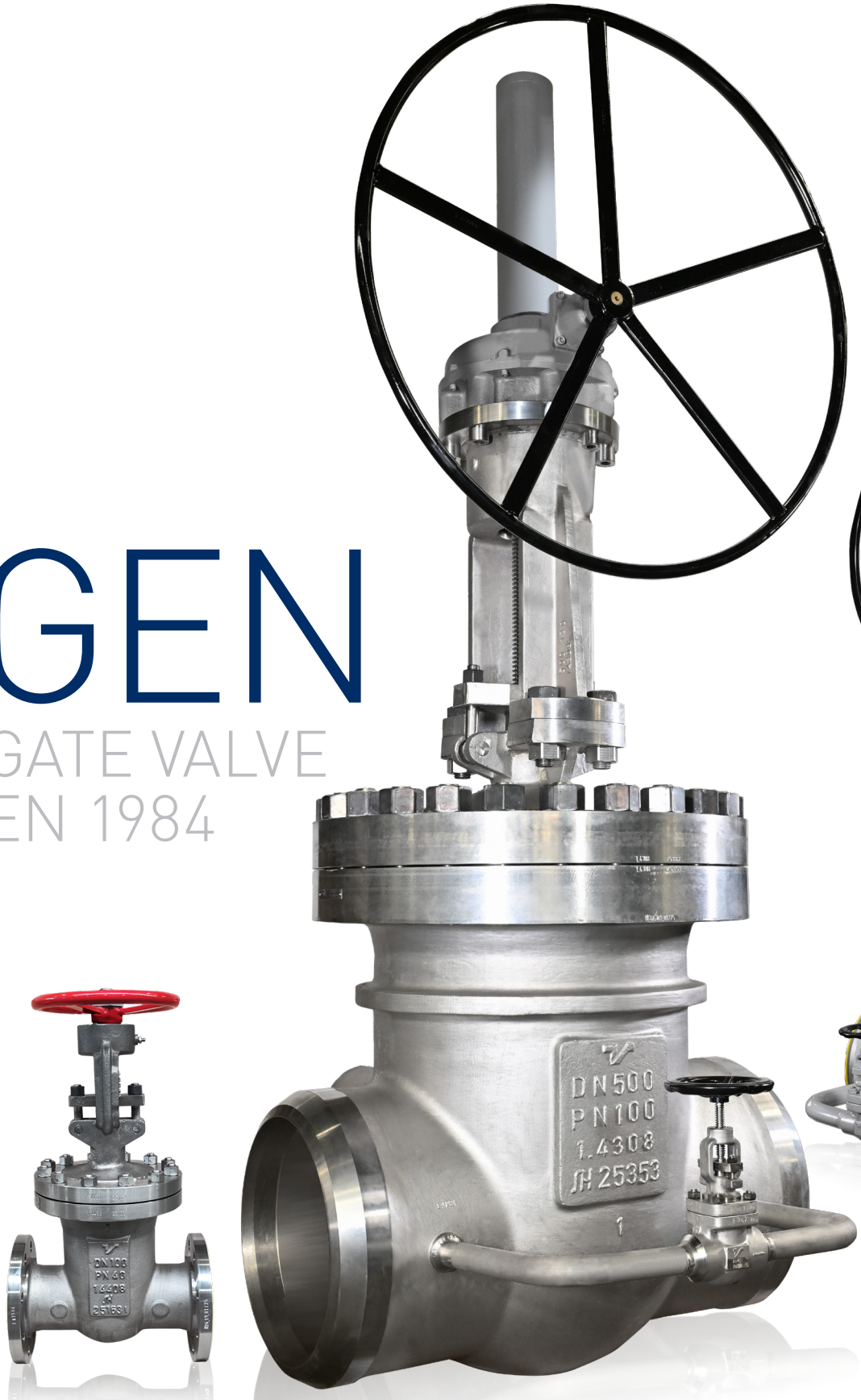
**TERMOVENT SC** SERBIA // INDUSTRIAL VALVES

# GEN

## GATE VALVE
## EN 1984




TERMOVENT SC since1963

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# I TECHNICAL DATA SHEETS

# Gate Valves [GEN] acc. to EN 1984

DN 50 ÷ DN 650
PN 16 ÷ PN 160

## Design

- Cast body and bonnet
- Bolted bonnet (BB)
- Rising stem (RS), outside screw and yoke (OS&Y)
- Flexible, split, solid or parallel slide wedge
- Hard-faced seats

## Applications

- The main purpose of the GEN is to isolate fluid flow through the pipeline for Power plant, Chemical, Petrochemical, Refining, Water supply and other

## Media

- Water, steam, gas, oil and other non-aggressive media

## Pressure and temperature ratings

- PN 16 ÷ PN 160
- Temperatures up to 600˚C
- p/T according to EN 12516-1

## Materials

- Carbon, low temperature and heat-resistant alloys and stainless steels

## Advantages

- Long service life
- Respect for emission standards
- Easy handling and maintenance

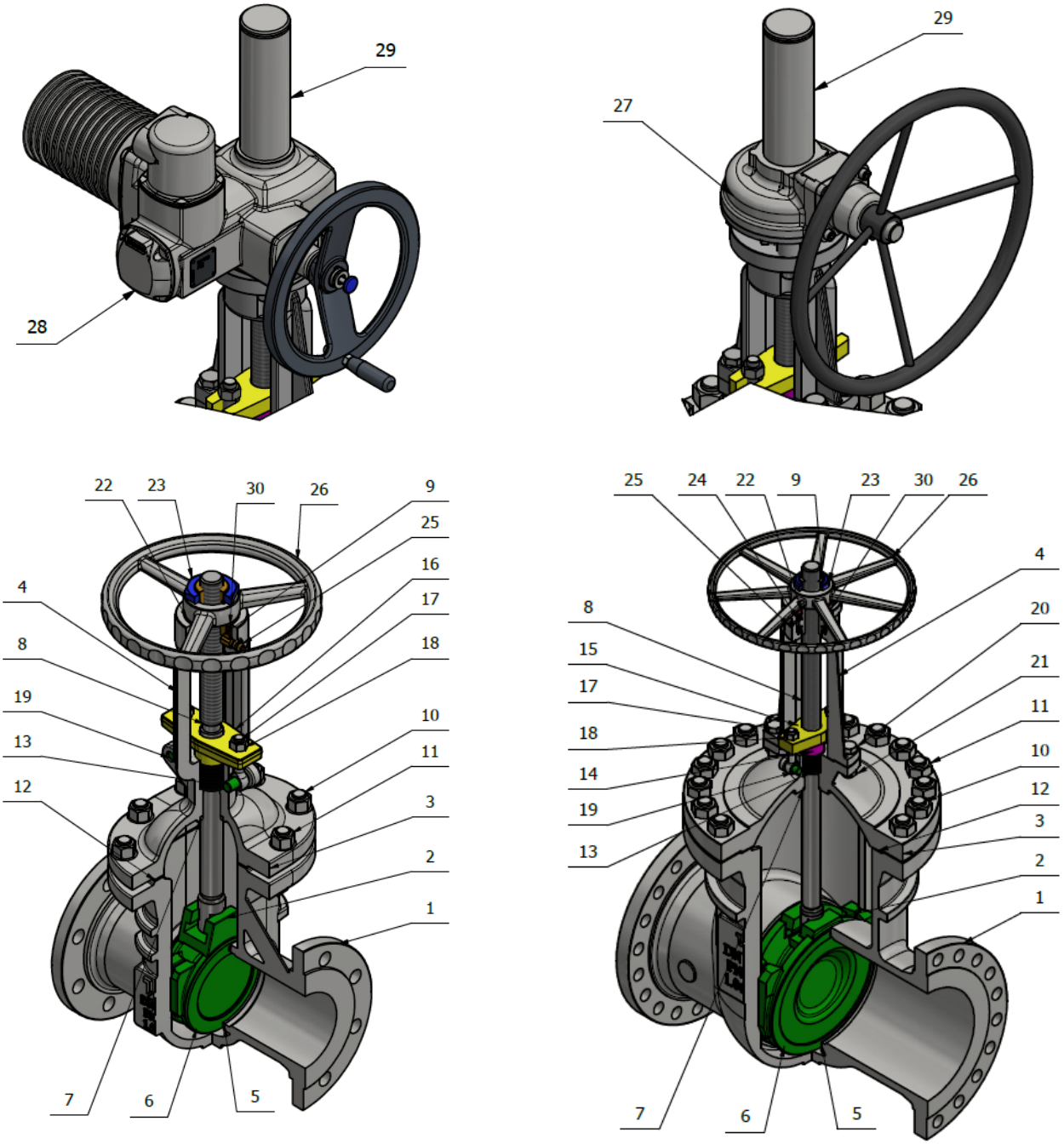
## Optional executions

- Electric actuator
- Pneumatic actuator
- Spring loaded stuffing box (SLSB)
- Lantern ring
- Position indicator
- Limit switches
- Locking device
- Over pressure safety devices
- Flanged or welded ends according to other Standards and Norms.

## Testing

- Every produced gate valve shall be tested according to EN 12266

## 2. PARTS & MATERIALS




- PN 16: Bonnet < DN 250 ≥ Bonnet + Yoke
- PN 25: Bonnet < DN 150 ≥ Bonnet + Yoke
- PN 40: Bonnet < DN 150 ≥ Bonnet + Yoke
- PN 63: Bonnet < DN 150 ≥ Bonnet + Yoke
- PN 100: Bonnet < DN 150 ≥ Bonnet + Yoke
- PN 160: Bonnet < DN 150 ≥ Bonnet + Yoke

**Figure D.1.1 Parts**

**List of materials** **Table D.1.1**

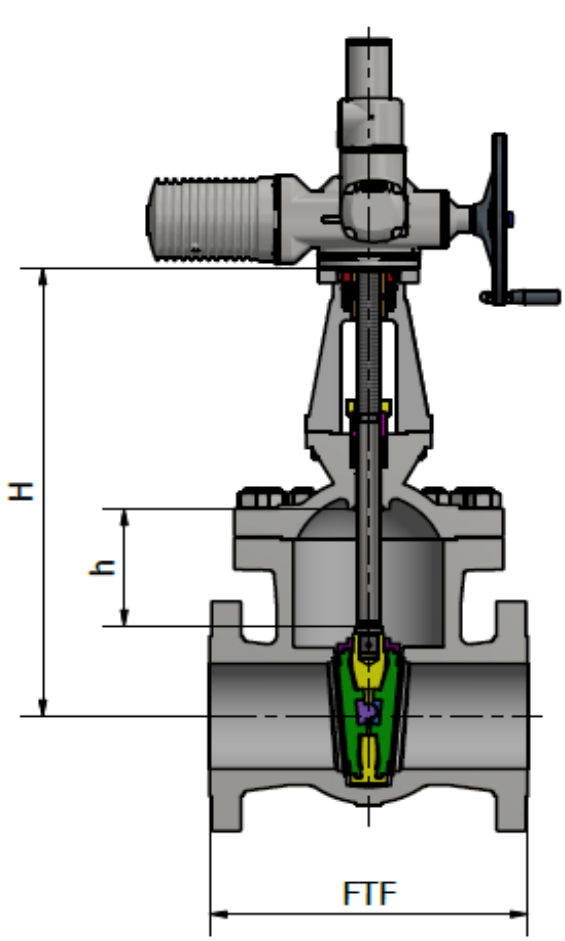
| Pos. | Name | Material Group acc. to EN 12516-1 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | Body [1] | 1.0619 | 1.5419 | 1.7357 | 1.7379 | 1.4955 | 1.4308 | 1.4408 |
| 2 | Wedge [1] | | | | | | | |
| 3 | Bonnet [1] | | | | | | | |
| 4 | Yoke | 1.0619 | | 1.7357 | | | 1.4308 | |
| 5 | Body overlay [2] | Hard-Faced 13Cr or Stellite™ | | | | | basic material or Stellite™ | |
| 6 | Wedge overlay [2] | | | | | | | |
| 7 | Backseat overlay | | | | | | | |
| 8 | Stem | 1.4021 | 1.4122 / 1.4923 [3] | | | | 1.4301 | 1.4401 |
| 9 | Stem nut | 1.0715 / Cu-Alloy | | | | | | |
| 10 | Stud bolts | A193 B7 or 1.7225 | A193 B16 or 1.7709 / 1.4913 [3] | | | | A193 B8 or 1.4301 | A193 B8M or 1.4401 |
| 11 | Nuts | A194 2H or 1.1191 | A194 7 or 1.7709 | | | | A194 8 or 1.4301 | A194 8M or 1.4401 |
| 12 | Bonnet gasket | reinforced graphite or spiral wound | | | | | | |
| 13 | Stem packing rings | graphite with corrosion inhibitor | | | | | | |
| 14 | Packing gland | 1.4021 / 1.4122 | | | | | 1.4301 | |
| 15 | Gland flange | 1.0425 | | | | | 1.4301 | |
| 16 | Gland | 1.0460 or 1.0619 | | | | | 1.4301 | |
| 17 | Gland bolts | 1.1181 | | | | | 1.4301 | |
| 18 | Gland nuts | A194 2H or 1.1191 | | | | | A194 8 or 1.4301 | |
| 19 | Pin | 1.1181 | | | | | 1.4301 | |
| 20 | Head bolts | steel | | | | | stainless steel | |
| 21 | Nuts | steel | | | | | stainless steel | |
| 22 | Cover bearing | 1.1191 | | | | | 1.4301 | |
| 23 | Handwheel nut | 1.1191 | | | | | 1.4301 | |
| 24 | Bearings | axial | | | | | | |
| 25 | Grease injector | Cu-Alloy / steel | | | | | | |
| 26 | Handwheel | steel | | | | | | |
| 27 | Gearbox | commercial | | | | | | |
| 28 | Electric actuator | commercial | | | | | | |
| 29 | Protect tube | steel | | | | | | |
| 30 | Slotted set screw | steel | | | | | | |

