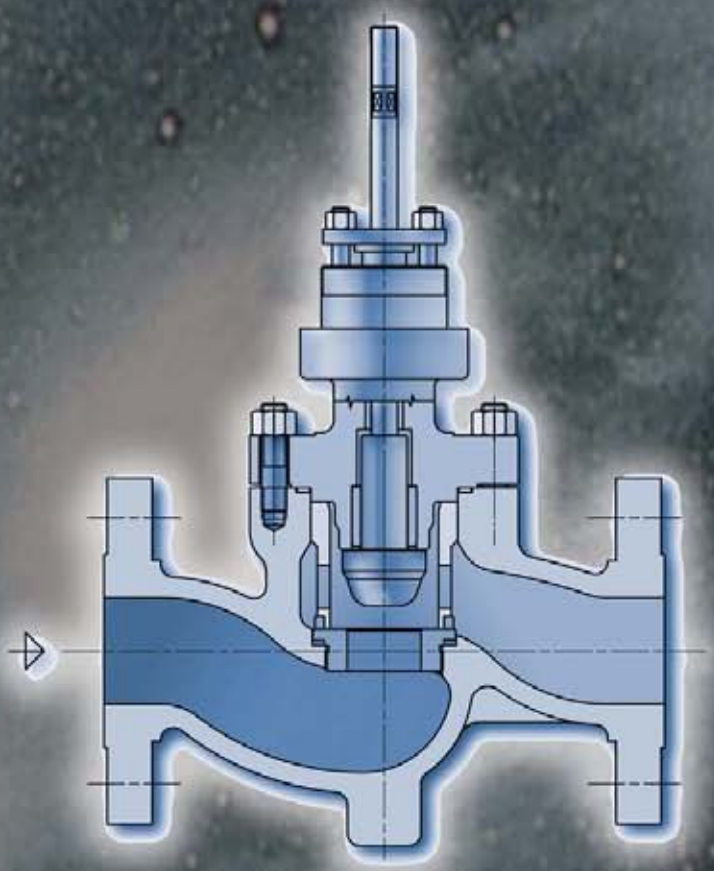
A Long Experience in Energy Equipment and one Goal:

The Customer's satisfaction.

VALVITALIA

CONTROL VALVES • DIVISION

by TGT tormene gas technology



# LTG1 - LTG2 Control Valves

# LTG1 and LTG2

Globe straight-way, single seat LTG1 and LTG2 series are very versatile control valves of general use for any applications under moderate p/T service conditions.
LTG1 is the standard design with screwed seat ring while LTG2 is the corresponding quick-change version with the same flow coefficients and pressure differentials capability. Due to simple construction and to the large range of available materials these valves are suitable for a wide range of applications, also for corrosive, dirty, sticking and slightly abrasive fluids.

### Other advantages of these valves series:

- heavy top guiding design provides excellent plug stability
- interchangeable low noise and anticavitation trim either for std or quick-change design
- tight shut-off class V and VI also available
- wide flow range capability is allowed by a great number of reduced capacity trims

### Actuators:

- pneumatic either piston or diaphragm types
- available also electric for control service.

### Body:

- flanged, butt-welded, SW, and threaded
- cast construction, also wrought or by bar for smaller dimensions
- face-to-face dimensions as per IEC 60534 –3-1
- sizes : $^{3}/_{4}$”, 1”, $1^{1}/_{2}$, 2”, 3”, 4”, 6” and ratings up to ANSI 600 /PN100 as per connections /ratings table
- materials: carbon, Cr-Mo and AISI 316 stainless steels
- flow direction: to-open
  to-close direction is also allowed for cavitating-not-flashing liquids, provided the internal plug balancing is guaranteed to avoid negative gradients

### Bonnet:

- flanged to body
- extended with bellows seal and for cryogenic applications
- same materials as body

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## Packing:

- adjustable by nuts and follower
- seal rings: reinforced braided teflon or pure graphite split-rings
- see table for temperature and pressure capability

| Type of packing | Allowable temperature range (°C) | | Max pressure ( bar) |
|---|---|---|---|
| | plain bonnet | extended bonnet | |
| braided teflon graphited seal rings | - 30°C to + 230°C | - 30°C to + 350°C | 150 bar |
| pure graphite solid seal rings | - 30°C to + 600°C | - 100°C to + 600°C | No practical limitation |

## Trim:

- top guided unbalanced plug both in LTG1 and LTG2 constructions
- guide: a bush fitted into the bonnet
- linear and equi% up to 2" port included - modified linear for higher sizes
- available plug types:
  - contoured
  - flat disc for quick opening operation
  - skirted and drilled BRD design for special services
  - soft seat – only for contoured and flat disc



*LTG1 - 4" RF*
*Diaphgram actuator*

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### Cage:

