | 5 | 6 | | 10 | | 15 | | 20 | | |
| Dp [mm] | 68 | 88 | 102 | 138 | 162 | 218 | 285 | 345 | 410 | 465 |

Multi-plate silence kits are custom-built for requirements of individual processes.

SIZES AND WEIGHTS

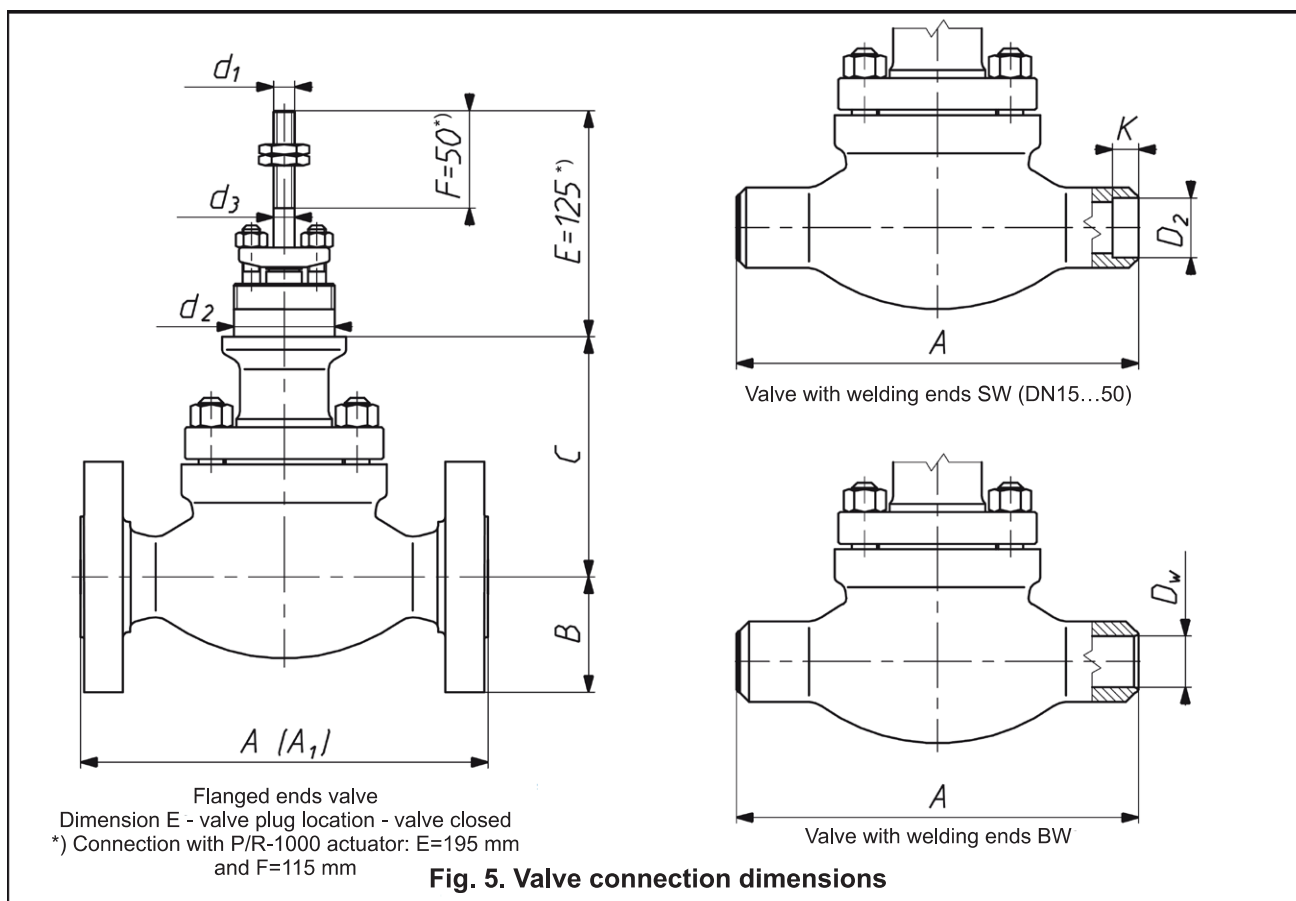


Fig. 5. Valve connection dimensions



Table 9a.: Connection dimensions of control valves

| DN | 25 | | | | | | 40 | | | | | | 50 | | | | | |
|-------------|------------------|------------------|-----------------|------------------|-------|------------------|------------------|------------------|-----------------|------------------|-------|------------------|------------------|------------------|-----------------|------------------|-------|------------------|
| PN | PN10... CL300 | PN63... CL600 | CL900; PN160 | PN250; CL1500 | PN320 | PN400; CL2500 | PN10... CL300 | PN63... CL600 | CL900; PN160 | PN250; CL1500 | PN320 | PN400; CL2500 | PN10... CL300 | PN63... CL600 | CL900; PN160 | PN250; CL1500 | PN320 | PN400; CL2500 |
| B max | 63 | 70 | 75 | | 80 | 90 | 75 | 85 | 93 | | 98 | 110 | 83 | 98 | 108 | | 105 | 118 |
| C | DS | 135 | | 149 | 193 | | 145 | | 172 | 214 | | 155 | | 175 | 237 | | | |
| | DW | 306 | | 320 | 364 | | 306 | | 348 | 385 | | 326 | | 345 | 402 | | | |
| | DM | 254 | - | - | - | - | 254 | - | - | - | - | - | 270 | - | - | - | - | - |
| Weight [kg] | 8 | 8,5 | | 9,5 | | | 15,5 | 17,5 | 19 | 20 | 22 | 23 | 22 | 25 | 28 | 31 | 33 | 34 |