*TM trademark materials*
*[1] Other materials available acc. to EN standard*
*[2] Hardness differential between the body and wedge seating surfaces shell be min. 50 HB*
*[3] Over 500°C*

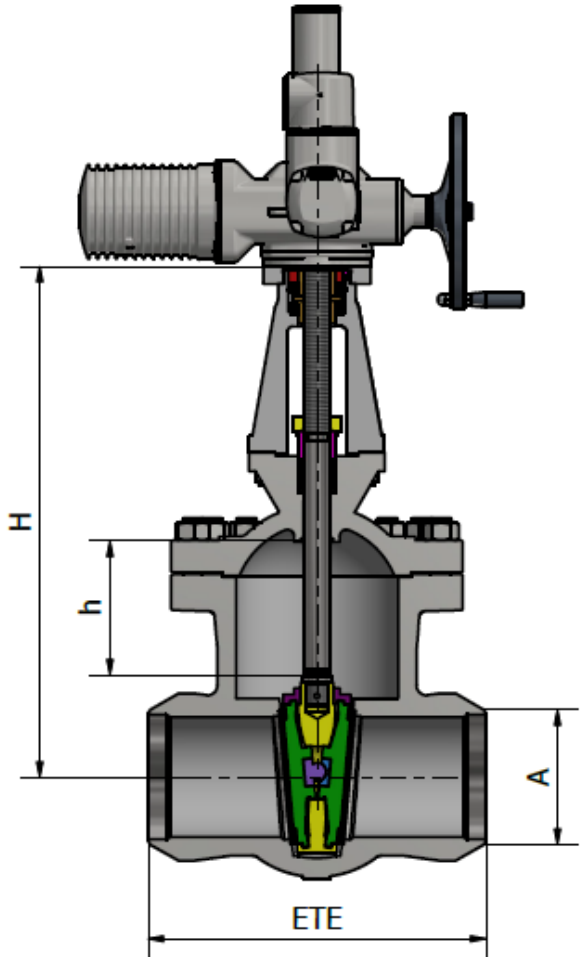
## 3. STANDARDS & DIMENSIONS

**Standards** **Table D.1.2**

| **GEN** | **PN 16 ÷ PN 160** |
|---|---|
| General design | EN 1984 |
| Wall thickness | EN 12516 |
| Pressure / temperature rating | EN 12516 |
| FTF according to | EN 558, Serie 14, Serie 15 and Serie 26 or Manufacturer standard |
| ETE according to | EN 12982, Serie 14, Serie 15 and Serie 26 or Manufacturer standard |
| Flanged Ends according to | EN 1092-1 |
| Welding Ends according to | EN 12627 |
| Testing according to | EN 12266 |




**GEN with flanged ends**




**GEN with welding ends (Dimensions A in the Table D.1.6)**

**Figure D.1.2 – Dimensions**

**GEN Dimensions** **Table D.1.3**

| Nominal Pressure | Diameter Nominal | Face-To-Face | End-To-End | Centre-to-Connection Flange | Stroke | Connection Flange ISO 5210 | Kvs | Weight (1) | |
|---|---|---|---|---|---|---|---|---|---|
| PN | DN | FTF | ETE | H | h | | m³/h | FTF | ETE |
| | | mm | | | | | | kg | |
| PN 16 (2) | **50** | 150 | 150 | 354 | 66 | F10-B1 | 375 | 25 | 19 |
| | **65** | 170 | 170 | 420 | 83 | F10-B1 | 545 | 30 | 25 |
| | **80** | 180 | 180 | 442 | 91 | F10-B1 | 825 | 40 | 36 |
| | **100** | 190 | 190 | 553 | 122 | F10-B1 | 1286 | 42 | 38 |
| | **125** | 200 | 200 | 607 | 140 | F10-B1 | 2000 | 76 | 70 |
| | **150** | 210 | 210 | 667 | 175 | F10-B1 | 2890 | 78 | 72 |
| | **200** | 230 | 230 | 791 | 220 | F10-C | 5143 | 126 | 108 |
| | **250** | 250 | 250 | 920 | 276 | F14-B1 | 8036 | 232 | 199 |
| | **300** | 270 | 270 | 1085 | 335 | F14-B1 | 11572 | 323 | 293 |
| | **350** | 290 | 290 | 1173 | 374 | F14-C | 15751 | 436 | 385 |
| | **400** | 310 | 310 | 1403 | 426 | F14-C | 20573 | 579 | 540 |
| | **500** | 350 | 350 | 1710 | 526 | F16-B1 | 32146 | 972 | 855 |
| | **600** | 390 | 390 | 2103 | 645 | F16-B1 | 46290 | 1326 | 1140 |
| PN 16 | **50** | 250 | 250 | 354 | 66 | F10-B1 | 375 | 28 | 22 |
| | **65** | 270 | 270 | 420 | 83 | F10-B1 | 545 | 32 | 27 |
| | **80** | 280 | 280 | 442 | 91 | F10-B1 | 825 | 36 | 32 |
| | **100** | 300 | 300 | 553 | 122 | F10-B1 | 1286 | 50 | 43 |
| | **125** | 325 | 325 | 607 | 140 | F10-B1 | 2000 | 83 | 77 |
| | **150** | 350 | 350 | 667 | 175 | F10-B1 | 2890 | 85 | 74 |
| | **200** | 400 | 400 | 791 | 220 | F10-C | 5143 | 143 | 125 |
| | **250** | 450 | 450 | 920 | 276 | F14-B1 | 8036 | 245 | 212 |
| | **300** | 500 | 500 | 1085 | 335 | F14-B1 | 11572 | 330 | 300 |
| | **350** | 550 | 550 | 1173 | 374 | F14-C | 15751 | 450 | 397 |
| | **400** | 600 | 600 | 1403 | 426 | F14-C | 20573 | 590 | 553 |
| | **450** | 650 | 650 | 1558 | 461 | F16-B1 | 26038 | 752 | 680 |
| | **500** | 700 | 700 | 1710 | 526 | F16-B1 | 32146 | 984 | 867 |
| | **600** | 800 | 800 | 2103 | 645 | F16-B1 | 46290 | 1767 | 1580 |
| | **650** | - | 850 | 2400 | 700 | F14-B3 | 54326 | - | 1860 |
| PN 25 | **50** | 250 | 250 | 384 | 82 | F10-B1 | 375 | 30 | 25 |
| | **65** | 270 | 270 | 420 | 84 | F10-B1 | 545 | 37 | 33 |
| | **80** | 280 | 280 | 462 | 96 | F10-B1 | 825 | 48 | 41 |
| | **100** | 300 | 300 | 524 | 111 | F10-B1 | 1286 | 68 | 57 |
| | **125** | 325 | 325 | 559 | 139 | F10-B1 | 2000 | 84 | 75 |
| | **150** | 350 | 350 | 749 | 183 | F10-C | 2890 | 130 | 113 |
| | **200** | 400 | 400 | 825 | 232 | F14-B1 | 5143 | 194 | 164 |
| | **250** | 450 | 450 | 1012 | 263 | F14-B1 | 8036 | 300 | 264 |
| | **300** | 500 | 500 | 1197 | 313 | F14-B1 | 11572 | 445 | 381 |
| | **350** | 550 | 550 | 1333 | 373 | F14-C | 15751 | 580 | 530 |
| | **400** | 600 | 600 | 1403 | 422 | F14-C | 20573 | 670 | 568 |
| | **450** | 650 | 650 | 1558 | 461 | F16-B1 | 26038 | 813 | 680 |
| | **500** | 700 | 700 | 1710 | 526 | F16-B1 | 32146 | 1030 | 867 |
| | **600** | 800 | 800 | 2066 | 649 | F14-B3 | 46290 | 1830 | 1580 |
| | **650** | - | 850 | 2400 | 700 | F14-B3 | 54326 | - | 1860 |

*(1) Weights without actuators*
*(2) FTF dimensions for GEN according to EN 558, Serie 14*
*- Depending on the executions weights are subject to modification*

**GEN Dimensions** **Table D.1.3**

| Nominal Pressure | Diameter Nominal | Face-To-Face | End-To-End | Centre-to-Connection Flange | Stroke | Connection Flange ISO 5210 | Kvs | Weight (1) | |
|---|---|---|---|---|---|---|---|---|---|
| PN | DN | FTF | ETE | H | h | | m³/h | FTF | ETE |
| | | mm | | | | | | kg | |
| PN 40 | **50** | 250 | 250 | 384 | 76 | F10-B1 | 375 | 34 | 28 |
| | **65** | 290 | 290 | 431 | 86 | F10-B1 | 545 | 53 | 46 |
| | **80** | 310 | 310 | 464 | 91 | F10-B1 | 825 | 51 | 44 |
| | **100** | 350 | 350 | 541 | 111 | F10-B1 | 1286 | 77 | 66 |
| | **125** | 400 | 400 | 625 | 135 | F10-C | 2000 | 115 | 103 |
| | **150** | 450 | 450 | 725 | 165 | F10-C | 2890 | 167 | 152 |
| | **200** | 550 | 550 | 831 | 217 | F14-B1 | 5143 | 267 | 235 |
| | **250** | 650 | 650 | 1067 | 305 | F14-B1 | 8036 | 410 | 358 |
| | **300** | 750 | 750 | 1236 | 334 | F14-B1 | 11572 | 555 | 490 |
| | **350** | 850 | 850 | 1289 | 372 | F16-B1 | 15751 | 860 | 786 |
| | **400** | 950 | 950 | 1395 | 408 | F16-B1 | 20573 | 1165 | 1095 |
| | **450** | 1050 | 1050 | 1583 | 467 | F14-B3 | 26038 | 1590 | 1210 |
| | **500** | 1150 | 1150 | 1655 | 517 | F14-B3 | 32146 | 1820 | 1665 |
| | **600** | 1350 | 1350 | 2051 | 626 | F14-B3 | 46290 | 2460 | 2251 |
| PN 63 | **50** | 250 | 250 | 384 | 75 | F10-B1 | 375 | 42 | 33 |
| | **65** | 290 | 290 | 431 | 86 | F10-B1 | 545 | 53 | 42 |
| | **80** | 310 | 310 | 467 | 92 | F10-B1 | 825 | 68 | 55 |
| | **100** | 350 | 350 | 507 | 111 | F10-B1 | 1286 | 83 | 67 |
| | **125** | 400 | 400 | 570 | 144 | F14-B1 | 2000 | 153 | 125 |
| | **150** | 450 | 450 | 692 | 164 | F14-B1 | 2890 | 190 | 160 |
| | **200** | 550 | 550 | 796 | 227 | F14-B1 | 5143 | 319 | 255 |
| | **250** | 650 | 650 | 1041 | 313 | F16-B1 | 8036 | 643 | 563 |
| | **300** | 750 | 750 | 1242 | 332 | F16-B1 | 11572 | 714 | 620 |
| | **350** | 850 | 850 | 1297 | 363 | F16-B1 | 15751 | 910 | 830 |
| | **400** | 950 | 950 | 1353 | 408 | F14-B3 | 20573 | 1234 | 1100 |
| | **450** | - | 1050 | 1583 | 467 | F14-B3 | 26038 | - | 1252 |
| | **500** | 1150 | 1150 | 1652 | 488 | F14-B3 | 32146 | 2095 | 1912 |
| | **600** | 1350 | 1350 | 2072 | 618 | F16-B3 | 46920 | 4370 | 4020 |