- in LTG2 design it has not a throttling function but only the scope to clamp the seat ring
- large windows of cage do not affect the inherent flow characteristic (including max Cv) of LTG1 corresponding trims

### Seat ring:

- threaded in LTG1 model and clamped-in in LTG2 model

### Leakage Class (according to IEC 60534-4):

- standard: IV
- optional: V and VI

## Noise

Aerodynamic noise generated by LTG control valves is calculated according to equations IEC std 60534-8-3. Main factors involved in such calculation, $F_L$ and $F_d$, are listed in the the tables of this catalogue together with other hydraulic coefficients.
With regard to acoustic power ratio $r_w$, values not fully consistent with the reccommendation of IEC std are here below listed:

| Trim type | LTG1 contoured | LTG2 contoured | LTG2 BRD trim |
|---|---|---|---|
| $r_w$ | 0.25 | 0.20 | 0.15 |
| $\Delta L_w$ | 0 dB (IEC value) | -1 dB | -2 dB |

In the table the acoustic benefits compared to std IEC 0.25 value are also outlined.
For LTG2 trim the different stated values of $r_w$ are due to the additional acoustic damping of the cage fitted around the throttling section.

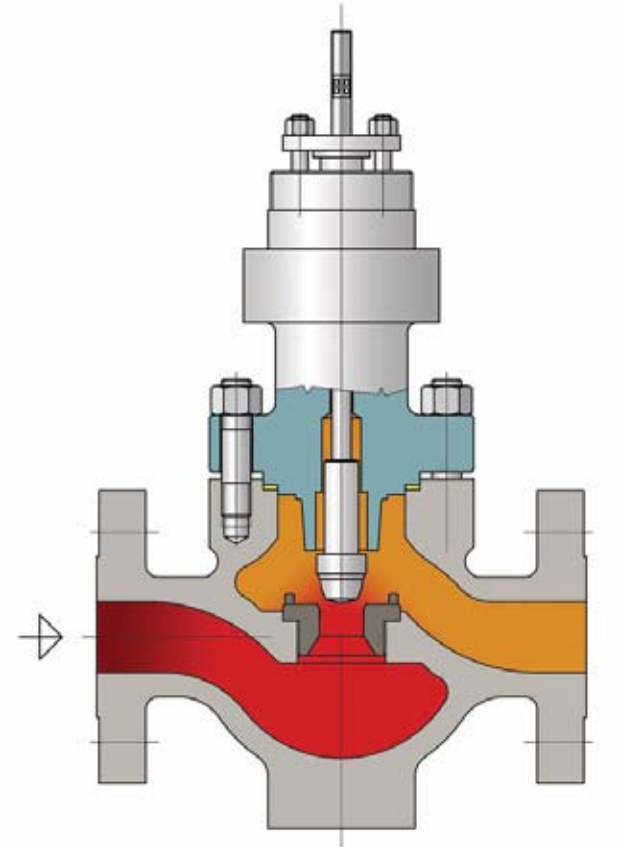
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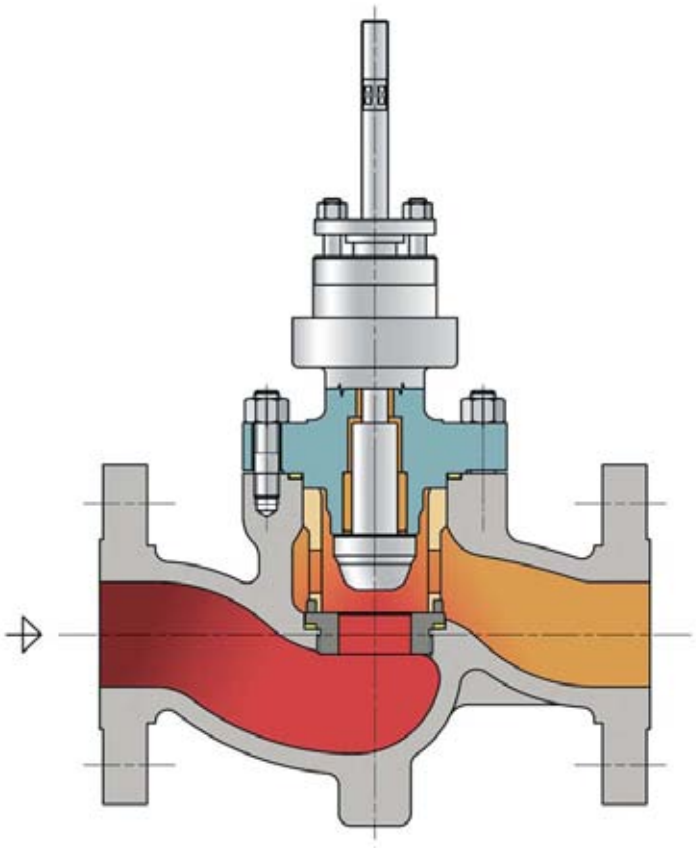
## LTG1 & LTG2 - FLOW COEFFICIENTS $C_V$