| DN | 80 | | | | | | 100 | | | | | | 150 | | | | | |
|-------------|------------------|------------------|-----------------|------------------|-------|------------------|------------------|------------------|-----------------|------------------|-------|------------------|------------------|------------------|-----------------|------------------|-------|------------------|
| PN | PN10... CL300 | PN63... CL600 | CL900; PN160 | PN250; CL1500 | PN320 | PN400; CL2500 | PN10... CL300 | PN63... CL600 | CL900; PN160 | PN250; CL1500 | PN320 | PN400; CL2500 | PN10... CL300 | PN63... CL600 | CL900; PN160 | PN250; CL1500 | PN320 | PN400; CL2500 |
| B max | 105 | 145 | 120 | 133 | 138 | 153 | 128 | 138 | 145 | 155 | 168 | 185 | 160 | | 178 | | 190 | |
| C | DS | 206 | | 233 | 257 | | 217 | | 252 | 329 | | 287 | | | | 365 | | |
| | DW | 375 | | 402 | 447 | | 407 | | 442 | 498 | | 426 | | | | 483 | | |
| | DM | 405 | - | - | - | - | 405 | - | - | - | - | - | 470 | | - | | - | |
| Weight [kg] | 40 | 43 | 44 | 50 | 51 | 52 | 65 | 72 | 75 | 86 | 89 | 95 | 132 | | 147 | | 156 | |

| DN | | 200 | | 250 | | |
|-------------|----|--------------|--------------|--------------|-------------------------|--------------|
| PN | | PN10...CL300 | PN63...CL600 | PN10...CL300 | PN10...CL300 (kv800) | PN63...CL600 |
| B max | | 190 | 235 | 258 | | 255 |
| C | DS | 439 | | 458 | | |
| | DW | 539 | | 558 | | |
| | DM | 580 | - | 580 | 660 | - |
| Weight [kg] | | 195 | 220 | 320 | 330 | 360 |

Note: Weight of valve with standard bonnet and without actuator.

Table 9b.: Connection dimensions of control valves

| DN | 25..50 | 50 | 80 | 80; 100 | 80; 100 | 100 | 150 | | | | 200 | 200; 250 | | | | 250 |
|----------|-----------------------|---------------|-------|---------------|---------|--------------|------------------------|--------------|----------|---------------|-----------------------|-----------------------|---------------|-----|---------|----------|
| Kvs | 10..25 | 40 | 25 | 40 | 63; 94 | 125; 160 | 63; 94 | 125; 160 | 200; 250 | 320 | 94 | 125; 160 | 200; 250 | 320 | 500 | 630; 800 |
| Stroke | 20 | 38 | 20 | 38 | 38 | 50 | 38 | 50 | 63 | 80 | 38 | 50 | 63 | 80 | 100 | |
| d1 | M12x1,25 | | | | M16x1,5 | | | | M20x1,5 | | M16x1,5 | | M20x1,5 | | M24x1,5 | |
| d2 ') | 57,15 / 2 1/4"-16UN2A | | | | | | 84,15 / 3 5/16"-16NS2A | | | | 95,25 / 3 3/4"-12UN2A | | | | | |
| d3 | 12 | | 16 | | | | 20 | | | | 24 | | | | | |
| Actuator | 160 | 630 R-630T | 160 | 630 R-630T | 630 | 1000 1500 | 630 | 1000 1500 | 1000 | 1500 1500T | 1000 1500 | 1000 1500 1500T | 1500 1500T | | | |
| | 250 | | 400 | | 1000 | | 1500 | | | | | | | | | |
| | 400 | | 630 | | 1000 | | 1500 | | | | | | | | | |
| | 630 | | 1000 | | 1500 | | 1500T | | | | | | | | | |
| | R-630T | | R-630 | | | | | | | | | | | | | |

Note:

¹⁾ for DN80 and DN100 valves with TA-LUFT packing d2 = 84.15



Table 10.: Construction lengths of control valves with flanged connection

| DN | Dimension A [mm] | | | | | | | | | | |
|-----|------------------|----------|-----|-----------|-----|-----------|-------|-------|-------|--------|--------|
| | PN / DIN | | | | | CL / ANSI | | | | | |
| | 10; 16; 25; 40 | 63 - 100 | 160 | 250 - 320 | 400 | CL150 | CL300 | CL600 | CL900 | CL1500 | CL2500 |
| 25 | 160 | 230 | 230 | 260 | 300 | 184 | 197 | 210 | 248 | 273 | 308 |
| 40 | 200 | 260 | 260 | 300 | 350 | 222 | 235 | 251 | 270 | 311 | 359 |
| 50 | 230 | 300 | 300 | 350 | 400 | 254 | 267 | 286 | 311 | 340 | 400 |
| 80 | 310 | 380 | 380 | 450 | 500 | 298 | 317 | 336 | 387 | 460 | 498 |
| 100 | 350 | 430 | 430 | 520 | 580 | 352 | 368 | 394 | 464 | 530 | 575 |
| 150 | 480 | 550 | 550 | - | - | 451 | 473 | 508 | 556 | - | - |
| 200 | 600 | 650 | - | - | - | 543 | 568 | 610 | - | - | - |
| 250 | 730 | 775 | - | - | - | 673 | 708 | 752 | - | - | - |

Note:

Dimensions „A“ as listed in Table 10 for CL150; CL300; CL600; CL900; CL1500; CL2500 apply to bodies with B seat (RF). For other designs dimension A_1 can be calculated using relations presented in Table 11.

Table 11.: Algorithms for calculation of control valve body length for valves with flanged end

- with a groove
- with a key (recess)
- with a groove to the ring

| Body type and marking | Pressure PN / ANSI | DN | A_1 |
|----------------------------|------------------------------------|----------|--------------------------|
| PN / ANSI | | | |
| with groove D1/GF | CL300 | 25...250 | $A_1 = A + 5 \times 2$ |
| | CL600 CL900 CL1500 CL2500 | | $A_1 = A - 1,5 \times 2$ |
| with key (recess) F1/FF | | | |
| | | | |
| with ring-joint J / RTJ | CL300 | 25 | $A_1 = A + 5,5 \times 2$ |
| | | 25...40 | $A_1 = A + 6,5 \times 2$ |
| | CL150 | 25...250 | $A_1 = A + 8 \times 2$ |
| | CL300 | 50...250 | $A_1 = A + 8 \times 2$ |
| | CL600 CL900 CL1500 | 25...40 | $A_1 = A$ |
| | CL2500 | 25 | $A_1 = A$ |
| | CL600 | 50...250 | $A_1 = A + 1,5 \times 2$ |
| | CL900 CL1500 | 50...100 | $A_1 = A + 1,5 \times 2$ |
| | CL900 | 150 | $A_1 = A + 3 \times 2$ |
| | | 80 | $A_1 = A + 3 \times 2$ |
| | CL2500 | 100 | $A_1 = A + 4,5 \times 2$ |
| | | | |

Table 12.: Construction lengths of control valves with welding ends.

| DN | Dimension A [mm] | | |
|-----|------------------|---------------|----------------|
| | Nominal pressure | | |
| | PN 10...CL600 | CL900...PN160 | PN250...CL2500 |
| 25 | 210 | 230 | 300 |
| 40 | 251 | 260 | 350 |
| 50 | 286 | 300 | 400 |
| 80 | 337 | 380 | 500 |
| 100 | 394 | 430 | 580 |
| 150 | 508 | 550 | - |
| 200 | 610 | - | - |
| 250 | 752 | - | - |