*(1) Weights without actuators*
*- Depending on the executions weights are subject to modification*

**GEN Dimensions** **Table D.1.3**

| Nominal Pressure | Diameter Nominal | Face-To-Face | End-To-End | Centre-to-Connection Flange | Stroke | Connection Flange ISO 5210 | Kvs | Weight (1) | |
|---|---|---|---|---|---|---|---|---|---|
| PN | DN | FTF | ETE | H | h | | m³/h | FTF | ETE |
| | | mm | | | | | | kg | |
| PN 100 | **50** | 250 | 250 | 384 | 74 | F10-B1 | 375 | 44 | 38 |
| | **65** | 290 | 290 | 431 | 85 | F10-B1 | 545 | 55 | 43 |
| | **80** | 310 | 310 | 467 | 92 | F10-B1 | 825 | 70 | 55 |
| | **100** | 350 | 350 | 539 | 110 | F10-B1 | 1286 | 110 | 92 |
| | **125** | 400 | 400 | 570 | 135 | F14-B1 | 2000 | 153 | 134 |
| | **150** | 450 | 450 | 691 | 164 | F14-B1 | 2890 | 239 | 195 |
| | **200** | 550 | 550 | 831 | 227 | F14-B1 | 5143 | 419 | 350 |
| | **250** | 650 | 650 | 1039 | 313 | F16-B1 | 8036 | 675 | 573 |
| | **300** | 750 | 750 | 1241 | 331 | F14-B3 | 11572 | 940 | 812 |
| | **350** | 850 | 850 | 1286 | 369 | F14-B3 | 15751 | 1320 | 1162 |
| | **400** | 950 | 950 | 1452 | 430 | F14-B3 | 20573 | 1725 | 1538 |
| | **450** | - | 1050 | 1609 | 478 | F16-B3 | 26038 | - | 1970 |
| | **500** | 1150 | 1150 | 1778 | 482 | F16-B3 | 32146 | 2800 | 2522 |
| | **600** | 1350 | 1350 | 2072 | 618 | F25-B3 | 46290 | 4450 | 4020 |
| PN 160 | **50** | 368 | 368 | 458 | 69 | F10-B1 | 350 | 65 | 57 |
| | **65** | 419 | 419 | 511 | 72 | F10-B1 | 495 | 110 | 97 |
| | **80** | 390 | 390 | 508 | 88 | F10-C | 782 | 104 | 84 |
| | **100** | 450 | 450 | 545 | 115 | F14-B1 | 1286 | 156 | 131 |
| | **125** | 525 | 525 | 667 | 152 | F14-B1 | 2000 | 261 | 220 |
| | **150** | 600 | 600 | 733 | 172 | F14-B1 | 2890 | 310 | 267 |
| | **200** | 750 | 750 | 831 | 212 | F16-B1 | 4940 | 642 | 496 |
| | **250** | 838 | 900 | 1046 | 270 | F14-B3 | 8036 | 865 | 772 |
| | **300** | 965 | 1050 | 1182 | 318 | F14-B3 | 10964 | 1405 | 1100 |
| | **400** | - | 1130 | 1505 | 426 | F16-B3 | 20573 | - | 2110 |

*(1) Weights without actuators*
*- Depending on the executions weights are subject to modification*