| DN | Port | Seat diameter [mm] | travel [mm] | 5% | 10% | 20% | 40% | 60% | 80% | 100% |
|---|---|---|---|---|---|---|---|---|---|---|
| ¾" | ¼" | 8 | 20 | 0,06 | 0,08 | 0,11 | 0,21 | 0,41 | 0,82 | 1,6 |
| | 3/8" | 10 | 20 | 0,11 | 0,13 | 0,18 | 0,37 | 0,76 | 1,54 | 3,2 |
| | ½" | 14 | 20 | 0,19 | 0,23 | 0,33 | 0,70 | 1,48 | 3,19 | 6,5 |
| | 3/4" | 18 | 20 | 0,24 | 0,31 | 0,46 | 1,05 | 2,39 | 5,25 | 11 |
| 1" | 3/8" | 10 | 20 | 0,12 | 0,14 | 0,20 | 0,41 | 0,83 | 1,68 | 3,5 |
| | ½" | 14 | 20 | 0,20 | 0,25 | 0,36 | 0,75 | 1,59 | 3,43 | 7,0 |
| | ¾" | 18 | 20 | 0,26 | 0,33 | 0,49 | 1,10 | 2,48 | 5,88 | 12 |
| | 1" | 22 | 20 | 0,28 | 0,35 | 0,53 | 1,23 | 2,83 | 7,15 | 14 |
| 1" ½ | ¾" | 18 | 25 | 0,29 | 0,36 | 0,54 | 1,21 | 2,73 | 6,40 | 13 |
| | 1" | 22 | 25 | 0,30 | 0,37 | 0,56 | 1,27 | 2,89 | 7,30 | 15 |
| | 1" ½ | 38 | 25 | 0,59 | 0,74 | 1,14 | 2,69 | 6,32 | 16,1 | 33 |
| 2" | 1" | 22 | 25 | 0,30 | 0,37 | 0,55 | 1,26 | 2,87 | 6,45 | 15 |
| | 1" ½ | 38 | 25 | 0,61 | 0,76 | 1,17 | 2,76 | 6,50 | 16,3 | 34 |
| | 2" | 42 | 25 | 0,95 | 1,20 | 1,84 | 4,27 | 9,93 | 22,9 | 48 |
| 3" | 1" ½ | 38 | 35 | 0,63 | 0,87 | 1,40 | 4,30 | 11,3 | 22,0 | 35 |
| | 2" | 42 | 35 | 1,00 | 1,30 | 2,00 | 6,20 | 16,7 | 32,1 | 51 |
| | 3" | 70 | 35 | 1,67 | 1,90 | 4,00 | 14,0 | 36,3 | 70,6 | 112 |
| 4" | 2" | 42 | 40 | 1,02 | 1,10 | 1,70 | 5,50 | 15,8 | 32,8 | 52 |
| | 3" | 70 | 40 | 1,73 | 2,60 | 4,00 | 14,4 | 37,6 | 73,1 | 116 |
| | 4" | 88 | 40 | 2,74 | 4,00 | 10,0 | 30,0 | 66,0 | 120 | 190 |
| 6" | 3" | 70 | 55 | 1,76 | 2,90 | 5,80 | 16,0 | 38,0 | 74,3 | 118 |
| | 4" | 88 | 55 | 3,02 | 5,10 | 11,2 | 32,9 | 70,0 | 132 | 210 |
| | 6" | 125 | 55 | 5,33 | 7,00 | 13,0 | 47,0 | 136 | 258 | 410 |

- Characteristic is equi% up to 2" included and modified linear for 3", 4", 6" ports.
- Linear valves are obtained by interpolation between $Cv_{100\%}$ and $Cv_{5\%}$.