Table 13.: Butt welding ends BW type PN 10...110

| DN | Dz [mm] | t [mm] | Dw [mm] | PN (DIN3239) | | | | | | | | | |
|-----|---------|--------|---------|--------------|----|----|----|----|-----|-----|-----|-----|-----|
| | | | | 10 | 16 | 25 | 40 | 63 | 100 | 160 | 250 | 320 | 400 |
| 25 | 33,7 | 2,6 | 28,5 | x | x | x | x | x | x | | | | |
| | | 2,9 | 27,9 | | | | | | | x | | | |
| | | 3,6 | 26,5 | | | | | | | | x | | |
| | | 5 | 23,7 | | | | | | | | | x | |
| | | 7,1 | 19,5 | | | | | | | | | | x |
| | 42,4 | 28,2 | | | | | | | | | | | x |
| 40 | 48,3 | 2,6 | 43,1 | x | x | x | x | | | | | | |
| | | 2,9 | 42,5 | | | | | x | x | | | | |
| | | 3,6 | 41,1 | | | | | | | x | | | |
| | | 5 | 38,3 | | | | | | | | x | | |
| | | 6,3 | 35,7 | | | | | | | | | x | |
| | 10 | 28,3 | | | | | | | | | | | x |
| 50 | 28,3 | 2,9 | 54,5 | x | x | x | x | x | | | | | |
| | | 3,2 | 53,9 | | | | | | x | | | | |
| | | 4 | 52,3 | | | | | | | x | | | |
| | | 6,3 | 47,7 | | | | | | | | x | | |
| | | 8 | 44,3 | | | | | | | | | x | |
| | 12,5 | 35,3 | | | | | | | | | | | x |
| 80 | 88,9 | 3,2 | 82,5 | x | x | x | x | | | | | | |
| | | 3,6 | 81,7 | | | | | x | | | | | |
| | | 4 | 80,9 | | | | | | x | | | | |
| | | 6,3 | 76,3 | | | | | | | x | | | |
| | | 11 | 66,9 | | | | | | | | x | | |
| | | 12,5 | 63,9 | | | | | | | | | x | |
| | | 17,5 | 53,9 | | | | | | | | | | x |
| | 114,3 | 79,3 | | | | | | | | | | | x |
| 100 | 114,3 | 3,6 | 107,1 | x | x | x | x | | | | | | |
| | | 4 | 106,3 | | | | | x | | | | | |
| | | 5 | 104,3 | | | | | | x | | | | |
| | | 8 | 98,3 | | | | | | | x | | | |
| | | 14,2 | 85,9 | | | | | | | | x | | |
| | | 16 | 82,3 | | | | | | | | | x | |
| | 139,7 | 22,2 | 69,9 | | | | | | | | | | x |
| 150 | 168,3 | 4,5 | 159,3 | x | x | x | x | | | | | | |
| | | 5,6 | 157,1 | | | | | x | | | | | |
| | | 7,1 | 154,1 | | | | | | x | | | | |
| | 193,7 | 12,5 | 143,3 | | | | | | | x | | | |
| 200 | 219,1 | 5,9 | 207,3 | x | x | | | | | | | | |
| | | 6,3 | 206,5 | | | x | x | | | | | | |
| | | 7,1 | 204,9 | | | | | x | | | | | |
| | | 10 | 199,1 | | | | | | x | | | | |
| | 244,5 | 12,5 | 219,5 | | | | | | | x | | | |
| 250 | 273 | 6,3 | 260,4 | x | x | | | | | | | | |
| | | 7,1 | 258,8 | | | x | x | | | | | | |
| | | 8,8 | 255,4 | | | | | x | | | | | |
| | 12,5 | 248 | | | | | | | x | | | | |

| DN | Schedule | Dz [mm] | t [mm] | Dw [mm] | ANSI (ASME 36.10 M) | | | | | |
|-----|----------|---------|--------|---------|---------------------|-----|-----|-----|-----|-----|
| | | | | | 63 | 100 | 160 | 250 | 320 | 400 |
| 1" | 40 | 33,4 | 3,4 | 26,6 | x | x | x | x | | |
| | 80 | | 4,5 | 24,4 | x | x | x | x | x | |
| | 160 | | 6,4 | 20,6 | | | | | x | |
| | XXS | | 9,1 | 15,2 | | | | | | x |
| 2" | 40 | 60,3 | 3,9 | 52,5 | x | x | x | x | | |
| | 80 | | 5,5 | 49,3 | | | | x | | |
| | 160 | | 8,7 | 42,9 | | | | | x | |
| | XXS | | 11,1 | 38,1 | | | | | | x |
| 4" | 40 | 114,3 | 6 | 102,3 | x | x | x | | | |
| | 80 | | 8,6 | 97,1 | | | | x | | |
| | 120 | | 11,1 | 92,1 | | | | | x | |
| | 160 | | 13,5 | 87,3 | | | | | x | |
| | XXS | | 17,1 | 80,1 | | | | | | x |
| 6" | 40 | 168,3 | 7,1 | 154,1 | x | x | | | | |
| | 80 | | 11 | 146,3 | | | x | x | | |
| | 120 | | 14,3 | 139,7 | | | | x | | |
| | 160 | | 18,3 | 131,7 | | | | x | | |
| 8" | 20 | 219,1 | 6,4 | 206,3 | x | x | | | | |
| | 30 | | 7 | 205,1 | | x | | | | |
| | 40 | | 8,2 | 202,7 | | x | | | | |
| | 60 | | 10,3 | 198,5 | | | x | | | |
| | 80 | | 12,7 | 193,7 | | | x | | | |
| 10" | 20 | 273 | 6,4 | 260,2 | x | x | | | | |
| | 30 | | 7,8 | 257,4 | | x | | | | |
| | 40 | | 9,3 | 254,4 | | x | | | | |
| | 60 | | 12,7 | 247,6 | | | x | | | |
| | 80 | | 15,1 | 242,8 | | | x | | | |

Where:

Dz [mm] - pipe external diameter

Dw [mm] - pipe internal diameter

t [mm] - pipe wall thickness

NOTE:

•) - execution with reduction stubs - discuss with technical dep't POLNA Corp.