## 4. FLANGED ENDS DESIGN & DIMENSIONS

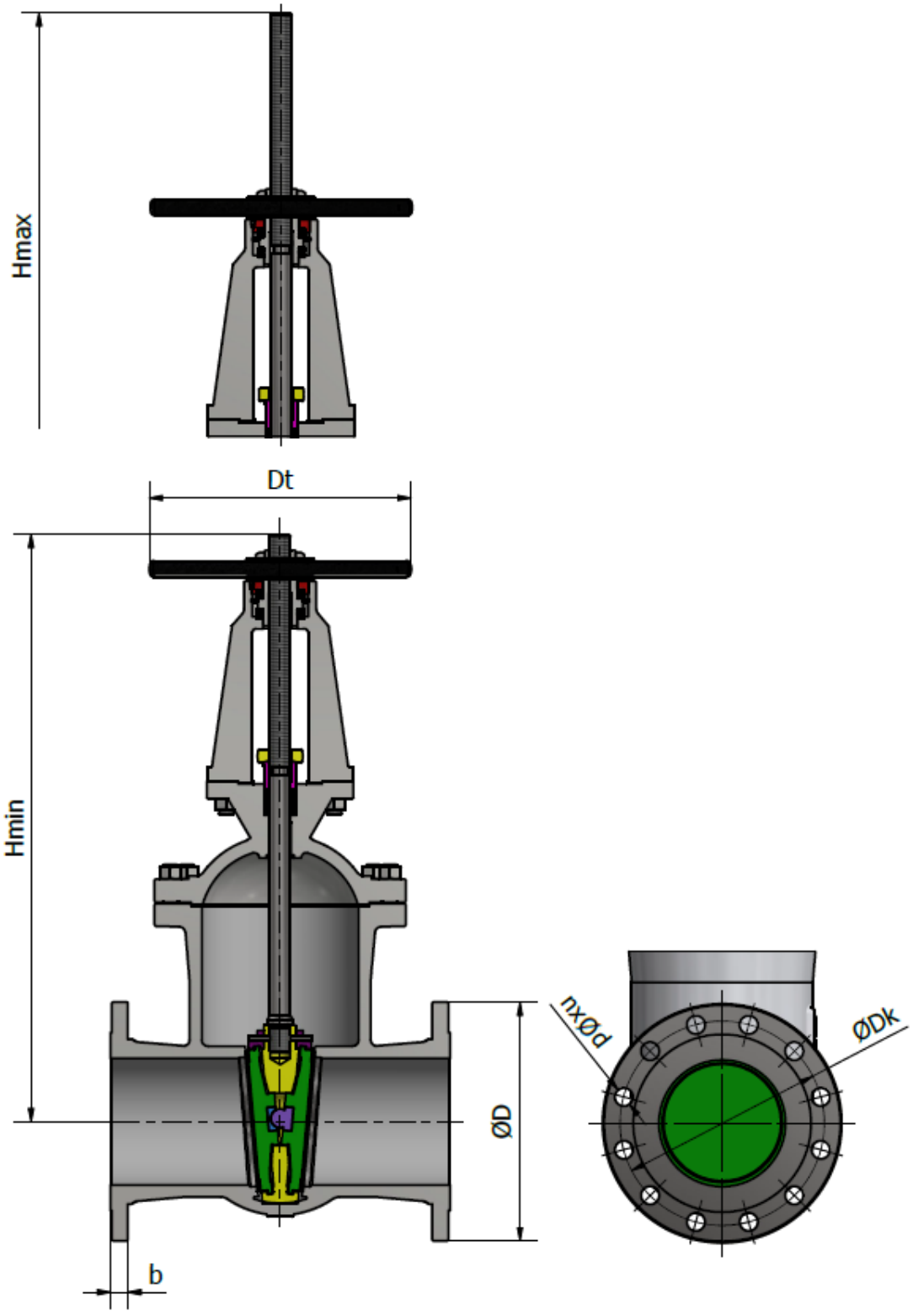



**Figure D.1.3 – GEN with flanged ends - dimensions**

**Flanged ends dimensions** **Table D.1.4**

| DN | | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 650 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PN 16** | | | | | | | | | | | | | | | | |
| | **øD** | 165 | 185 | 200 | 220 | 250 | 285 | 340 | 405 | 460 | 520 | 580 | 640 | 715 | 840 | - |
| | **øDk** | 125 | 145 | 160 | 180 | 210 | 240 | 295 | 355 | 410 | 470 | 525 | 585 | 650 | 770 | - |
| | **nxød** | 4x18 | 8[(1)]x18 | 8x18 | 8x18 | 8x18 | 8x22 | 12x22 | 12x26 | 12x26 | 16x26 | 16x30 | 20x30 | 20x33 | 20x36 | - |
| **mm** | **b** | 18 | 18 | 20 | 20 | 22 | 22 | 24 | 26 | 28 | 30 | 32 | 40 | 44 | 54 | - |
| | **Hmax** | 425 | 493 | 537 | 677 | 771 | 859 | 1038 | 1267 | 1485 | 1593 | 1907 | 2103 | 2323 | 2893 | 3035 |
| | **Hmin** | 359 | 410 | 446 | 555 | 631 | 684 | 818 | 991 | 1150 | 1219 | 1481 | 1642 | 1797 | 2248 | 2335 |
| | **Dt** | 250 | 250 | 250 | 250 | 300 | 300 | 400 | 500 | 500 | 500 | 630 | 730 | 730 | GB[(2)] | GB[(2)] |
| **PN 25** | | | | | | | | | | | | | | | | |
| | **øD** | 165 | 185 | 200 | 235 | 270 | 300 | 360 | 425 | 485 | 555 | 420 | 670 | 730 | 845 | - |
| | **øDk** | 125 | 145 | 160 | 190 | 220 | 250 | 310 | 370 | 430 | 490 | 550 | 600 | 660 | 770 | - |
| | **nxød** | 4x18 | 8x18 | 8x18 | 8x22 | 8x26 | 8x26 | 12x26 | 12x30 | 16x30 | 16x33 | 16x36 | 20x36 | 20x36 | 20x39 | - |
| **mm** | **b** | 20 | 22 | 24 | 24 | 26 | 28 | 30 | 32 | 34 | 38 | 40 | 46 | 48 | 58 | - |
| | **Hmax** | 466 | 515 | 562 | 652 | 760 | 950 | 1086 | 1323 | 1565 | 1709 | 1903 | 2128 | 2323 | 2878 | 3035 |
| | **Hmin** | 384 | 431 | 466 | 541 | 621 | 767 | 903 | 1060 | 1252 | 1336 | 1481 | 1667 | 1797 | 2229 | 2335 |
| | **Dt** | 250 | 250 | 250 | 250 | 300 | 400 | 400 | 500 | 500 | 500 | 630 | 730 | 730 | GB[(2)] | GB[(2)] |
| **PN 40** | | | | | | | | | | | | | | | | |
| | **øD** | 165 | 185 | 200 | 235 | 270 | 300 | 375 | 450 | 515 | 580 | 660 | 685 | 755 | 890 | - |
| | **øDk** | 125 | 145 | 160 | 190 | 220 | 250 | 320 | 385 | 450 | 510 | 585 | 610 | 670 | 795 | - |
| | **nxød** | 4x18 | 8x18 | 8x18 | 8x22 | 8x26 | 8x26 | 12x30 | 12x33 | 16x33 | 16x36 | 16x39 | 20x39 | 20x42 | 20x48 | - |
| **mm** | **b** | 20 | 22 | 24 | 24 | 26 | 28 | 34 | 38 | 42 | 46 | 50 | 57 | 57 | 72 | - |
| | **Hmax** | 471 | 522 | 556 | 662 | 776 | 916 | 1122 | 1431 | 1626 | 1744 | 1889 | 2150 | 2281 | 2835 | - |
| | **Hmin** | 395 | 436 | 465 | 551 | 641 | 751 | 905 | 1126 | 1292 | 1372 | 1481 | 1683 | 1764 | 2209 | - |
| | **Dt** | 250 | 250 | 250 | 250 | 400 | 400 | 500 | 500 | 500 | 630 | 730 | GB[(2)] | GB[(2)] | GB[(2)] | - |
| **PN 63** | | | | | | | | | | | | | | | | |
| | **øD** | 180 | 205 | 215 | 250 | 295 | 345 | 415 | 470 | 530 | 600 | 670 | - | 800 | 930 | - |
| | **øDk** | 135 | 160 | 170 | 200 | 240 | 280 | 345 | 400 | 460 | 525 | 585 | - | 705 | 820 | - |
| | **nxød** | 4x22 | 8x22 | 8x22 | 8x26 | 8x30 | 8x33 | 12x36 | 12x36 | 16x36 | 16x39 | 16x42 | - | 20x48 | 20x56 | - |
| **mm** | **b** | 26 | 26 | 28 | 30 | 34 | 36 | 42 | 46 | 52 | 56 | 60 | - | 68 | 72 | - |
| | **Hmax** | 459 | 522 | 557 | 531 | 774 | 890 | 1102 | 1459 | 1639 | 1738 | 1889 | 2150 | 2276 | 2871 | - |
| | **Hmin** | 384 | 436 | 465 | 520 | 630 | 726 | 875 | 1146 | 1307 | 1375 | 1481 | 1683 | 1788 | 2253 | - |
| | **Dt** | 250 | 250 | 250 | 300 | 400 | 500 | 500 | 630 | 630 | 630 | GB(2) | GB[(2)] | GB[(2)] | GB[(2)] | - |
| **PN 100** | | | | | | | | | | | | | | | | |
| | **øD** | 195 | 220 | 230 | 265 | 315 | 355 | 430 | 505 | 585 | 655 | 715 | - | 870 | 990 | - |
| | **øDk** | 145 | 170 | 180 | 210 | 250 | 290 | 360 | 430 | 500 | 560 | 620 | - | 760 | 875 | - |
| | **nxød** | 4x26 | 8x26 | 8x26 | 8x30 | 8x33 | 12x33 | 12x36 | 12x39 | 16x42 | 16x48 | 16x48 | - | 20x56 | 20x62 | - |
| **mm** | **b** | 30 | 34 | 36 | 40 | 40 | 44 | 52 | 60 | 68 | 74 | 78 | - | | 90 | - |
| | **Hmax** | 468 | 521 | 567 | 661 | 776 | 928 | 1138 | 1459 | 1637 | 1784 | 2050 | 2292 | 2735 | 2871 | - |
| | **Hmin** | 394 | 436 | 475 | 551 | 641 | 764 | 911 | 1146 | 1306 | 1415 | 1620 | 1814 | 2253 | 2253 | - |
| | **Dt** | 250 | 250 | 250 | 300 | 400 | 500 | 500 | 730 | 730 | GB[(2)] | GB[(2)] | GB[(2)] | GB[(2)] | GB[(2)] | - |
| **PN 160** | | | | | | | | | | | | | | | | |
| | **øD** | 195 | 220 | 230 | 265 | 315 | 355 | 430 | 515 | 585 | - | - | - | - | - | - |
| | **øDk** | 145 | 170 | 180 | 210 | 250 | 290 | 360 | 430 | 500 | - | - | - | - | - | - |
| | **nxød** | 4x26 | 8x26 | 8x26 | 8x30 | 8x33 | 12x33 | 12x36 | 12x42 | 16x42 | - | - | - | - | - | - |
| **mm** | **b** | 30 | 34 | 36 | 40 | 44 | 50 | 60 | 68 | 78 | - | - | - | - | - | - |
| | **Hmax** | 535 | 645 | 622 | 736 | 925 | 966 | 1168 | 1487 | 1626 | - | 2117 | - | - | - | - |
| | **Hmin** | 466 | 573 | 534 | 621 | 773 | 794 | 956 | 1217 | 1308 | - | 1691 | - | - | - | - |
| | **Dt** | 300 | 400 | 400 | 400 | 500 | 500 | 630 | GB[(2)] | GB[(2)] | - | GB[(2)] | - | - | - | - |

*(1) 8 holes is preferred however 4 holes may be supplied upon special request by the Customer.*
*(2) with Gearbox.*

# 5. BUTT WELDING ENDS DESIGN

**Symbols** **Table D.1.5**

| | |
|---|---|
| A | - outside diameter of the Valve butt welding end in mm |
| T | - wall thickness of the pipe in mm |

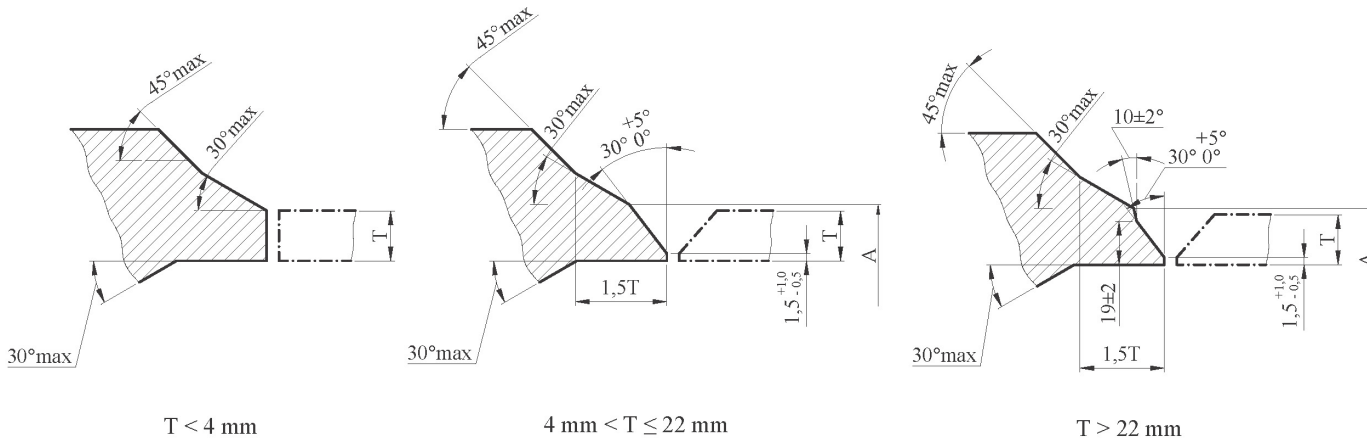



**Figure D.1.4 - Form of the butt welding ends EN 12627**

**Dimensions and tolerance of outside diameter** **Table D.1.6**

| DN | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 650 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A (mm) | 62 | 78 | 91 | 117 | 144 | 172 | 223 | 278 | 329 | 362 | 413 | 464 | 516 | 619 | 670 |
| Tolerance (mm) | +2,5 -2 | | +2,5 -2,5 | | +4,0 -2,5 | | | | | | | | | | |

# 6. WEDGE DESIGNS

## 6.1 Flexible wedge

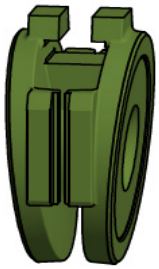


Figure D.1.5 - Flexible wedge

The flexible wedge can bend and better conform to the valve seats, ensuring reliable sealing even under temperature and pressure fluctuations.

This design reduces the risk of sticking and wear, extending the valve's service life and making maintenance easier.

## 6.2 Split wedge

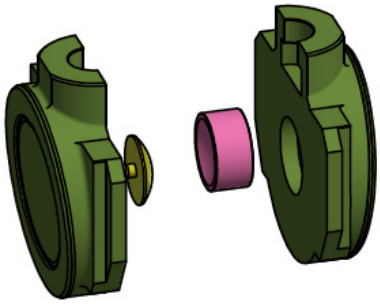


Figure D.1.6 - Split wedge

The split wedge allows each half of the gate to adjust independently to the valve seats, improving sealing even when the surfaces are misaligned or worn.

It also reduces friction and stress during valve operation, extending its service life and increasing reliability.

## 6.3 Solid wedge

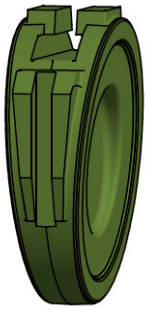


Figure D.1.7 - Solid wedge

This type of wedge is suitable for small DN.

This type of wedge is not suitable for high pressure and temperature.

If the gate valve is closed while hot, the wedge can become stuck.

## 6.4 Parallel Slide Wedge

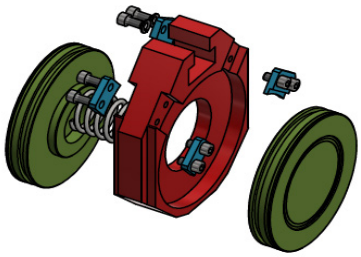


Figure D.1.8 - Parallel slide wedge

This type of valve is designed with two parallel discs, each sliding over its own seat.

It relies on upstream pressure to act on the downstream disc, ensuring a good seal.

There is no wedging or additional load on the seats, which allows for a smaller actuator torque.

However, a drawback is the wear on the seat caused by the sliding disc during operation.

## 7. OPTIONAL EXECUTIONS

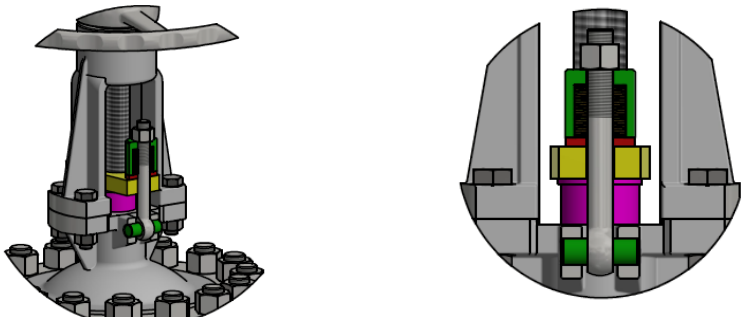


Figure D.1.9 –
Spring loaded stuffing box

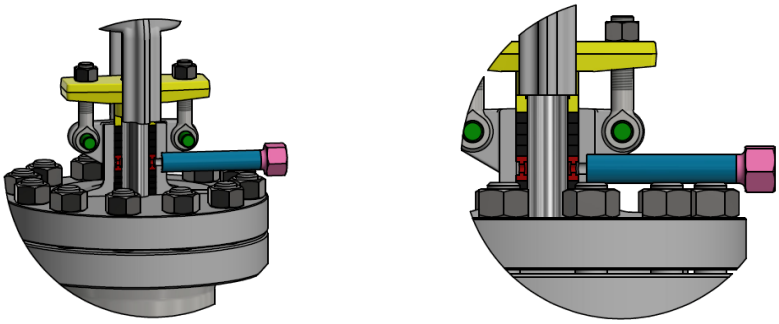


Figure D.1.10 - Lantern ring

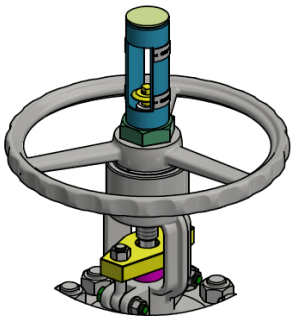


Figure D.1.11 – Position indicator

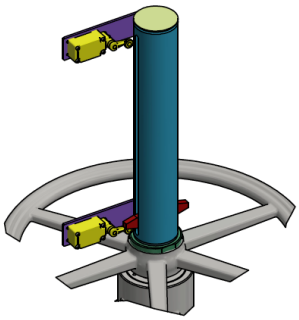


Figure D.1.12 – Limit switches

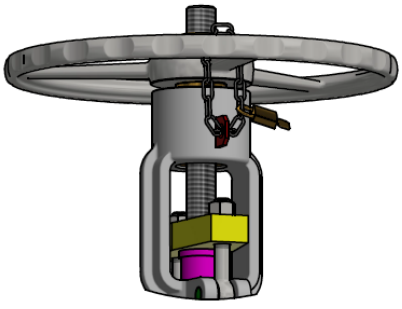


Figure D.1.13 - Locking devices

# 8. OVER PRESSURIZATION, PRESSURE LOCKING & THERMAL BINDING PROCESS CONDITIONS

In case when GEN in the closed position the temperature of the fluid (mainly water) increase in the chamber above the wedge impermissibly high pressure can occur.