*LTG1 - threaded seat ring*



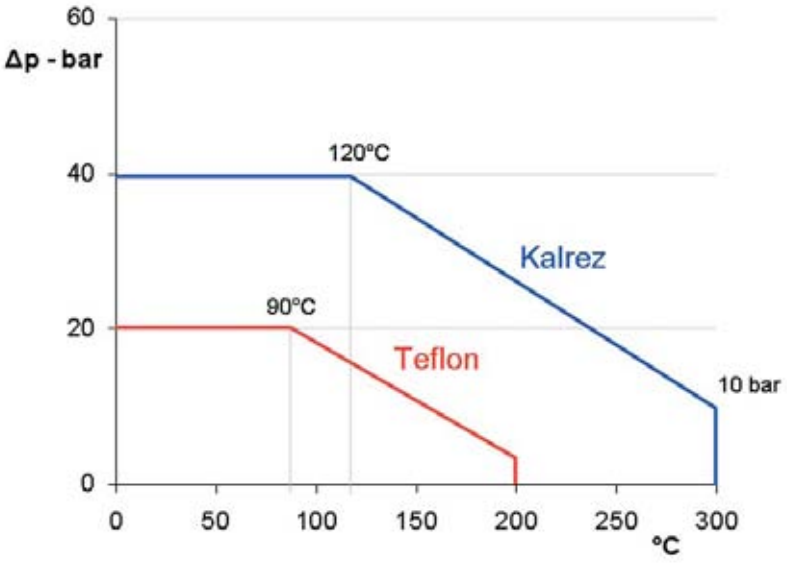
*LTG2 - quick change seat ring*

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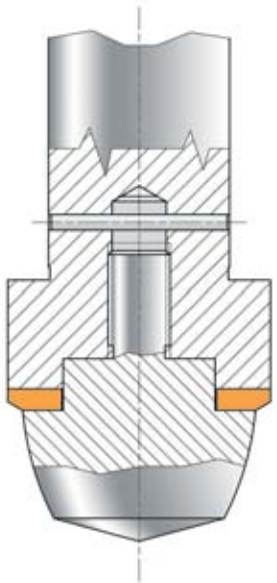
## LTG1 & LTG2 - SIZING FACTORS

| DN | Port | $F_L$ | | $X_T$ | | $X_{FZ}$ | | $F_d$ | |
|---|---|---|---|---|---|---|---|---|---|
| | | 10% | 100% | 10% | 100% | 10% | 100% | 10% | 100% |
| ¾" | ¼" | 0.98 | 0.92 | 0.80 | 0.70 | 0.61 | 0.54 | 0.07 | 0.30 |
| | 3/8" | 0.97 | 0.89 | 0.80 | 0.70 | 0.60 | 0.51 | 0.07 | 0.31 |
| | ½" | 0.94 | 0.89 | 0.79 | 0.69 | 0.57 | 0.51 | 0.07 | 0.31 |
| | 3/4" | 0.96 | 0.90 | 0.79 | 0.68 | 0.59 | 0.52 | 0.08 | 0.32 |
| 1" | 3/8" | 0.95 | 0.91 | 0.79 | 0.69 | 0.58 | 0.53 | 0.07 | 0.31 |
| | ½" | 0.94 | 0.89 | 0.79 | 0.69 | 0.57 | 0.51 | 0.07 | 0.31 |
| | ¾" | 0.94 | 0.89 | 0.78 | 0.68 | 0.57 | 0.51 | 0.08 | 0.32 |
| | 1" | 0.96 | 0.90 | 0.78 | 0.68 | 0.59 | 0.52 | 0.08 | 0.32 |
| 1" ½ | ¾" | 0.94 | 0.89 | 0.79 | 0.69 | 0.57 | 0.51 | 0.08 | 0.32 |
| | 1" | 0.94 | 0.89 | 0.78 | 0.68 | 0.57 | 0.51 | 0.08 | 0.32 |
| | 1" ½ | 0.94 | 0.90 | 0.78 | 0.68 | 0.57 | 0.52 | 0.10 | 0.35 |
| 2" | 1" | 0.94 | 0.89 | 0.79 | 0.69 | 0.57 | 0.51 | 0.08 | 0.32 |
| | 1" ½ | 0.94 | 0.89 | 0.78 | 0.68 | 0.57 | 0.51 | 0.10 | 0.35 |
| | 2" | 0.96 | 0.90 | 0.78 | 0.68 | 0.59 | 0.52 | 0.11 | 0.38 |
| 3" | 1" ½ | 0.94 | 0.89 | 0.78 | 0.68 | 0.57 | 0.51 | 0.10 | 0.35 |
| | 2" | 0.95 | 0.90 | 0.78 | 0.68 | 0.58 | 0.52 | 0.11 | 0.38 |
| | 3" | 0.96 | 0.91 | 0.77 | 0.69 | 0.59 | 0.53 | 0.12 | 0.40 |
| 4" | 2" | 0.94 | 0.89 | 0.78 | 0.68 | 0.57 | 0.51 | 0.11 | 0.38 |
| | 3" | 0.94 | 0.89 | 0.77 | 0.69 | 0.57 | 0.51 | 0.12 | 0.40 |
| | 4" | 0.95 | 0.90 | 0.76 | 0.68 | 0.58 | 0.52 | 0.13 | 0.41 |
| 6" | 3" | 0.94 | 0.88 | 0.77 | 0.69 | 0.57 | 0.50 | 0.12 | 0.40 |
| | 4" | 0.92 | 0.89 | 0.76 | 0.68 | 0.54 | 0.51 | 0.13 | 0.41 |
| | 6" | 0.95 | 0.90 | 0.76 | 0.68 | 0.58 | 0.52 | 0.14 | 0.42 |