Table 14. Socket welding ends, SW type.

| DN | D ₂ | K |
|----|----------------|----|
| 25 | 34 | 13 |
| 40 | 48,7 | |
| 50 | 61 | 16 |

**VALVE ACTUATOR**

• **Pneumatic** – diaphragm multi-spring actuator as per Table 15 type:

- P1/R1 – with cast yoke, no handwheel
- P1B/R1B – with cast yoke, side-mounted handwheel
- P/R – column type, no handwheel
- PN/RN – column type, top-mounted handwheel

Note: P – direct action; air-to-close
R – reverse action; air-to-open

Table 15. Pneumatic actuator types.

| Type | Size | Diaphragm effective area [cm ²] | Stroke [mm] | Number of manual actuator turns for full stroke |
|----------------------------------|-----------|---|-------------------------|---|
| P/R ; PN/RN | 160 | 160 | 20 | 5 |
| | 250 | 250 | | |
| P1/R1 ; P/R ; P1B/R1B ; PN/RN | 400 | 400 | 20 ; 38 | 5 ; 9 |
| | 630 | 630 | | |
| | R-630T *) | 2 x 630 | 38 ; 50 ; 63 | 8 ; 10 ; 13 |
| | 1000 | 1000 | | |
| P1/R1 ; P1B/R1B | 1500 | 1500 | 38 ; 50 ; 63 ; 80 ; 100 | 8 ; 10 ; 13 ; 16 ; 20 |
| | 1500T | 2 x 1500 | | |

*) - there is no top mounted handwheel for R-630T

Table 16. Dimensions and weight of pneumatic actuators P/R and PN/RN - fig. 6

| Actuator size | D ₁ [mm] | D ₂ [mm] | H ₁ [mm] | H ₂ [mm] | Weight [kg] | |
|---------------|---------------------|---------------------|---------------------|---------------------|-------------|-------|
| | | | | | P/R | PN/RN |
| 160 | 210 | 225 | 306 | 468 | 9 | 13,5 |
| 250 | 240 | | 324 | 486 | 10 | 14,5 |
| 400 | 305 | | 332 | 494 | 16 | 20,5 |
| 630 | 375 | 305 | 424 | 586 | 30 | 37 |
| R-630T | | - | 638 | - | 45 | - |
| 1000 | 477 | 450 | 607 | 847 | 74 | 100 |
| 1500 | 550 | - | 704 | - | 95 | - |
| 1500T | | - | 1008 | - | 200 | - |

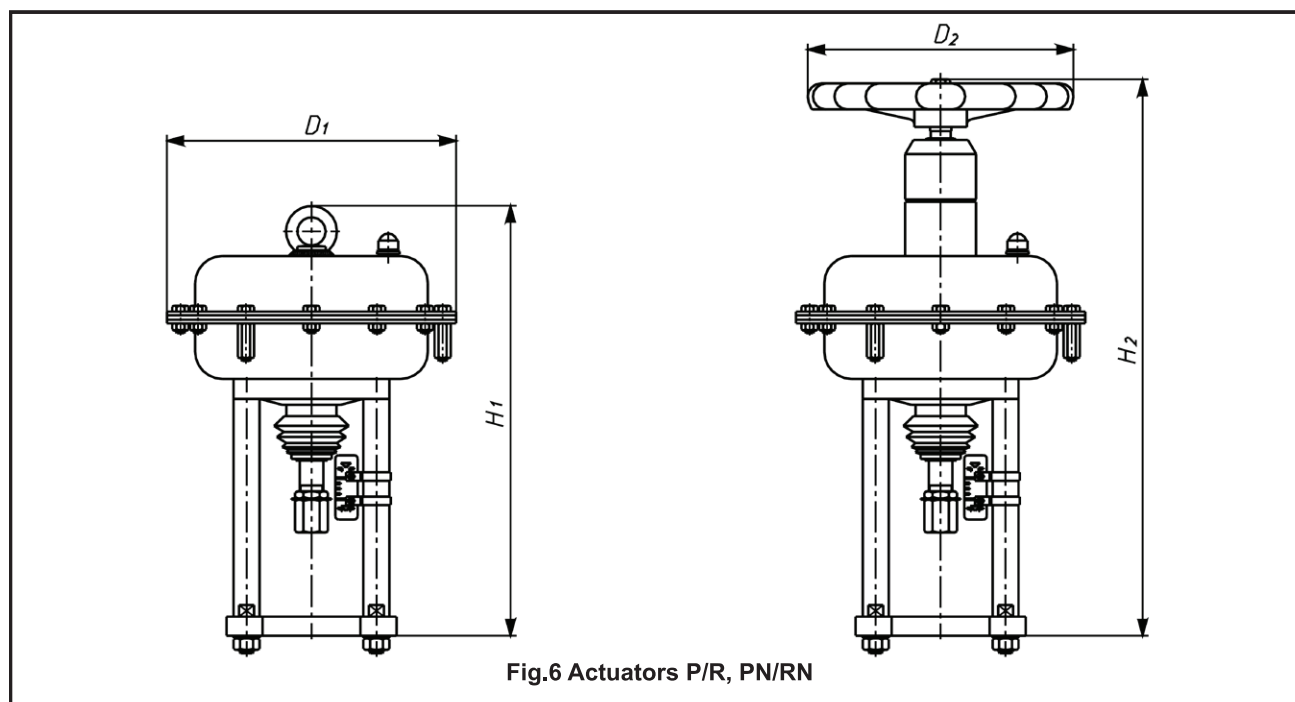
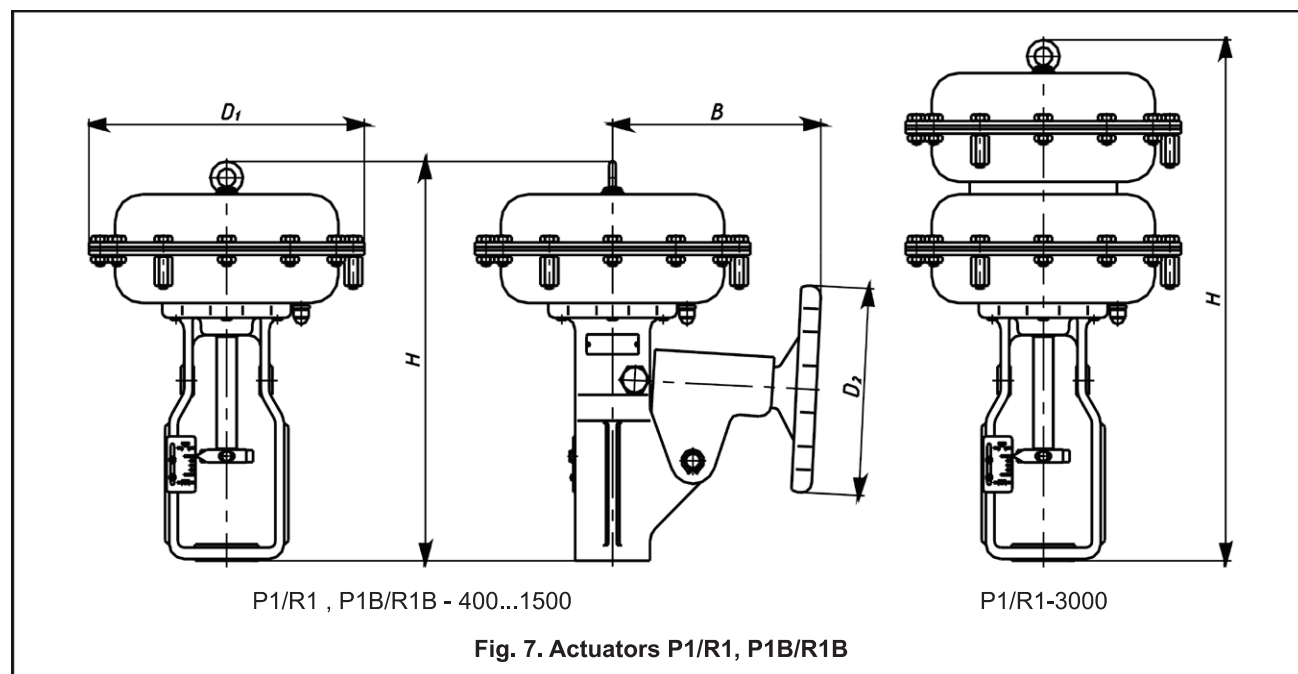


