

Series 240

Pneumatic Control Valves Type 3522-1 and Type 3522-7 Globe Valve Type 3522 ANSI Class 300



Application

Control valve for process engineering and plants with industrial requirements.

Sizes ½" to 2"

Pressures ANSI Class 300

Temperatures from 20 °F to +430 °F (28 °C to +220 °C)

Compliant ANSI, ASME and ASTM standards.



Type 3522 Globe Valve Actuator options:

- Type 271 Pneumatic Actuator (Type 3522-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3522-7 Control Valve)
for integral positioner attachment

Valve body material options:

- Bronze B148-9A
- Stainless cast steel per ASTM specification A 351 CF8M

Valve plug sealing options:

- Metal
- Soft
- Lapped-in metal

These control valves feature a low profile design and interchangeability of parts that provides the flexibility to meet a wide range of applications. The modular accessory packages available can be configured to satisfy any control requirements.

Versions

- **Type 3522-1** · Nominal sizes ½" to 2"
with Type 271 Pneumatic Actuator (see Data Sheet T 8310)
- **Type 3522-7** (Fig. 1) · Nominal sizes ½" to 2"
with Type 3277 Pneumatic Actuator for integral positioner attachment (see Data Sheet T 8311)

Additional versions optionally with:

- **Non-adjustable packing and blowout protected stems** are standard for maintenance, convenience, and safety
- **Adjustable packing** · On request
- **Insulating section** · For high operating temperatures (-325 to 800 °F) · On request
- **Manual handwheel** · See Data Sheet T 8310



Fig. 1 · Type 3522-7 ½" to 2" with
Type 3277 Pneumatic Actuator

Fail-safe action

Springs/Diaphragm plate orientation determines fail-safe action (see Data Sheet T 8310 for details)

Actuator stem "extends" (air-to-open / fail-close)

The actuator springs "close" the valve upon air supply failure.

Actuator stem "retracts" (air-to-close / fail-open)

The actuator springs "open" the valve upon air supply failure.

Notes on the differential pressure tables 3a to 3d

- For all valves in nominal sizes 1/2" to 2" with actuators containing an effective diaphragm area size 350, the maximum permissible supply pressure is 90 psi.
- Process medium flows against the closing direction of the valve plug (flow-to-open valve)
- Version with PTFE stuffing box
- With the maximum differential pressures specified, the leakage rates does not exceed Table 1.
- The differential pressure specified can be limited by the Pressure-Temperature Diagram.

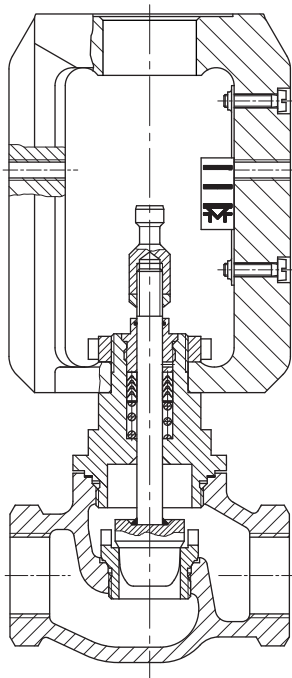


Fig. 3·Type 3522-1 1/2" to 1"