## SOFT SEATED LTG1 PLUG




*Soft seated plug – Temperature/Pressure capability*



*LTG1 – Soft seated plug*

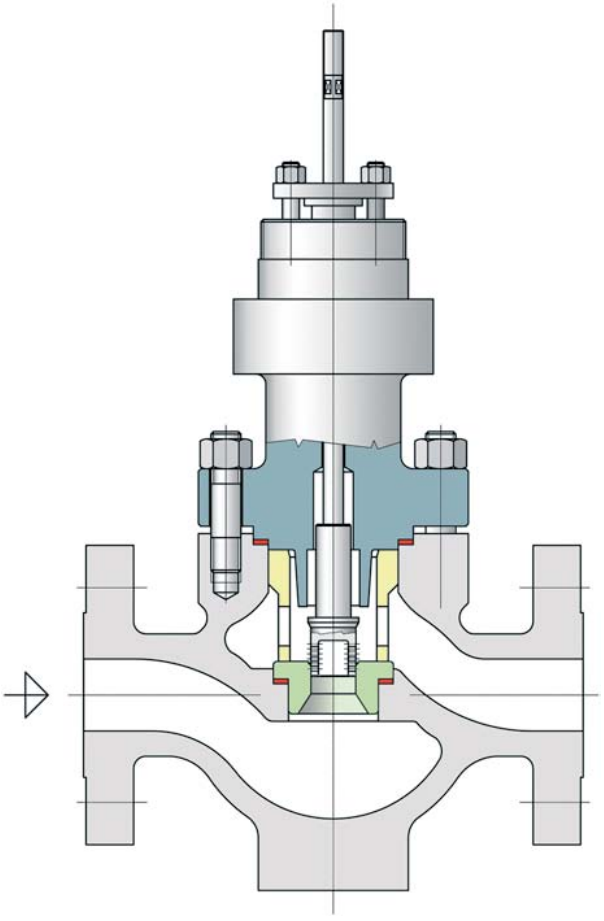
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## BRD TRIM - FLOW COEFFICIENTS $C_V$

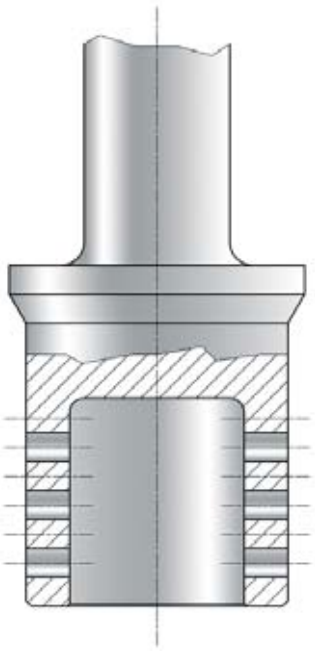
| DN | Port | Seat diameter [mm] | Travel [mm] | 5% | 10% | 20% | 40% | 60% | 80% | 100% |
|---|---|---|---|---|---|---|---|---|---|---|
| ¾" | ¾" | 22 | 20 | 0,09 | 0,30 | 0,71 | 1,53 | 2,36 | 3,18 | 4 |
| 1" | ¾" | 22 | 20 | 0,12 | 0,38 | 0,89 | 1,92 | 2,94 | 3,97 | 5 |
| | 1" | 26 | 20 | 0,21 | 0,68 | 1,60 | 3,45 | 5,30 | 7,15 | 9 |
| 1" ½ | ¾" | 22 | 25 | 0,17 | 0,53 | 1,24 | 2,68 | 4,12 | 5,56 | 7 |
| | 1" | 26 | 25 | 0,28 | 0,90 | 2,13 | 4,60 | 7,07 | 9,53 | 12 |
| | 1" ½ | 38 | 25 | 0,43 | 1,35 | 3,20 | 6,90 | 10,6 | 14,3 | 18 |
| 2" | 1" | 26 | 25 | 0,33 | 1,05 | 2,49 | 5,37 | 8,24 | 11,1 | 14 |
| | 1" ½ | 38 | 25 | 0,47 | 1,5 | 3,56 | 7,67 | 11,8 | 15,9 | 20 |
| | 2" | 42 | 25 | 0,68 | 2,18 | 5,16 | 11,1 | 17,1 | 23,0 | 29 |
| 3" | 1" ½ | 38 | 35 | 0,83 | 2,63 | 6,22 | 13,4 | 20,6 | 27,8 | 35 |
| | 2" | 42 | 35 | 1,02 | 3,23 | 7,64 | 16,5 | 25,3 | 34,2 | 43 |
| | 3" | 70 | 35 | 1,77 | 5,63 | 13,3 | 28,8 | 44,2 | 59,6 | 75 |
| 4" | 2" | 42 | 40 | 1,30 | 4,13 | 9,78 | 21,0 | 32,4 | 43,7 | 55 |
| | 3" | 70 | 40 | 1,89 | 6,00 | 14,2 | 30,7 | 47,1 | 63,6 | 80 |
| | 4" | 88 | 40 | 2,41 | 7,65 | 18,1 | 39,1 | 60,0 | 81,0 | 102 |
| 6" | 3" | 70 | 55 | 2,79 | 8,85 | 21,0 | 45,2 | 69,5 | 93,7 | 118 |
| | 4" | 88 | 55 | 3,85 | 12,2 | 29,0 | 62,5 | 96,0 | 129 | 163 |
| | 6" | 125 | 55 | 4,96 | 15,8 | 37,3 | 80,5 | 123,7 | 166 | 210 |