To prevent failure or damage of pressure-relating parts gate valves should be equipped with some of the presented constructive solutions:

## 8.1 Solutions for Over-Pressurization & Pressure Locking

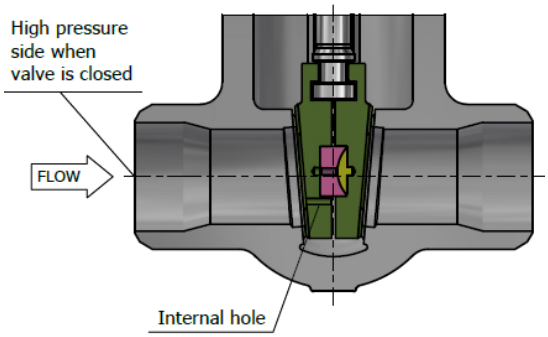



**Figure D.1.14 - With a hole in the wedge**

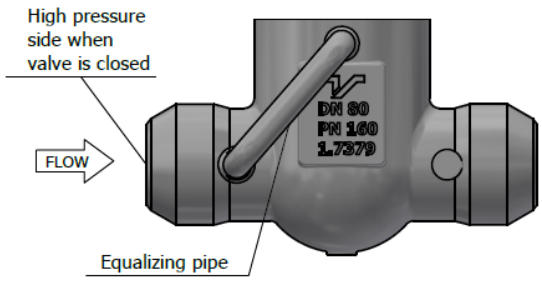



**Figure D.1.15 - With equalizing pipe**

- **One side wedge hole** connecting the body cavity to the high-pressure side of the valve.

- **Equalizing pipe** connecting the body cavity to the high-pressure side of the valve.


**Figure D.1.16 - With closed nozzle for safety valve**

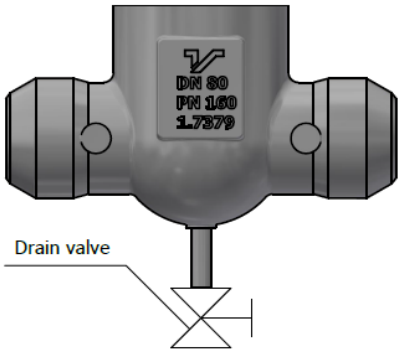



**Figure D.1.17 - With drain valve**

- **With closed nozzle for safety valve**
  Safety valve connecting the body cavity to the atmosphere.
  The discharge of this valve must be made to a safe location (safety valve is not scope of delivery).

- **With a drain valve** connecting the body cavity to the atmosphere.
  The discharge of this valve must be made to a safe location.

## 8.2 Solutions for Thermal Biding

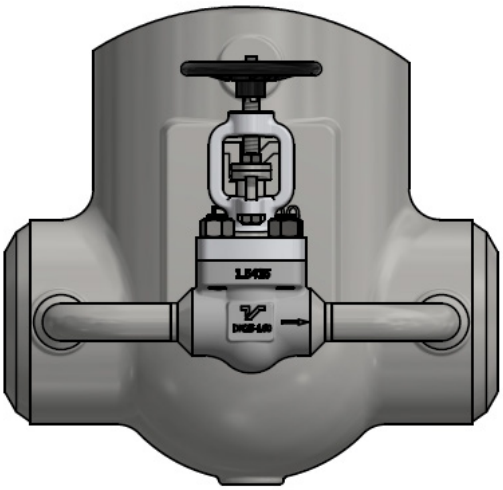


Figure D.1.18 – With By-pass valve

- By-pass valve in addition to equalizing pressure differential across the wedge, will allow warm up of both sides of the wedge.
- After reaching the operating parameters By-pass valve on opened GEN, should be closed.
- After closing a GEN, back up the stem (1/8 turn). This will give room for dimensional changes due to temperature variation. This is only applicable for manually operated valves or on electric actuator- operated valves (by handwheel).
- Adequate supports can reduce the thermal binding problem by reducing pipe stresses
- Parallel slide GEN is not subjected to thermal binding. If parallel slide GEN is selected as a possible solution for thermal binding, it is very important to know that such a valve: subject to pressure lock, higher seat wear and poor sealing under low pressure.

## 8.3 Combined Effects of Over-Pressurization, Pressure Locking & Thermal Binding

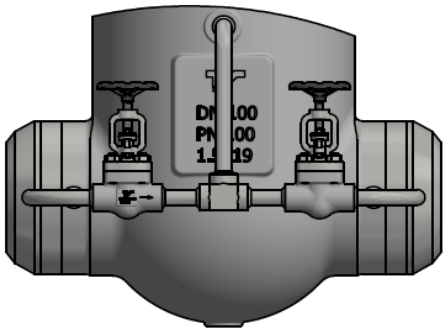


Figure D.1.19 – With double by-pass & equalizing pipe

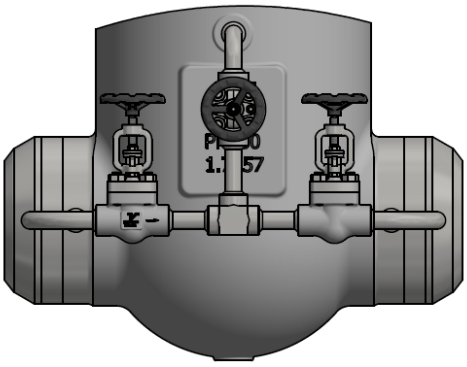


Figure D.1.20 – With double by-pass & equalizing pipe with a valve

- After reaching the operating parameters By-pass valves on the pressurized side of closed GEN should be in open position. When GEN is opened By-pass valves should be closed.

## 8.4 By-pass Valve Size Selection

When by-pass valves are required, they shell be in accordance with Table D.1.7

Table D.1.7

| Valve nominal size | By-pass nominal size |
|---|---|
| DN | DN |
| 50 ≤ 100 | 15 |
| 125 ≤ 200 | 20 |
| 200 ≤ 600 | 25 |