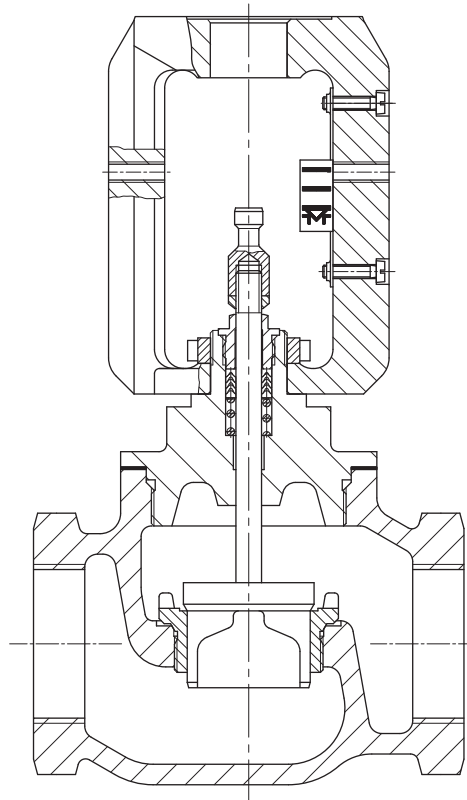


Fig. 4·Type 3522-1 1 1/4" to 2"
Version with forged yoke design

Table 1 · Technical data

| | | | |
|---|---------------------------------|----------------------------|---------------------------------|
| Size | ½" ... 2" | | |
| ASTM material | Bronze B148-9A | Stainless steel A 351 CF8M | |
| Type of connection | Female thread | | |
| Form of connection | NPT ¹⁾ | | |
| Pressure ANSI Class | 300 | | |
| Seat/plug sealing | Metal, soft or lapped-in metal | | |
| Characteristic | Equal percentage or linear | | |
| Rangeability | 50:1 for sizes ½" ... 2" | | |
| Temperature ranges °F (°C) · Permissible operating pressures according to the Pressure-Temperature Diagram | | | |
| Body without insulating section | -20 ... 430 °F (-10 ... 220 °C) | | |
| Body with | Insulating section | On request | |
| | Bellows section | On request | |
| Valve plug | Standard | Metal sealing | -20 ... 430 °F (-10 ... 220 °C) |
| | | Soft sealing | -20 ... 430 °F (-10 ... 220 °C) |
| Leakage rate class according to ANSI/FCI 70-2-1991 | | | |
| Valve plug | Standard | Metal sealing | IV |
| | | Soft sealing | VI |
| | | Lapped-in metal s. | VI |

¹⁾ Other versions available on request

Table 2 · Materials ASTM/AISI Material description

| | | |
|------------------------------------|---|----------------------------|
| Standard version | | |
| Valve body ¹⁾ | Bronze B148-9A | Stainless steel A 351 CF8M |
| Valve bonnet | Bronze B148-9A | Stainless steel A 351 CF8M |
| Seat and plug ²⁾ | AISI 316 Ti ³⁾ | |
| | Sealing ring for soft sealing: PTFE with glass fiber | |
| Stuffing box packing ⁴⁾ | V-ring packing of PTFE with carbon · Packing spring of stainless steel AISI 301 | |
| Body gasket | Copper | Stainless steel |
| Insulating section | On request | |

¹⁾ See Pressure-Temperature Diagram; other materials on request.

²⁾ All seats and plugs with metal sealing are also available with stellite hardening.

³⁾ Other materials on request.

⁴⁾ Other packings available on request.

Table 3 · C_v and K_{vs} values

Table 3a · Overview

| | | | | | | | | | | | | | | | |
|-----------------|----|------|------|------|------|------|-----|------|-----|-----|-------|----|------|-----|-----|
| C _v | | 0.12 | 0.2 | 0.3 | 0.5 | 0.75 | 1.2 | 2 | 3 | 5 | 7.5 | 12 | 20 | 30 | 40 |
| K _{vs} | | 0.1 | 0.16 | 0.25 | 0.4 | 0.63 | 1.0 | 1.6 | 2.5 | 4.0 | 6.3 | 10 | 16 | 25 | 35 |
| Seat Ø D | in | 0.12 | | | 0.24 | | | 0.47 | | | 0.945 | | 1.22 | 1.5 | 1.9 |
| | mm | 3 | | | 6 | | | 12 | | | 24 | | 31 | 38 | 48 |
| Travel | in | 0.6 | | | | | | | | | | | | | |
| | mm | 15 | | | | | | | | | | | | | |

Table 3b · Standard version

| | | | | | | | | | | | | | | | |
|-----------------|-------|------|------|------|-----|------|-----|-----|-----|-----|-----|----|----|----|----|
| C _v | | 0.12 | 0.2 | 0.3 | 0.5 | 0.75 | 1.2 | 2 | 3 | 5 | 7.5 | 12 | 20 | 30 | 40 |
| K _{vs} | | 0.1 | 0.16 | 0.25 | 0.4 | 0.63 | 1.0 | 1.6 | 2.5 | 4.0 | 6.3 | 10 | 16 | 25 | 35 |
| Size | in/mm | | | | | | | | | | | | | | |
| 1/2 | 15 | • | • | • | • | • | • | • | • | • | | | | | |
| 3/4 | 20 | • | • | • | • | • | • | • | • | • | • | | | | |
| 1 | 25 | • | • | • | • | • | • | • | • | • | • | • | | | |
| 1 1/2 | 40 | | | | • | • | • | • | • | • | • | • | • | • | • |
| 2 | 50 | | | | • | • | • | • | • | • | • | • | • | • | • |