## RATINGS AND CONNECTIONS

| Size | Ratings | Flanged | BW | Threaded and SW |
|---|---|---|---|---|
| ¾" to 2" | 150 - 300 | • | | |
| | 600 | • | • | • |
| 3" and 4" | 150 - 300 | • | | |
| | 600 | • | • | |
| 6" | 150 - 300 | • | | |



*LTG2 - BRD trim*



*LTG2 - BRD trim section*

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## SIZING FACTORS OF BRD TRIM

| DN | Port | $F_L$ | | $X_T$ | | $X_{FZ}$ | | $F_d$ | |
|---|---|---|---|---|---|---|---|---|---|
| | | 10% | 100% | 10% | 100% | 10% | 100% | 10% | 100% |
| ¾" | ¾" | 0.94 | 0.93 | 0.73 | 0.72 | 0.63 | 0.61 | 0.50 | 0.30 |
| 1" | ¾" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.50 | 0.30 |
| | 1" | 0.94 | 0.93 | 0.73 | 0.72 | 0.63 | 0.61 | 0.47 | 0.28 |
| 1" ½ | ¾" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.48 | 0.28 |
| | 1" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.45 | 0.27 |
| | 1" ½ | 0.94 | 0.93 | 0.73 | 0.72 | 0.63 | 0.61 | 0.40 | 0.25 |
| 2" | 1" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.42 | 0.26 |
| | 1" ½ | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.31 | 0.24 |
| | 2" | 0.94 | 0.93 | 0.72 | 0.72 | 0.63 | 0.61 | 0.30 | 0.21 |
| 3" | 1" ½ | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.28 | 0.22 |
| | 2" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.27 | 0.20 |
| | 3" | 0.94 | 0.93 | 0.73 | 0.72 | 0.63 | 0.61 | 0.26 | 0.19 |
| 4" | 2" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.26 | 0.19 |
| | 3" | 0.93 | 0.92 | 0.71 | 0.70 | 0.62 | 0.60 | 0.25 | 0.18 |
| | 4" | 0.94 | 0.93 | 0.73 | 0.72 | 0.63 | 0.61 | 0.23 | 0.17 |
| 6" | 3" | 0.93 | 0.92 | 0.72 | 0.70 | 0.62 | 0.60 | 0.24 | 0.17 |
| | 4" | 0.94 | 0.93 | 0.73 | 0.72 | 0.63 | 0.61 | 0.22 | 0.16 |
| | 6" | 0.95 | 0.94 | 0.75 | 0.73 | 0.64 | 0.62 | 0.20 | 0.15 |



*LTG2 - 6" BW*
*diaphragm actuator*



*LTG2 - 6" RF*
*piston type actuator – extended bonnet*

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# BASIC MATERIAL CLASSES

| Component | | MC1 | MC2 | MC4 | MC5 | NACE |
|---|---|---|---|---|---|---|
| Item | Name | | | | | |
| 1 | body | A216 WCB (1) | A351 CF8M | A217WC9 | A352 LCB | A216WCB (1) (2) |
| 2 | bonnet | A216 WCB (1) | A 351 CF8M (3) | A182 F22 (4) | A 350 LF2 (4) | A216WCB (1) (2) (3) |
| 3 | stem | A 479 - 316 | A 479 - 316 | A 479 - 316 | A 479 - 316 | A 479 – 316 (2) |
| 4 | stud | A193 B7 | A193 B7 | A193 B7 | A193 B7 | A193 B7M |
| 5 | nut | A 194 -4 | A 194 -4 | A 194 -4 | A 194 -4 | A 194 2M |
| 6 | body gasket | 316L /graphite filler | 316L /graphite filler | 316L /graphite filler | 316L /graphite filler | 316L /graphite filler |
| 7 | pin | AISI 304 | AISI 304 | AISI 304 | AISI 304 | AISI 316 (2) |
| 8 | cage (LTG2) | AISI 304 | AISI 304 | AISI 304 | AISI 304 | AISI 304 (3) |
| 9 | seat ring gasket (LTG2) | 316L /graphite filler | 316L /graphite filler | 316L /graphite filler | 316L /graphite filler | 316L /graphite filler |
| 10 | plug | A 479-316<br>A 479-316 stellited on seat<br>A 479-316 stellited on seat and post | | | A 479-316 (1) | |
| 11 | seat ring | A 479-316<br>A 479-316 stellited on seat | | | A 479-316 hardfaced on seat (1) | |
| 12 | guide bushing | AISI 440 C – fully hardened<br>AISI 416 – fully hardened<br>Nitronic 60 (for basic classes MC2 and MC5) | | | stellite gr 6 | |