# 9. PRESSURE & TEMPERATURE RATINGS

**Pressure (bar)/Temperature (°C) ratings acc. to EN 12516-1** **Table D.1.8**

| Materials | PN | -10 | 20 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 420 | 450 | 475 | 480 | 500 | 510 | 525 | 530 | 550 | 575 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.0619 | 16 | 16,0 | 16,0 | 16,0 | 15,0 | 14,2 | 13,4 | 12,3 | 11,1 | 10,4 | 9,6 | 8,8 | 5,9 | | | | | | | | | |
| | 25 | 25,0 | 25,0 | 25,0 | 23,4 | 22,2 | 21,0 | 19,2 | 17,4 | 16,2 | 15,0 | 13,7 | 9,2 | | | | | | | | | |
| | 40 | 40,0 | 40,0 | 40,0 | 37,4 | 35,5 | 33,6 | 30,7 | 27,8 | 25,9 | 24,0 | 22,2 | 14,7 | | | | | | | | | |
| | 63 | 63,0 | 63,0 | 63,0 | 59,0 | 55,9 | 52,9 | 48,4 | 43,8 | 40,8 | 37,8 | 34,6 | 23,2 | | | | | | | | | |
| | 100 | 100,0 | 100,0 | 100,0 | 93,6 | 88,8 | 84,0 | 76,8 | 69,6 | 64,8 | 60,0 | 54,9 | 36,8 | | | | | | | | | |
| | 160 | 160,0 | 160,0 | 160,0 | 149,8 | 142,1 | 134,5 | 122,9 | 111,4 | 103,7 | 96,0 | 87,9 | 58,9 | | | | | | | | | |
| 1.5419 | 16 | 16,0 | 16,0 | 16,0 | 16,0 | 15,7 | 14,6 | 13,6 | 12,7 | 11,9 | 11,5 | 11,4 | 10,7 | 10,5 | 10,4 | 7,3 | 6,3 | 4,5 | 4,0 | | | |
| | 25 | 25,0 | 25,0 | 25,0 | 25,0 | 24,5 | 22,8 | 21,3 | 19,8 | 18,6 | 18,0 | 17,7 | 16,7 | 16,4 | 16,3 | 11,3 | 9,9 | 7,1 | 6,3 | | | |
| | 40 | 40,0 | 40,0 | 40,0 | 40,0 | 39,1 | 36,5 | 34,1 | 31,7 | 29,8 | 28,8 | 28,4 | 26,7 | 26,2 | 26,1 | 18,1 | 15,8 | 11,3 | 10,0 | | | |
| | 63 | 63,0 | 63,0 | 63,0 | 63,0 | 61,6 | 57,5 | 53,7 | 49,9 | 46,9 | 45,4 | 44,7 | 42,0 | 41,3 | 41,1 | 28,6 | 24,9 | 17,8 | 15,8 | | | |
| | 100 | 100,0 | 100,0 | 100,0 | 100,0 | 97,8 | 91,2 | 85,2 | 79,2 | 74,4 | 72,0 | 71,0 | 66,7 | 65,5 | 65,3 | 45,3 | 39,5 | 28,3 | 25,1 | | | |
| | 160 | 160,0 | 160,0 | 160,0 | 160,0 | 156,6 | 146,0 | 136,4 | 126,8 | 119,1 | 115,3 | 113,5 | 106,8 | 104,9 | 104,5 | 72,6 | 63,2 | 45,2 | 40,1 | | | |
| 1.7357 | 16 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 14,9 | 13,7 | 13,7 | 12,6 | 11,8 | 11,6 | 10,0 | 8,9 | 7,3 | 6,7 | 4,2 | | |
| | 25 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 23,3 | 21,3 | 21,3 | 19,7 | 18,5 | 18,1 | 15,6 | 13,9 | 11,5 | 10,5 | 6,5 | | |
| | 40 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 37,3 | 34,1 | 34,1 | 31,5 | 29,5 | 28,9 | 25,0 | 22,3 | 18,3 | 16,8 | 10,5 | | |
| | 63 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 58,7 | 53,8 | 53,8 | 49,7 | 46,5 | 45,5 | 39,3 | 35,1 | 28,9 | 26,4 | 16,5 | | |
| | 100 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 93,1 | 85,3 | 85,4 | 78,9 | 73,9 | 72,2 | 62,4 | 55,8 | 45,9 | 41,9 | 26,1 | | |
| | 160 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 149,1 | 136,6 | 136,6 | 126,2 | 118,2 | 115,6 | 99,9 | 89,3 | 73,4 | 67,1 | 41,8 | | |
| 1.7379 | 16 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 15,0 | 13,7 | 13,2 | 12,6 | 11,8 | 11,6 | 10,5 | 10,2 | 8,6 | 8,0 | 5,6 | 4,4 | 2,4 |
| | 25 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 23,5 | 21,3 | 20,65 | 19,7 | 18,5 | 18,1 | 16,5 | 15,9 | 13,5 | 12,5 | 8,8 | 6,8 | 3,7 |
| | 40 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 37,5 | 34,1 | 33,0 | 31,5 | 29,5 | 28,9 | 26,3 | 25,4 | 21,5 | 20,1 | 14,1 | 10,9 | 6,0 |
| | 63 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 59,1 | 53,8 | 51,9 | 49,7 | 46,5 | 45,5 | 41,5 | 40,0 | 33,9 | 31,6 | 22,2 | 17,1 | 9,4 |
| | 100 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 93,8 | 85,3 | 82,4 | 78,9 | 73,9 | 72,2 | 65,8 | 63,5 | 53,9 | 50,1 | 35,2 | 27,2 | 14,9 |
| | 160 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 150,2 | 136,6 | 131,8 | 126,2 | 118,2 | 115,6 | 105,3 | 101,7 | 86,2 | 80,2 | 56,3 | 43,5 | 23,9 |
| 1.4955 | 16 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 16,0 | 15,0 | 13,7 | 13,2 | 12,6 | 11,8 | 11,6 | 10,5 | 10,2 | 9,6 | 9,6 | 9,3 | 8,9 | 8,0 |
| | 25 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 23,5 | 2,13 | 20,6 | 19,7 | 18,5 | 18,1 | 16,5 | 15,9 | 15,0 | 14,9 | 14,6 | 14,0 | 12,5 |
| | 40 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 40,0 | 37,5 | 34,1 | 32,9 | 31,5 | 29,5 | 28,9 | 26,3 | 25,4 | 24,1 | 23,9 | 23,3 | 22,3 | 20,0 |
| | 63 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 63,0 | 59,1 | 53,8 | 51,9 | 49,7 | 46,5 | 45,5 | 41,5 | 40,0 | 37,9 | 37,7 | 36,7 | 35,2 | 31,5 |
| | 100 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 93,8 | 85,3 | 82,4 | 78,9 | 73,9 | 72,2 | 65,8 | 63,5 | 60,2 | 59,8 | 58,2 | 55,9 | 50,0 |
| | 160 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 160,0 | 150,2 | 136,6 | 131,8 | 126,2 | 118,2 | 115,6 | 105,3 | 101,7 | 96,3 | 95,7 | 93,2 | 89,4 | 80,0 |
| 1.4308 | 16 | 16,0 | 16,0 | 16,0 | 14,8 | 13,0 | 11,2 | 10,5 | 9,9 | 9,1 | 8,7 | 8,5 | 8,2 | 8,1 | 8,0 | 7,9 | 7,8 | 7,3 | 7,3 | 7,1 | 6,4 | 5,0 |
| | 25 | 25,0 | 25,0 | 25,0 | 23,1 | 20,3 | 17,5 | 16,5 | 15,4 | 14,3 | 13,6 | 13,3 | 12,9 | 12,6 | 12,5 | 12,3 | 12,2 | 11,4 | 11,3 | 11,1 | 10,0 | 7,9 |
| | 40 | 40,0 | 40,0 | 40,0 | 37,0 | 32,5 | 28,0 | 26,3 | 24,6 | 22,8 | 21,7 | 21,3 | 20,6 | 20,2 | 20,1 | 19,7 | 19,5 | 18,2 | 18,1 | 17,7 | 16,0 | 12,6 |
| | 63 | 63,0 | 63,0 | 63,0 | 58,2 | 51,2 | 44,1 | 41,5 | 38,8 | 36,0 | 34,2 | 33,5 | 32,5 | 31,8 | 31,6 | 31,0 | 30,7 | 28,7 | 28,6 | 27,9 | 25,2 | 19,8 |
| | 100 | 100,0 | 100,0 | 100,0 | 92,4 | 81,2 | 70,0 | 65,8 | 61,6 | 57,1 | 54,3 | 53,2 | 51,5 | 50,4 | 50,2 | 49,3 | 48,7 | 45,6 | 45,4 | 44,3 | 40,0 | 31,5 |
| | 160 | 160,0 | 160,0 | 160,0 | 147,9 | 130,0 | 112,1 | 105,3 | 98,6 | 91,4 | 87,0 | 85,2 | 82,5 | 80,7 | 80,3 | 78,9 | 78,0 | 73,0 | 72,6 | 70,9 | 64,0 | 50,4 |
| 1.4408 | 16 | 16,0 | 16,0 | 16,0 | 15,2 | 13,7 | 12,1 | 11,2 | 10,3 | 9,9 | 9,4 | 8,3 | 9,1 | 9,0 | 8,9 | 8,9 | 8,8 | 8,4 | 9,2 | 8,3 | 7,0 | 5,8 |
| | 25 | 25,0 | 25,0 | 25,0 | 23,8 | 21,4 | 18,9 | 17,5 | 16,1 | 15,4 | 14,7 | 13,0 | 14,1 | 14,0 | 14,0 | 13,9 | 13,8 | 13,1 | 14,4 | 12,9 | 10,9 | 9,1 |
| | 40 | 40,0 | 40,0 | 40,0 | 38,1 | 34,2 | 30,2 | 28,0 | 25,8 | 24,6 | 23,5 | 20,9 | 22,6 | 22,4 | 22,4 | 22,2 | 22,1 | 20,9 | 23,1 | 20,7 | 17,5 | 14,5 |
| | 63 | 63,0 | 63,0 | 63,0 | 60,0 | 53,8 | 47,6 | 44,1 | 40,6 | 38,8 | 37,0 | 32,9 | 35,6 | 35,3 | 35,2 | 34,9 | 34,8 | 32,9 | 36,3 | 32,6 | 27,6 | 22,8 |
| | 100 | 100,0 | 100,0 | 100,0 | 95,2 | 85,4 | 75,6 | 70,0 | 64,4 | 61,6 | 58,8 | 52,2 | 56,6 | 56,0 | 55,9 | 55,4 | 55,2 | 52,3 | 57,7 | 51,7 | 43,7 | 36,3 |
| | 160 | 160,0 | 160,0 | 160,0 | 152,4 | 136,7 | 121,0 | 112,1 | 103,1 | 98,6 | 94,1 | 83,5 | 90,5 | 89,6 | 89,5 | 88,7 | 88,4 | 83,7 | 92,3 | 82,8 | 70,0 | 58,1 |

*Note: Presented values belong to Standard Rating. For Special class contact Termovent SC.*

# 10. MARKING & LABELING

Gate valve shall be marked in accordance with general design specification EN 1984 and the requirements of standard EN 19.

## 10.1 Marking

**General marking of the valve** **Table D.1.9**

| Item[a] | Subject **Class designed valves** | | Marking |
|---|---|---|---|
| 1 | Product identification | Type | GEN |
| | | Serial number | xxxx.xx.xx/xx |
| 2 | Nominal size | | DN xxx |
| 3 | PN designation | | PN xxx |
| 4 | Body Material | | xxx |
| 5 | Cast (heat) identification | | xxx |
| 6 | Allowable flow direction arrow | | → |
| 7 | Manufacturer's name and registered trade details | | Termovent SC<br>Serbia |
| 8 | Ring joint number | | - |
| 9 | Maximum allowable temperature, *TS*max | | xx °C or xx C |
| | Minimum allowable temperature, *TS*min | | xx °C or xx C |
| 10 | Maximum allowable pressure PS | | xx bar |
| 11 | Trim identification | | xxx |
| 12 | Month / year of manufacturing | | mm/yy |

[a] Other (additional) markings may be requested by the user or recommended by the manufacturer.

### 10.1.1 Additional Marking

Equipment that meets specific requirements for safety and operation in potentially explosive atmospheres should be marked with an additional mark as follows:

CE

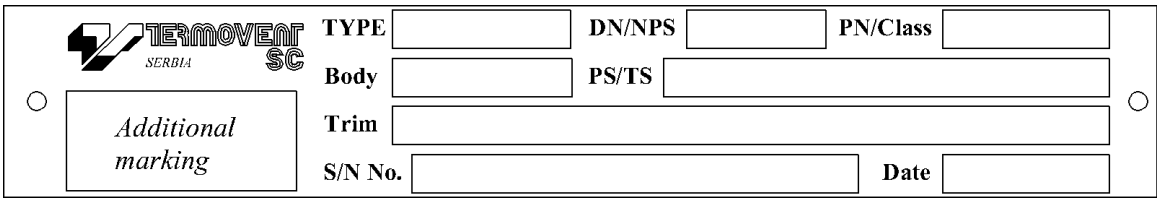
The valves satisfy the safety requirements of Annex I of the European Pressure Equipment Directive 2014/68/EU (PED) for fluids in Groups 1 and 2.

Ex

The valves do not have a potential internal source of ignition and can be used in potentially explosive atmospheres, Group II, category 2 (zones 1+21) and category 3 (zone 2+22) to ATEX 2014/34/EU.

### 10.2 Labeling

Valve information can be found on the valve body, and the typical valve nameplate is shown on Figure D.1.21.




| | |
|---|---|
| TYPE | Type of valve |
| DN / NPS | Nominal valve size |
| PN / Class | Nominal Pressure / Pressure Class |
| Body | Material |
| PS / TS | Pressure-temperature rating |
| Trim | Material of stem and sealing faces |
| S / N No. | Serial Number |
| Date | Date of manufacture |
| Additional marking | As per 10.1.1 |

**Figure D.1.21**

## 11. SURFACE PROTECTION *

The supplied valves are already protected against corrosion with a manufacturer-standard paint system. The protective paint system meets the requirements of ISO 12944 for corrosion category C3-M.

** Note: At the customer's request, a special surface protection and color different from the standard can be applied.*

## 12. PACKAGING

Termovent SC products are packed in standard boxes to ensure safe transport by truck to their destination. The standard packaging includes boxes made of OSB-3 panels fixed on a heat-treated wooden pallet and further protected by outer nylon foil.

It's important to note that standard crates are not stackable.

However, upon request, the packaging can be customized to meet specific customer requirements, such as stackable or sea-worthy packaging.

# II INSTRUCTIONS for INSTALLATION, OPERATION & MAINTENANCE

# 13. INSTRUCTIONS for INSTALLATION, OPERATION & MAINTENANCE

## 13.1 General safety information

- Instructions for installation, start-up and maintenance during the period of exploitation of valves manufactured by TERMOVENT SC should be used as a manual intended for all personnel directly or indirectly involved in dealing with the products.
- Operators in charge of installation, operation and maintenance of GEN during the period of use should be fully trained for the correct/optimal performance of these tasks. If GEN is equipped with mechanical actuators, the operator should be trained for the adequate operation of such valves.
- Information about temperatures and allowable working pressures are shown in Table D.1.8 according to EN 12516-1. Under no circumstances should the valves be operated under conditions outside these tables.
- Before the service or reinstallation of the GEN, the plant or installation should be taken out of operation (zero pressure, temperature of valves should be the same temperature as the environment).
- Because valves in working conditions have hot parts (handwheel, body and bonnet) and may cause burns, the operator is required to undertake all necessary precautions to avoid this by using protective equipment.
- These products are recyclable. No ecological hazard is anticipated with the disposal of these products providing due care is taken.

## 13.2 Storage & Handling

GEN are delivered in their wedge in the closed position with protective covers on their ends. During the storage period, protective covers shall not be removed.

### 13.2.1 Recommended storage conditions

- Storage conditions shall be: ambient temperature between +10ºC and +35ºC and the humidity is up to 85%
- The valves must be stored in closed, clean, dry and ventilated storage facilities.
- Do not store the valves outside.
- Store the valves in their original shipped packaging.
- Protect the valve from contact with solvents, lubricants, fuels or other chemicals.
- Store the valve in vibration-free conditions.
- Valve should be taken out of crates or removed from the covering of a pallet just before installation.
- Spare parts such as soft sealing elements, plastic or lubricants should be stored in a dry place at room temperature protected from light.