Fig.6 Actuators P/R, PN/RN

Table 17. Sizes and weights of pneumatic actuators P1/R1 and P1B/R1B - Fig. 7

| Actuator size | B [mm] | D ₁ [mm] | D ₂ [mm] | H [mm] | Weight [kg] | |
|---------------|-----------|------------------------|------------------------|-----------|-------------|---------|
| | | | | | P1/R1 | P1B/R1B |
| 400 | 255 | 305 | 225 | 453 | 20 | 28 |
| 630 | 280 | 375 | 305 | 548 | 40 | 50 |
| 1000 | 340 | 477 | 450 | 773 | 85 | 105 |
| 1500 | 410 | 550 | | 833 | 120 | 150 |
| 1500T | | | | 1138 | 225 | 255 |

**Technical specification of pneumatic actuators**

- control air connections: 1/4" NPT ; Rc 1/2"
- tube diameters: 6x1 ; 8x1 ; 12x1
- spring ranges:
 - 20...100 kPa; 40...120 kPa; 60...140 kPa – 3 springs
 - 40...200 kPa; 80...240 kPa; 120...280 kPa – 6 springs
 - 180...380 kPa – 12 springs
 (not applicable for actuators P/R; P1/R1 - 250; 400)

Note: For actuator P1/R1-3000 (Tandem) – for each range double the above numbers of springs.

- maximum supply pressure: actuator size 160...630 - 600 kPa
actuator size R-630T a 1000...1500T - 500 kPa

Accessories (optional):

- manual drive side-mounted (P1/R1) or top-mounted (P/R)
- pneumatic positioner
- electropneumatic positioner
- smart electropneumatic positioner
- pressure air filter-reductor
- 3/2-way solenoid valve
- lock-up valve
- position transmitter
- limit switches

- **Electric actuators** – electrically operated actuators; electrohydraulic, domestic; imported (detailed technical information - as per the catalogue cards of the actuator manufacturers).