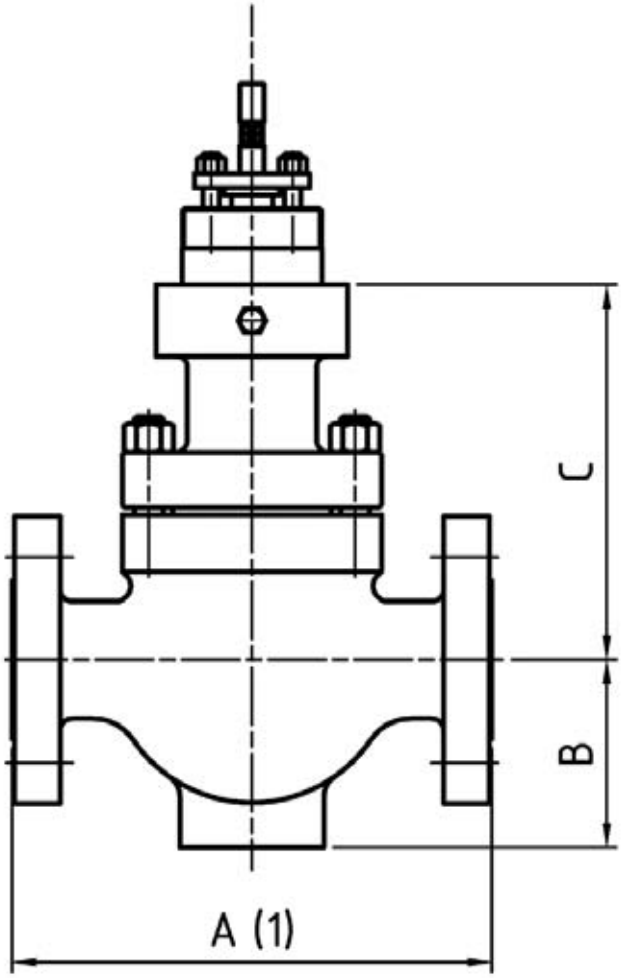
note 1 – alternate WCC material can be supplied without notice
note 2 – max hardness 22 HRC
note 3 – or equivalent wrought material
note 4 – or equivalent cast material

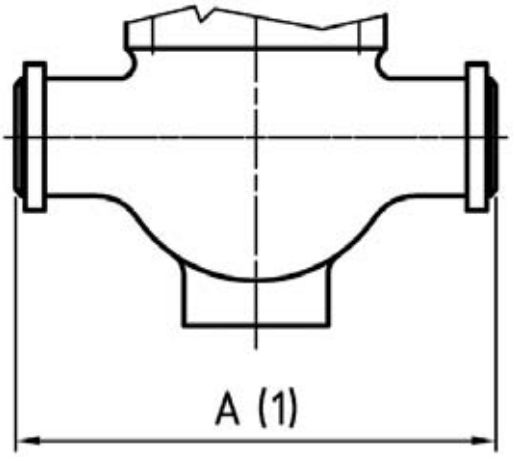
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# DIMENSIONAL TABLES

| DN | | A | | | | | | | | | B max | C max | C extend. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ANSI 150 | | | ANSI 300 | | | ANSI 600 | | | All Classes | All Classes | All Classes |
| Inches | mm | RF | RJ | BW | RF | RJ | BW | RF | RJ | BW | | | |
| ¾" | 17 | 184 | - | 206 | 194 | 207 | 206 | 206 | 206 | 206 | 75 | 200 | 220 |
| 1 | 25 | 184 | 197 | 210 | 197 | 210 | 210 | 210 | 210 | 210 | 75 | 200 | 230 |
| 1 ½" | 40 | 222 | 235 | 251 | 235 | 248 | 251 | 251 | 251 | 251 | 90 | 200 | 290 |
| 2 | 50 | 254 | 267 | 286 | 267 | 283 | 286 | 286 | 289 | 286 | 95 | 250 | 300 |
| 3 | 80 | 298 | 311 | 337 | 317 | 333 | 337 | 337 | 340 | 337 | 95 | 300 | 350 |
| 4 | 100 | 352 | 365 | 394 | 368 | 384 | 394 | 394 | 397 | 394 | 115 | 330 | 400 |
| 6 | 150 | 451 | 464 | 508 | 473 | 489 | 508 | - | - | - | 165 | 395 | 495 |

| DN | | Flanged connection mass (kg) | | Threaded/Welded mass (kg) |
|---|---|---|---|---|
| Inches | Mm | ANSI 150-300 | ANSI 600 | ANSI 600 |
| ¾" | 17 | 40 | 40 | 31 |
| 1 | 25 | 40 | 40 | 31 |
| 1 ½" | 40 | 40 | 40 | 31 |
| 2 | 50 | 45 | 45 | 36 |
| 3 | 80 | 100 | 100 | 84 |
| 4 | 100 | 165 | 170 | 127 |
| 6 | 150 | 250 | - | - |