### 13.2.2 Storage inspection

- Periodical inspection should be performed on all stored valves. At the minimum, all valves should be inspected every 3-4 months for dirt, moisture or any other type of contamination. If any of this is found the valves are to be thoroughly cleaned and dried.
- Slight external rusting may occur on valves. This will not affect their performance.
- If valves are stored for more than 6 months we recommend the following:
  - ➔ Valves should be cycled open to close 2-3 times every 6 months to keep packing from adhering to the stem and help lubricate the stem and stem nut.
  - ➔ Preservation of inner surfaces, inner parts, stem, flange facing, butt welding ends and threads shall be repeated every 6 months with appropriate corrosion preventive coating

### 13.2.3 Handling requirements

- For valve handling and/or lifting the lifting equipment must be sized and selected while taking into consideration the valve weight indicated on the packing list.
- Do not use the lifting points located on the actuator (Figure D.1.22).
- Do not lift GEN via the handwheel (Figure D.1.23).
- If possible, lift GEN via the lifting lugs or yoke (Figure D.1.24 or Figure D.1.25).
- Caution must be taken during the handling to avoid that this equipment passing over the workers' heads.
- For valve handling or lifting, the lifting equipment must be sized and selected while taking or over any other place where a possible fall could cause damage.

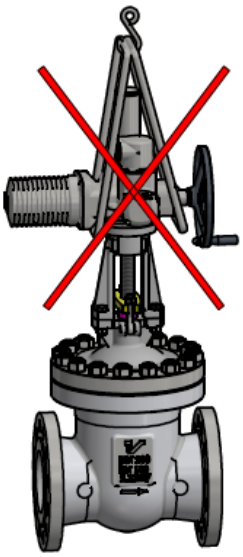


Figure – D.1.22

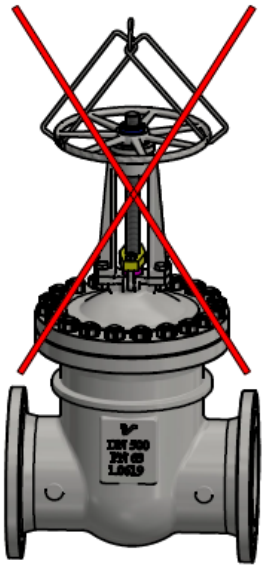


Figure – D.1.23

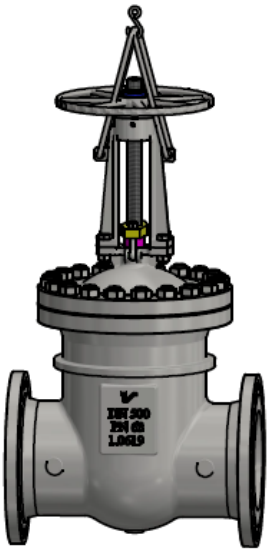


Figure – D.1.24

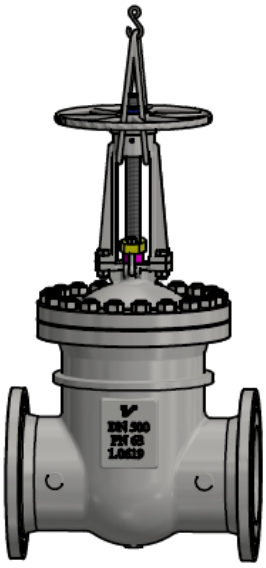


Figure – D.1.25

**WARNING!!!**

➔ Lifting and handling must be performed by qualified personnel only.
➔ You must not remove the protection covers from the valve connection ends.
➔ Store the valves in the 'closed' position.
➔ You must not lift the valves using the connection flange holes, handwheel or actuators.

### 13.3 Installation & Start-up

- GEN are delivered with their wedge in the closed position, and they are ready for use. After the removal of the protection covers it is necessary to thoroughly clean inside the valve with compressed air without first opening the valve.
- Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.
- Closure of the valve is performed by turning the handwheel in a CW (clockwise) direction. On the handwheel there is an arrow and the letter “C” indicating the closing direction, and another arrow and the letter “O” indicating the opening direction.
- When installing valves with flanged ends it is necessary to take into consideration the selection of adequate bolt material and the appropriate type of gasket depending on the type of working fluid, pressure, temperature, and the type of flange facing. It is necessary to install gaskets strictly in accordance with instructions given by the manufacturer of the gaskets.
- GEN with flanged ends shall be installed in a slightly open to fully open position.
- GEN with welding ends up to DN 100 should be welded on the pipeline in the CLOSED position.
- GEN with welding ends over DN 100 shall be welded on pipeline in OPEN position.
- Welding must be performed by an expert and with appropriate WPS.
- After welding, if necessary, local normalization should be performed and the inside of the pipeline should be cleaned to remove possible welding remains.
- At the moment of installation, the influence of pipeline load on the valve should be reduced. The same also applies to temperature oscillation, hydraulic impact and similar. The valve should not be used as a support for a pipeline.
- When installing the GEN equipped with an overpressure safety device (described in Section 8) you must take into consideration the permitted flow direction. Allowed flow direction is defined by the arrow located on the GEN body.
- Manually operated gate valves should be relieved of maximum seating force when the gate valve wedge is closed. Relieving of the force shall be provided by moving the handwheel CCW (counterclockwise) to the open position by ¼ of a turn. Regarding this action, contact between the stem and wedge will be disengaged. The action described will prevent damage to the seating surfaces caused by excessive thermal stem expansion.
- We recommend installation of GEN with stem in vertical position. GEN could be installed with the stem in a horizontal position but for vertical pipelines. We do not recommend the installation of GEN over DN 150 with a horizontal stem on the horizontal pipelines.
- After the installation, start-up and operating parameters are set, it is possible to detect a leakage on the stem packing. In this case, it is necessary to tighten the gland nuts equally. The tightness should not go beyond more than necessary to allow comfortable manipulation of GEN (opening/closing).
- Recommendation: GEN should be installed with a minimum of 5x nominal diameter of straight pipeline in front of and behind the GEN.

**WARNING!!!**

- ➔ Do not disassemble or modify a valve in any way prior to installation. This will void the factory warranty if it occurs.
- ➔ Before installation, the impurities should be removed from the pipeline or from the appliance.
- ➔ Remove protecting covers from the valve ends, degrease and clean the inside of the valve, and in case of a flanged connection, carefully clean the sealing surfaces.
- ➔ During the installation, check if there is enough space for normal and safe manipulation.
- ➔ Installation of valves with an overpressure safety device (Section 8 - with a hole in the wedge and with equalizing pipe) must be in accordance with the allowed flow direction.
- ➔ The valve should not be used as support for a pipeline.

## 13.4 Usage & Maintenance

- The gate-stem packing should be the subject of particular attention as it is important for the qualitative maintenance of tightness and shall be checked every 3 months. If leakage at the stem packing is detected, the gland nuts should be tightened slowly (Figure D.1.26). Torque for tightness gland nuts shown in Table D.1.10. When gland nuts are tightened, if the gland falls down more than twice the packing ring height, new packing rings should be added to the stem packing.

**Table D.1.10**

| | M10 | M12 | M14 | M16 | M18 | M20 | M24 | M27 | M30 | M33 | M36 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Torque /Nm/ | **15÷40** | **25÷65** | **40÷80** | 64÷150 | **100÷160** | **125÷250** | 210÷500 | **280÷580** | **410÷700** | **550÷800** | **710÷1200** |

Figure D.1.26 – Stem packing gland tightening

- Stem packing must be replaced, depending on the working conditions and maintenance level, during packing replacement, special care must be taken to remove all old packing from the packing chamber. The preparation of new packing rings is shown in Figure D.1.27. Packing rings replacement is shown in Figure D.1.28 with a general note that every next packing ring must be rotated relative to the previous one (not less than 90°).

**Figure D.1.27 – Stem packing ring**

**Figure D.1.28**

- Lubrication of thread between stem (Pos.8 – Figure D.1.1) / stem nut (Pos.9 – Figure D.1.1) is highly important. To lubricate the bearings (Pos.24 – Figure D.1.1) on manual, gearbox or electric-operated valves, we suggest using quality-level grease, as shown in the following Table D.1.11. Lubrication shall be performed every month, or twice a year if they are rarely used. Valves used in high-temperature applications, use appropriate lubricants to support the temperature range. Lubrication is performed with lubrication nipples (Pos.25 – Figure D.1.1) on the yoke or bonnet (Pos.4 and Pos.3 – Figure D.1.1).
- It is recommended to replace the grease in bushes during every general overhaul or during the pipeline revision. The type of grease depends on the temperature in the plant. Remote controls, bushings and gearboxes should be lubricated depending on how frequently they are used, every 3 months. For the lubrication of the actuator (Pos.27 – Figure D.1.1) and (Pos.28 – Figure D.1.1) it is necessary to remove the protective tube (Pos.29 – Figure G.1) then grease the stem (Pos.8 – Figure D.1.1) and return the protective tube. Some of the lubricants we use for lubrication are in the Table D.1.11

**Table D.1.11**

| Manufacturer | Quality level |
|---|---|
| *AGIP, SHELL, MOBIL, TOTAL* | *ISO 6743-9: L-X CCHA 2 / DIN 51 502: K 2K-30* |

- GEN delivered with an actuator is adjusted for proper work. GEN delivered with connection for later build on it the electric actuator must be adjusted. The closing of GEN should be adjusted by the torque switch and the opening by the limit switch. The torque and limit switch settings must be in accordance with the instructions from “TERMOVENT SC”.

**WARNING!!!**

- ➔ During usage, GEN must be completely in an open or closed position.
- ➔ Valve opening and closing by handwheel should be done without the use of auxiliary means such as a rod or similar.
- ➔ GEN cannot be used for flow control.
- ➔ A Strainer being installed before the valve will increase its reliability and proper working.

### 13.5 Service & Repair

- Only authorized persons should perform service and repair with appropriate tools and, if possible, use original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.
- Using the wrong or defective spare parts may pose a hazard for personnel, or result in damage, malfunctions or even total failure.
- For GEN standard spare parts are Stem packing and Bonnet gasket.
- Contact “TERMOVENT SC” if You need other spare parts like a Stem, Wedge, Stem nut, etc.
- Every GEN serviced or repaired should be subject to all necessary tests usually performed for a newly produced valve.
- Bolts for connection between body and bonnet should be tightened evenly and crosswise applying appropriate torque when the valve is in the open position.
- Possible torques for tightening are listed in Table D.1.12 and the selection of torque depends on the material grade of bolts and nuts used, as well as the quality of the gasket of the bonnet.

**Table D.1.12**

| Bolt diameter | Bolt materials | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1.7225 | 1.7709 | 1.4913 | 1.4301 | 1.4401 | B7 | B16 | B8 | B8M |
| | Torque [Nm] | | | | | | | | |
| M10 | 52 | 39 | 53 | 14 | 14 | 51 | 51 | 15 | 46 |
| M12 | 90 | 68 | 93 | 24 | 25 | 89 | 89 | 25 | 81 |
| M14 | 145 | 109 | 149 | 38 | 40 | 143 | 143 | 41 | 129 |
| M16 | 226 | 170 | 233 | 59 | 62 | 223 | 224 | 64 | 203 |
| M18 | 309 | 233 | 318 | 81 | 85 | 305 | 307 | 87 | 278 |
| M20 | 441 | 333 | 454 | 115 | 121 | 436 | 439 | 124 | 396 |
| M22 | 609 | 459 | 626 | 159 | 167 | 600 | 605 | 171 | 546 |
| M24 | 765 | 577 | 787 | 200 | 210 | 755 | 760 | 215 | 687 |
| M27 | 1131 | 852 | 1163 | 295 | 310 | 1116 | 1123 | 318 | 1015 |
| M30 | 1528 | 1151 | 1570 | 398 | 419 | 1507 | 1517 | 429 | 1371 |
| M33 | 2095 | 1578 | 2153 | 525 | 574 | 2066 | 2080 | 588 | 1880 |
| M36 | 2681 | 2020 | 2755 | 698 | 734 | 2644 | 2663 | 753 | 2405 |
| M39 | 3494 | 2632 | 3590 | 910 | 957 | 3446 | 3470 | 981 | 3135 |
| M42 | 4306 | 3244 | 4425 | 1121 | 1180 | 4247 | 4277 | 1209 | 3864 |

- For high temperature and high-pressure applications after 24 hours of operation, all nuts shall be re-tightened diametrically opposite to design stress Figure D.1.29. This action compensates for any relaxation or creep. Periodic inspection is recommended, thereafter.