Terms for control valve sizing according to ISA S75.01/(DIN) IEC 534, Parts 2-1 and 2-2: F_L = 0.95, x_T = 0.75
 Conversion of valve sizing coefficients: C_v (gpm/min.) = 1.17 · K_{vs} (m³/h)

Table 4 · Differential pressure tables · Unbalanced valve plugs

Values specified in the **shaded columns** correspond to the **bench range** · Differential pressures specified in the **white columns** apply to maximum **pre-tensioned springs**.

Differential pressures enclosed in parentheses in the table refer to the values enclosed in parentheses in the row "Bench range".

See notes on the differential pressure tables (page 2).

Table 4a · Permissible differential pressures Δp · Pressures in bar

For actuators employing fail-safe action: Actuator stem "extends" · Valve fully closed at supply pressure 0 bar

| Bench range (bar) for actuators: | | 240 | | 0.2...1.0 | | 0.3...1.1 | | 0.4...2.0 | | 0.6...2.2 | | 0.6...3.0 ¹⁾ | | 0.9...3.3 | | - | | - | | |
|----------------------------------|----------------|-----------------|---------------|----------------------------|-----|-----------|------|-----------|-----|-----------|----|-------------------------|----|-----------|----|-----------|----|-----------|---|---|
| | | 120,350 | | | | 0.4...1.2 | | | | 0.8...2.4 | | | | 1.2...3.6 | | 1.4...2.3 | | 2.1...3.3 | | |
| Required supply pressure (bar) | | | | 1.2 | | 1.4 | | 2.2 | | 2.6 | | 3.2 | | 3.8 | | 2.5 | | 3.5 | | |
| Size | C _v | K _{vs} | Actuator Size | Δp with p ₂ = 0 | | | | | | | | | | | | | | | | |
| in | mm | | | | | | | | | | | | | | | | | | | |
| 1/2" to 1" | 15 to 25 | 0.12 to 0.3 | 0.1 to 0.25 | 120 | 40 | - | 40 | - | - | - | - | - | - | - | - | - | - | - | - | |
| | | | | 240 | 40 | 40 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 1/2" to 2" | 15 to 50 | 0.5 to 1.2 | 0.4 to 1.0 | 120 | 22 | - | 40 | - | - | - | - | - | - | - | - | - | - | - | - | |
| | | | | 240 | 40 | 40 | 40 | - | - | - | - | - | - | - | - | - | - | - | - | |
| | | | | 2 | 1.6 | 120 | 9 | - | 28 | - | - | - | - | - | - | - | 40 | - | - | - |
| | | | | 3 | 2.5 | 240 | 28 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | - | - | - | - |
| 3/4" to 2" | 20 to 50 | 7.5 | 6.3 | 120 | - | - | 5.5 | - | - | - | - | - | - | - | 30 | 40 | - | - | | |
| | | | | 240 | 5.2 | 9.3 | 14.8 | 24 | 24 | 39 | - | - | - | - | - | - | - | | | |
| | | | | 12 | 10 | 350 | 10 | 24 | 24 | 38 | 38 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | |
| 1 1/2" and 2" | 40 and 50 | 20 | 16 | 120 | - | - | 3 | - | - | - | - | - | - | 18 | 28 | - | - | - | | |
| | | | | 240 | 2.5 | 5.2 | 8.0 | 14 | 14 | 23 | - | - | - | - | - | - | | | | |
| | | | | 350 | 5.2 | 13.5 | 13.5 | 30 | 22 | 47 | 40 | 40 | 40 | 40 | 40 | | | | | |
| 1 1/2" to 2" | 40 to 50 | 30 | 25 | 120 | - | - | 1.5 | - | - | - | - | - | - | 12 | 19 | - | - | - | | |
| | | | | 240 | 1.3 | 3.1 | 5.0 | 9.0 | 9.0 | 15 | - | - | - | - | - | | | | | |
| | | | | 350 | 3.1 | 8.5 | 8.5 | 20 | 14 | 31 | 37 | 40 | 40 | 40 | 40 | | | | | |
| | | | | 240 | - | - | 3.0 | 5.0 | 5.0 | 9.0 | - | - | - | - | - | | | | | |
| 2" | 50 | 40 | 35 | 350 | 1.6 | 5.0 | 5.0 | 12 | 8.5 | 19 | 23 | 35 | - | - | - | - | - | | | |