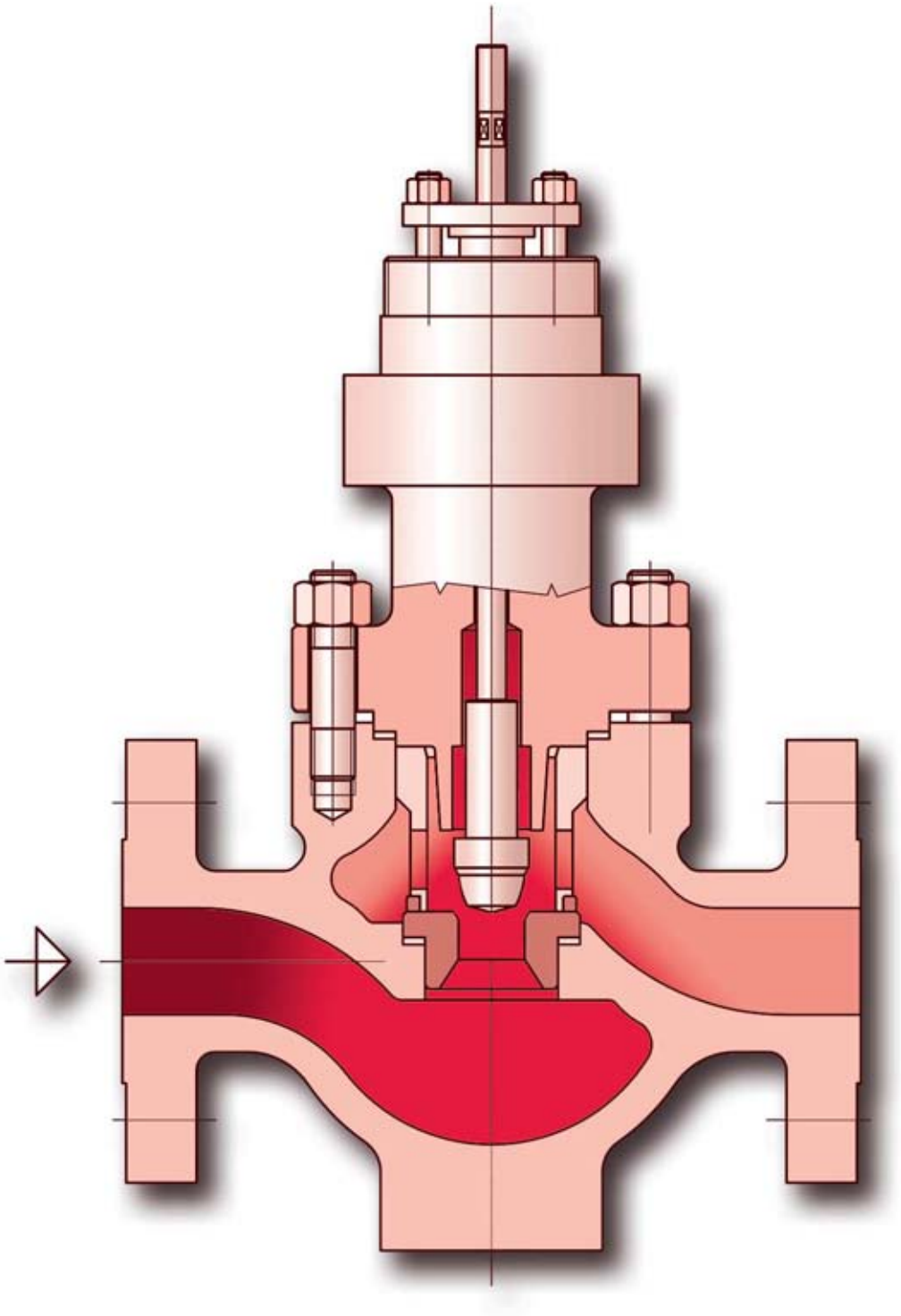



**NOTE:**

(1) ± 1,5 mm for body size up to 10"
± 3 mm for body size 12" and over

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*A Long Experience in Energy Equipment and one Goal:*

*The Customer's satisfaction.*



Padova Plant.

VALVITALIA

CONTROL VALVES • DIVISION

by TGT tormene gas technology


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03.07 - 200 - CVD/LIG1-LIG2.01