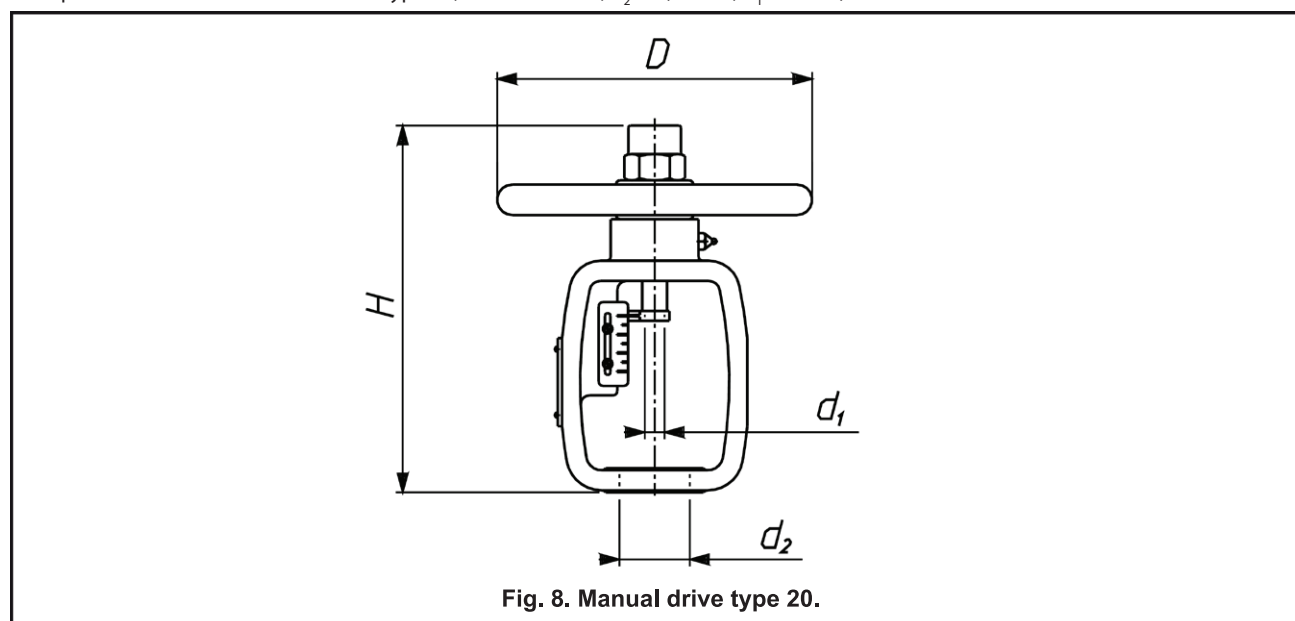
- **Manual drives** – manual drive, type 20, fig.8, tab.18.

Table 18. Types, dimensions and weight of manual drive type 20.

| Type | Stroke | d_1 | d_2 | H | D | No of turns for full stroke | Weight [kg] |
|---------------|--------|----------|-------|-----|-----|-----------------------------|-------------|
| 20-20-57-M12 | 20 | M12x1,25 | 57,15 | 265 | 228 | 8 | 7,5 |
| 20-20-84-M12 | | | 84,15 | | | | |
| 20-38-57-M12 | 38 | M16x1,5 | 57,15 | 265 | 298 | 15 | 10 |
| 20-38-57-M16 | | | 84,15 | | | | |
| 20-38-84-M16 | | | 95,25 | | | | |
| 20-38-95-M16 | | | 57,15 | | | | |
| 20-50-57-M16 | 50 | M16x1,5 | 84,15 | 385 | 457 | 16 | 16 |
| 20-50-84-M16 | | | 95,25 | | | | |
| 20-50-95-M16 | | | 84,15 | | | | |
| 20-63-84-M20 | 63 | M20x1,5 | 95,25 | 385 | 457 | 20 | 16 |
| 20-63-95-M20 | | | 84,15 | | | | |
| 20-80-84-M20 | 80 | M20x1,5 | 95,25 | 533 | 610 | 19 | 24 |
| 20-80-95-M20 | | | 84,15 | | | | |
| 20-100-95-M24 | 100 | M24x1,5 | 95,25 | 533 | 610 | 19 | 24 |

Marking:

Example: 20-38-57-M16 – Manual drive type 20; stroke - 38mm; $d_2=57,15\text{mm}$; $d_1=M16x1,5$


SPECIAL OPTIONS
• valves for oxygen and hydrogen:

Application of adequate materials, mechanical and chemical cleaning, inspections and assembly ensure compatibility with oxygen and hydrogen flows.

• valves for liquid and gaseous fuels with high speed travel:

Driven by pneumatic actuators with quick closing systems - valve closing time-below 1 sec.

• valves for cryogenic service:

Proper materials and special design of the seal to prevent the valve drive from being affected by low temperatures. Used mainly for liquid oxygen and nitrogen.

• valves for acid gases:

Parts of valve can be made of materials and under conditions to enable valve operation with gases of H_2S content as per NACE MR-0175.