¹⁾ Not for actuator 120

Table 4b · Permissible differential pressures Δp · Pressures in psi

For actuators employing fail-safe action: Actuator stem "extends" · Valve closed at supply pressure 0 psi

| Bench range (psi) for actuators: | | 240 | | 3...15 | 5...17 | | 6...30 | 9...33 | | 9...45 ¹⁾ | 13...49 | | - | | - | | | | |
|-------------------------------------|-----------|----------------|-----------------|---------------|------------------------------------|-----|--------|---------|-----|----------------------|---------|-----|---------|-----|---------|-----|-----|-----|--|
| | | 120, 350 | | | 6...18 | | | 12...36 | | | 18...54 | | 20...34 | | 30...48 | | | | |
| Required supply pressure (psi) | | | | 18 | | 21 | | 33 | | 39 | | 48 | | 57 | | 37 | | 51 | |
| Size | | C _v | K _{vs} | Actuator Size | Δp with p ₂ = 0 | | | | | | | | | | | | | | |
| in | mm | | | | | | | | | | | | | | | | | | |
| 1/2" to 1" | 15 to 25 | 0.12 to 0.3 | 0.1 to 0.25 | 120 | 320 | - | 580 | - | - | - | - | - | - | - | - | - | - | - | |
| | | | | 240 | 580 | 580 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1/2" to 2" | 15 to 50 | 0.5 to 1.2 | 0.4 to 1.0 | 120 | 320 | - | 580 | - | - | - | - | - | - | - | - | - | - | - | |
| | | | | 240 | 580 | 580 | 580 | - | - | - | - | - | - | - | - | - | - | - | |
| | 2 | 1.6 | 120 | 130 | - | 405 | - | - | - | - | - | 580 | - | - | - | - | - | | |
| | 3 | 2.5 | 240 | 406 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | - | - | - | - | - | - | | |
| | 5 | 4 | 350 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | - | 580 | - | - | - | - | - | | |
| 3/4" to 2" | 20 to 50 | 7.5 | 6.3 | 120 | - | - | 80 | - | - | - | - | - | 435 | 580 | - | - | - | - | |
| | | | | 240 | 75 | 135 | 215 | 350 | 350 | 350 | 565 | - | - | - | - | - | - | - | |
| | 12 | 10 | 350 | 145 | 350 | 350 | 550 | 550 | 550 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | |
| 1 1/2" and 2" | 40 and 50 | 20 | 16 | 120 | - | - | 44 | - | - | - | - | 260 | 405 | - | - | - | - | - | |
| | | | | 240 | 36 | 75 | 115 | 200 | 200 | 335 | - | - | - | - | - | - | - | - | |
| | | | | 350 | 75 | 195 | 195 | 435 | 320 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | 580 | |
| 1 1/2" to 2" | 40 to 50 | 30 | 25 | 120 | - | - | 22 | - | - | - | - | 175 | 275 | - | - | - | - | - | |
| | | | | 240 | 19 | 45 | 72 | 130 | 130 | 218 | - | - | - | - | - | - | - | - | |
| | | | | 350 | 45 | 125 | 125 | 290 | 200 | 450 | 535 | 580 | 580 | 580 | 580 | 580 | 580 | | |
| 2" | 50 | 40 | 35 | 240 | - | - | 43 | 72 | 72 | 130 | - | - | - | - | - | - | - | | |
| | | | | 350 | 23 | 72 | 72 | 175 | 123 | 275 | 330 | 507 | 507 | 507 | 507 | 507 | | | |