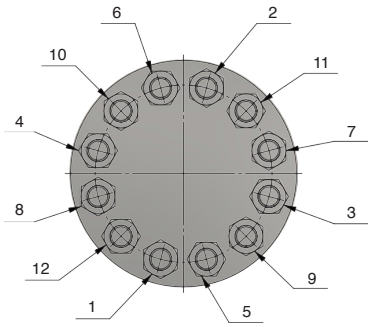



**Figure D.1.29 - Recommended re-tighten order**

**WARNING!!!**

➔ Before the service or reinstallation of the valves, the plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).

➔ Manipulation with body gasket and stem packing should be with high precautions because they could contain stainless steel wire which can cause severe injuries.

### 13.5.1 Stem packing rings replacement

Only authorized persons should perform service and repair with appropriate tools and, if possible, using original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.

Requirements before disassembling:

➔ The plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).

➔ GEN must be completely opened.

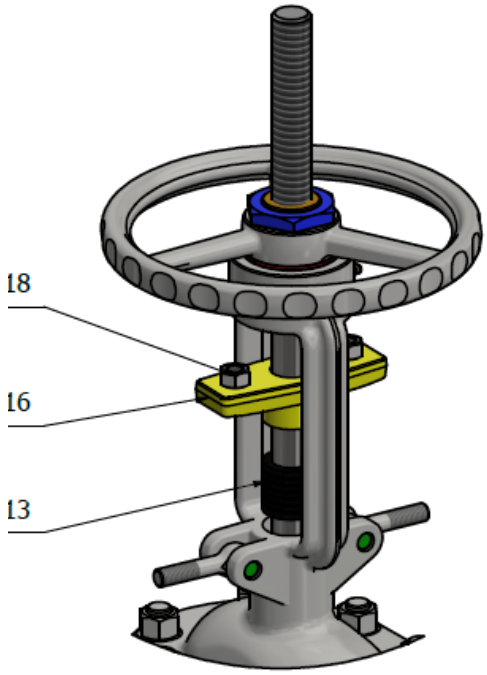



**Figure D.1.30 –Stem packing rings replacement**

**Disassembling**

| | |
|---|---|
| **Step 1 ›** | Unscrew gland nuts (Pos.18) |
| **Step 2 ›** | Lift upwards gland (Pos.16) |
| **Step 3 ›** | Take out stem packing rings (Pos.13). All stem packing rings shall be removed (Pos.13) |
| **Step 4 ›** | The packing chamber shall be cleaned. |

**Assembling**

| | |
|---|---|
| **Step 1 ›** | The packing chamber shall be filled with new stem packing rings (Pos.13) |
| **Step 2 ›** | Put down gland (Pos.16) |
| **Step 3 ›** | Put back and tighten gland nuts (Pos.18) |
| **Step 4 ›** | Tighten gland nuts (Pos.18) according to Table D.1.10 |

### 13.5.2 Bonnet gasket replacement

Only authorized persons should perform service and repair with appropriate tools and, if possible, use original spare parts. Personal protection should be applied in accordance with valid regulations and legalizations.

Requirements before disassembling:

➔ The plant or installation should be taken out of operation (pressure 0 bar, temperature of valves should be the same temperature as the environment).

➔ GEN must be opened.

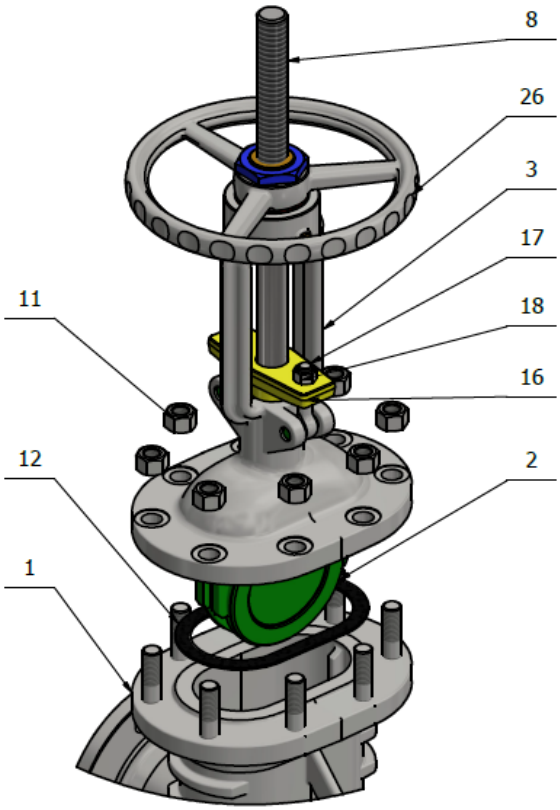



**Figure D.1.31 –Bonnet gasket replacement**

**Disassembling**

| | |
|---|---|
| **Step 1 ›** | Unscrew nuts (Pos.11) |
| **Step 2 ›** | Lift upwards bonnet (Pos.3) together with following parts from the body (Pos.1)<br>› Stem (Pos.8)<br>› Handwheel (Pos.26)<br>› Gland bolts (Pos.17)<br>› Gland nuts (Pos.18)<br>› Gland (Pos.16)<br>› Wedge (Pos.2) |
| **Step 3 ›** | Remove old bonnet gasket (Pos.12) |
| **Step 4 ›** | The chamber for bonnet gasket shall be cleaned. |

**Assembling**

| | |
|---|---|
| **Step 1 ›** | The chamber for bonnet gasket shall be filled with new bonnet gasket (Pos.12) |
| **Step 2 ›** | Put down bonnet (Pos.3) to the body (Pos.1) |
| **Step 3 ›** | Put back and screw nuts (Pos.11) |
| **Step 4 ›** | Tighten nuts (Pos.11) according to Table D.1.12 |

### 13.6 Possible Malfunctions & Solutions

- During the period of usage of the installed gate valve, malfunctions may occur. Only experts in the premises of the user should undertake repairs. The most common cause of malfunctions and how to overcome such situations is listed in Table D.1.13

**Table D.1.13**

| Failure | Possible cause | Troubleshooting |
|---|---|---|
| Absence of flow | GEN is in closed position | Open the GEN completely with the handwheel (Pos.26) |
| | Protection covers are not removed | Remove protection covers from connection ends |
| | GEN is not completely open | Open the GEN completely with the handwheel (Pos.26) |
| Difficult manipulation | Dry stem /stem nut | Grease stem (Pos.8) or stem nut (Pos.9) |
| | Gland nuts are too tight | Slightly loosen gland nuts (Pos.18) with precaution to preserve sealing of the stem packing rings (Pos.13) |
| Leakage on stem packing | Gland nuts are not tightened | Tighten gland nuts (Pos.18) |
| | Stem packing rings are damaged | Completely open the gate valve, remove the worn stem packing and clean the chamber of the stem packing and install the new stem packing rings, the same or similar quality (Pos.13) |
| Leakage on bonnet gasket | Nuts are not tightened | Tighten nuts (Pos.11) |
| | Bonnet gasket is damaged | Disassemble the bonnet (Pos. 2) and replace the bonnet gasket (Pos.11) with new one |
| Leaking on seat | GEN is not completely closed | Turn the handwheel (Pos.26) in the direction indicated for closing without auxiliary means |
| | Mechanical damage of the seat or wedge | Grind the seats and, if necessary, have damaged components replaced. Check the actuator setting |
| | The working medium contains solid dirt particles | Clean the Valve thoroughly. We recommend the installation of a Strainer before the Gate Valve |
| The valve does not function | The electric actuator does not function | Check the electric actuator as specified in the manufacturer’s documentation. |
| | The pneumatic actuator does not function | Check the pneumatic actuator as specified in the manufacturer’s documentation. |
| Malfunction of the valve | Limit switch (for optional electric or pneumatic) is defective | Have the limit switch checked. Prior to readjustment consult with Termovent SC |
| | Torque switch (with optional electric or pneumatic) is defective | Have the torque switch checked. Prior to readjustment consult with Termovent SC |

### 13.7 Guarantee

- Termovent SC guarantee that each of its products free from defects and work properly for a period of eighteen (18) months from the date of installation or twenty-four (24) months from the date of shipment from the manufacturer, whichever comes first.
- Manufacturer agrees to repair or replace any product which is non-conforming to the Warranty due to defective workmanship or defective material of which the Warranty non-conformance customer notifies the manufacturer in writing during the Warranty Period.
- Warranty does not apply to products that have defects or failures resulting from

  (a) accident, disaster, neglect, misuse, improper handling.

  (b) application of excessive torque to the operating mechanism, presence of foreign matter.

  (c) the products are not being installed or maintained as required by instructions

  (d) modifications or repairs without manufacturer approval.

  (e) natural tears and wear caused by material ageing.

# III PURCHASE GUIDE

## 14. RFQ FORM

To better define the technical characteristics of the product, it is recommended to provide the following data and parameters when submitting an inquiry.:

| ***RFQ - Form*** | | | | | | | | | | | ***GEN*** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Service condition*** | | | | | | | | | | | |
| Fluid: | | | | | | | | | | | |
| Flow: | | | | | | | | | | | m³/h |
| Operating and design pressure | Operating | | bar | | | Design | | bar | | | |
| Operating and design temperature | Operating | | °C | | | Design | | °C | | | |
| Max. Shut Off pressure | | | | | | | | | | | bar |
| Ambient temperature | | | | | | | | | | | °C |
| ***Pressure rating*** | | | | | | | | | | | |
| PN | | PN 16 | | PN 25 | | PN 40 | | PN 63 | | PN 100 | PN 160 |
| ***Connection & Installation dimensions*** | | | | | | | | | | | |
| Installation dimension | | | | | | | | | | | mm |
| Inlet and outlet pipe dimension | Inlet | | mm | | | Outlet | | mm | | | |
| Butt welding ends | | | EN 12627 | | | | | Other | | | |
| Flanges | | | EN 1092-1 | | | | | Other | | | |
| ***Materials & Internal parts*** | | | | | | | | | | | |
| Body | | | | | | Trim / internal parts | | | | | |
| ***Installation position*** | | | | | | | | | | | |
| Installation position | | Vertical | | | | Horizontal | | Other | | | |
| ***Over pressure devices*** | | | | | | | | | | | |
| With hole in the wedge | | | | | | | | | | | |
| With nozzle for safety valve | | | | | | | | | | | |
| With by-pass | | | | | | | | | | | |
| With double by-pass & equalizing pipe | | | | | | | | | | | |
| With double by-pass & equalizing pipe with valve | | | | | | | | | | | |
| With equalizing pipe | | | | | | | | | | | |
| ***Accessories*** | | | | | | | | | | | |
| With drain valve | | | | | | | | | | | |
| Spring loaded stuffing box | | | | | | | | | | | |
| Limit switches | | | | | | | | | | | |
| Other | | | | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| ***Actuation type*** | | | | |
| Handwheel | | | | |
| Gearbox | | | | |
| Electric actuator | | Closing time | | sec |
| Pneumatic actuator | | Closing time | | sec |
| Accessories for actuator | | | | |
| ***Testing*** | | | | |
| Testing | | Tightness Class | | |
| ***Surface protection*** | | | | |
| Surface protection | | | | |
| ***Marking*** | | | | |
| Marking | | | | |
| ***Additional requirements*** | | | | |

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GEN v1.0