• valves with a heating jacket:

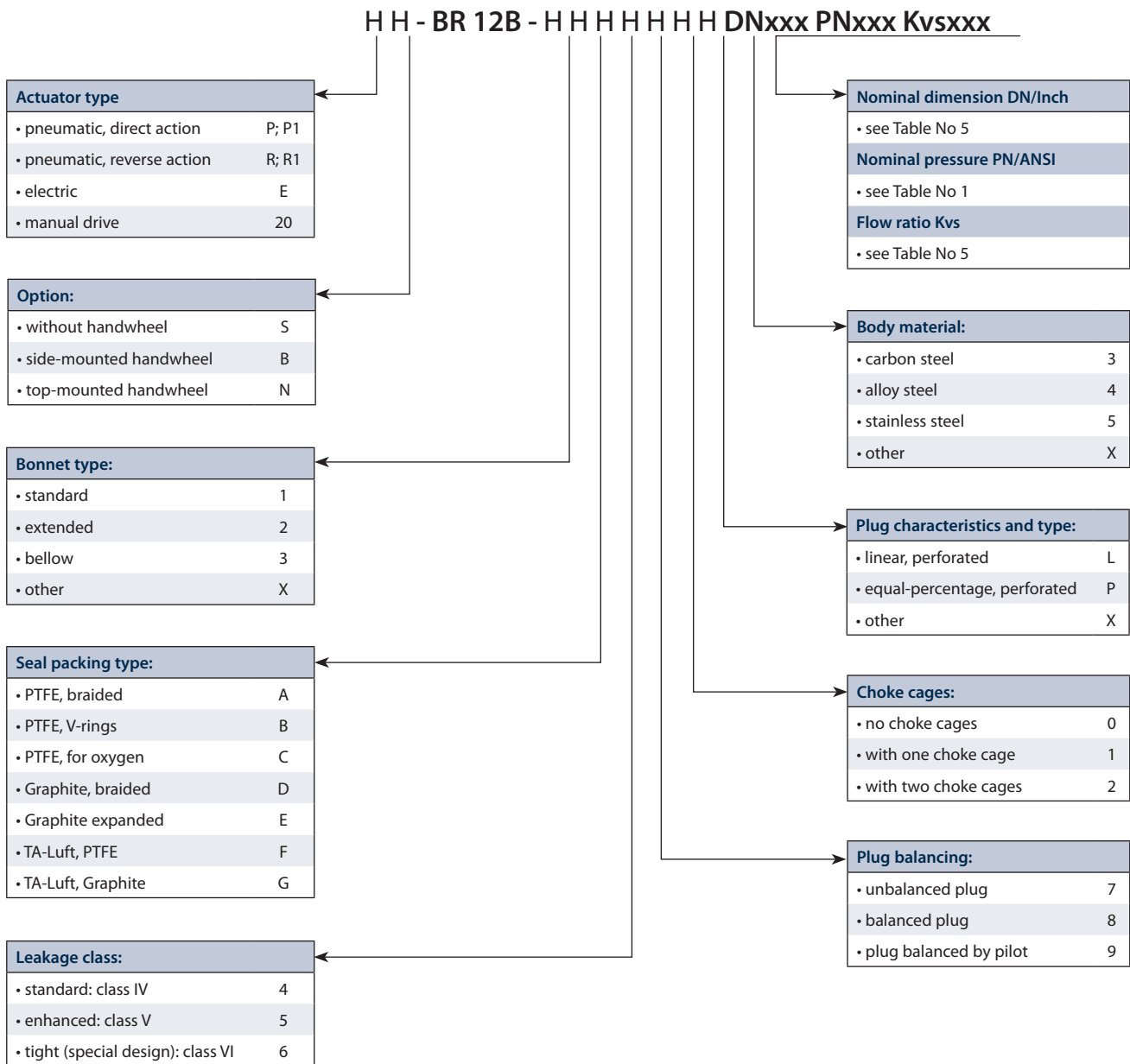
Design and technical parameters-as agreed with the client individually.

• balanced valves with pilot:

Construction allows achievement of high leakage class at high pressure drops and reduced available force of actuator, flow direction - above the plug.

valves with non-cast bodies:

If a special construction of the valve body is needed, it is possible to design a valve for individual customer's needs (angle valves – type L and Z)

MARKING:**MARKING EXAMPLE:**

Control valve series BR 12B with pneumatic actuator (reverse action) with manual drive, extended bonnet. Seal packing by expanded Graphite, leakage class IV, with one choke cage, equal-percentage plug. Body material alloy steel:

RN-BR 12B-2E481P4 DN80 PN250 Kvs63

Valve can be equipped by choke cages: 1, 2 or none - depending on construction allowance of DN and Kvs and based on needs related to valve calculations.

Such marking is shown on valve nameplate..

On the nameplate additionally mentioned:

- maximum working temperature [TS]
- maximum working pressure [PS]
- test pressure [PT]
- plug stroke [H]
- fluid group [1 or 2]
- serial number and year of manufacture







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