¹⁾ Not for actuator 120

Tables 4c and 4d · Permissible differential pressures Δp

For actuators employing fail-safe action: Actuator stem "retracts" · Valve closed at required supply pressure

| Bench range (bar/psi) for actuators: | | | | Table 4c · Pressures in bar | | | | Table 4d · Pressures in psi | | | | | |
|---|-----------|----------------|-----------------|-----------------------------|------------------------------------|-----|-----|-----------------------------|------------------------------------|-----|----------|----|---|
| | | | | 120 ... 350 | | | | 0.2 ... 1.0 | | | 3 ... 15 | | |
| Required supply pressure (bar/psi) | | | | 1.2 | | 2.4 | | 4 | | 18 | 36 | 58 | |
| Size | | C _v | K _{vs} | Actuator Size | Δp with p ₂ = 0 | | | | Δp with p ₂ = 0 | | | | |
| in | mm | | | | | | | | | | | | |
| 1/2" to 1" | 15 to 25 | 0.12 to 0.3 | 0.1 to 0.25 | 120 | 23 | 40 | - | 330 | 580 | - | - | | |
| | | | | 240 | 40 | - | - | 580 | - | - | | | |
| 1/2" to 2" | 15 to 50 | 0.3 to 1.2 | 0.4 to 1.0 | 120 | 23 | 40 | - | 330 | 580 | - | - | | |
| | | | | 240 | 40 | 40 | - | 580 | 580 | - | - | | |
| | | | | 2 | 1.6 | 120 | 9 | 40 | - | 130 | 580 | - | - |
| | | | | 3 | 2.5 | 240 | 28 | 40 | - | 410 | 580 | - | - |
| | 5 | 4 | 350 | 40 | 40 | - | 580 | 580 | - | - | | | |
| 3/4" to 2" | 20 to 50 | 7.5 | 6.3 | 120 | 0.6 | 31 | 40 | 10 | 450 | 580 | | | |
| | | | | 240 | 5.2 | 40 | 40 | 80 | 580 | 580 | | | |
| | 12 | 10 | 350 | 10 | 40 | 40 | 145 | 580 | 580 | | | | |
| 1 1/2" and 2" | 40 and 50 | 20 | 16 | 120 | - | 18 | 40 | - | 260 | 580 | | | |
| | | | | 240 | 2.5 | 37 | 40 | 35 | 540 | 580 | | | |
| | | | | 350 | 5.2 | 40 | 40 | 75 | 580 | 580 | | | |
| 1 1/2" to 2" | 40 to 80 | 30 | 25 | 120 | - | 11 | 28 | - | 160 | 410 | | | |
| | | | | 240 | 1.3 | 24 | 40 | 20 | 350 | 580 | | | |
| | | | | 350 | 3.1 | 37 | 40 | 45 | 540 | 580 | | | |
| 2" | 50 | 40 | 35 | 240 | 0.5 | 15 | 34 | 10 | 220 | 490 | | | |
| | | | | 350 | 1.6 | 23 | 40 | 25 | 330 | 580 | | | |

Table 5 · Dimensions of the standard Type 3522-1 and Type 3522-7 versions

| Globe valve | Size | NPT | 1/2" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" |
|--------------------|-----------|-----|-------|-------|-------|--------|--------|-------|
| Length L | Class 300 | in | 3.5 | 3.5 | 4.31 | - | 5.31 | 6.66 |
| | | mm | 89 | 89 | 109 | - | 135 | 169 |
| H1 for actuators: | ≤ 350 | in | 9.25 | | | - | 8.62 | 8.875 |
| | | mm | 235 | | | - | 219 | 225 |
| H2 (approximately) | | in | 1.125 | 1.125 | 1.375 | - | 1.68 | 1.75 |
| | | mm | 28.5 | 28.5 | 35 | - | 43 | 44.5 |

| | | | | |
|---|-----------------|-----------------|-----------------|-----------------|
| Pneumatic actuator | Size | 120 | 240 | 350 |
| | in ² | 18.6 | 37.2 | 54.25 |
| Diaphragm Ø D | in | 6.6 | 9.45 | 11.02 |
| | mm | 168 | 240 | 280 |
| H | in | 2.72 | 2.56 | 3.35 |
| | mm | 69 | 65 | 85 |
| H3 (Type 271 and Type 3277 Actuators) ¹⁾ | in | 4.33 | | |
| | mm | 110 | | |
| Thread | | M 30 x 1.5 | | |
| a (for Type 271 Actuator) | | NPT 1/8 (G 1/8) | NPT 1/4 (G 1/4) | NPT 3/8 (G 3/8) |
| a2 (for Type 3277 Actuator) | | - | | |
| | | NPT 3/8 (G 3/8) | | |

¹⁾ Minimum clearance for actuator removal

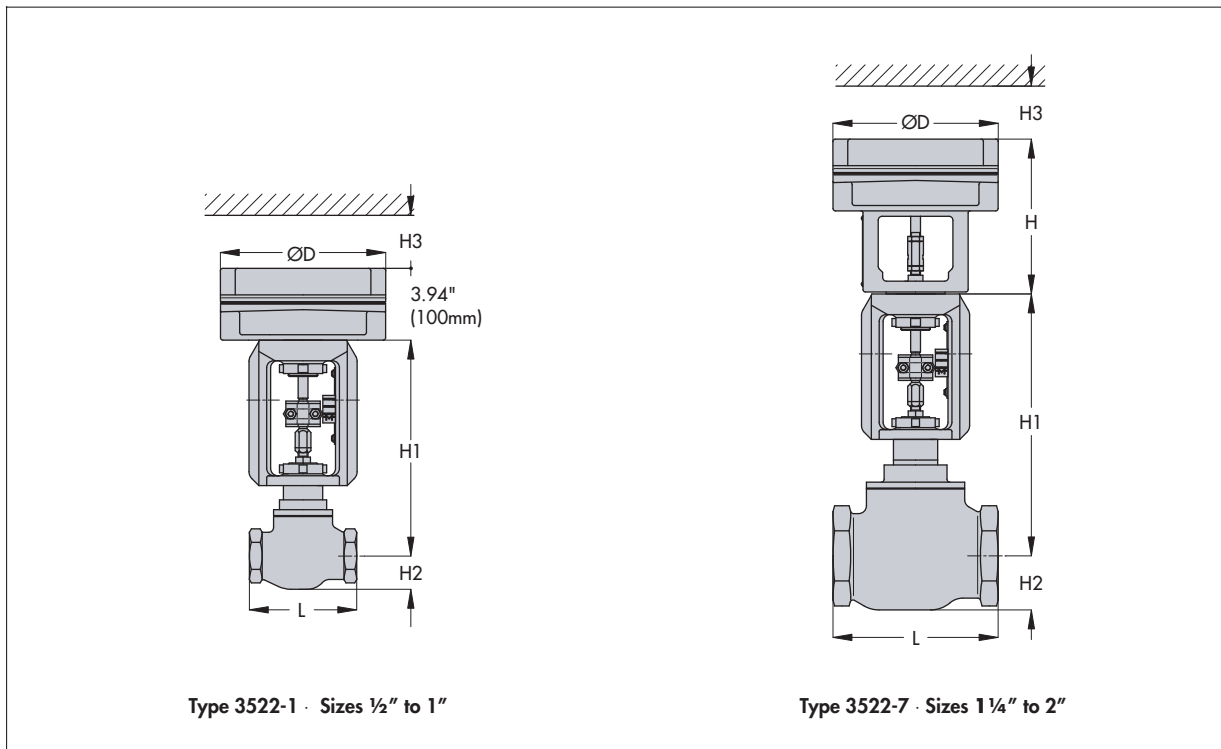


Table 6 × Weights of 3522-1 and Type 3522-1 Control Valves

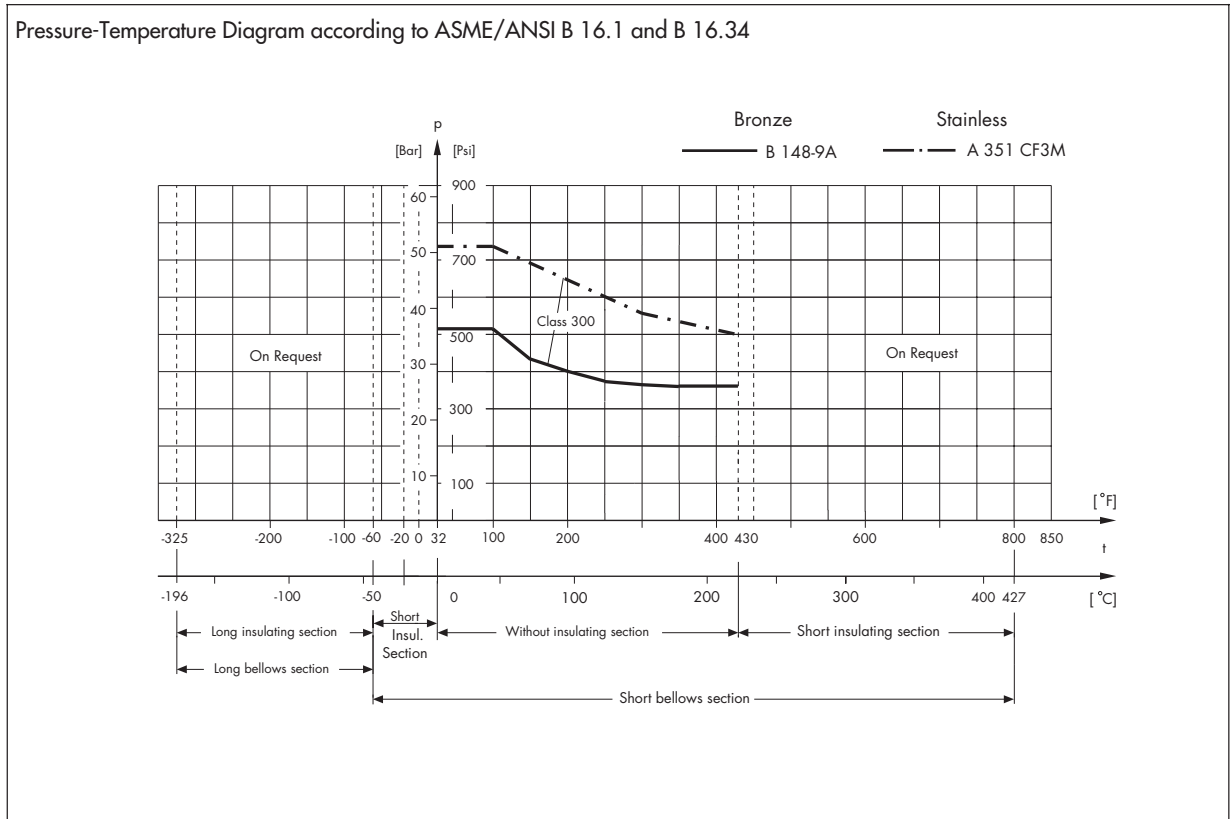
| Globe valve | Size in | 1/2" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" |
|-------------------------|---------|------|------|----|--------|--------|----|
| Weight without actuator | lbs | 11 | 13 | 15 | - | 26 | 33 |
| | kg | 5 | 6 | 7 | - | 12 | 15 |

| Pneumatic actuator | Size | 120 | 240 | 350 |
|---------------------|------|-----------------|------|------|
| | | in ² | 18.6 | 37.2 |
| Weight of Type 271 | lbs | 6.6 | 11 | 18 |
| | kg | 3 | 5 | 8 |
| Weight of Type 3277 | lbs | 7.7 | 20 | 26.5 |
| | kg | 3.5 | 9 | 12 |

Ordering text:

Size ...
 ANSI Class ... 300
 Body material: According to Table 2
 Type of connections: NPT female thread
 Valve plug: Standard; with metal, soft or lapped-in metal sealing
 Characteristic: Equal percentage or linear
 Pneumatic actuator: Versions according to T 8310 / T 8311

Fail-safe action: Fail-open/fail-close
 Process fluid: Density in lb/ft³ and temperature in °F
 Flow rate: In lb/hr, scfh under standard or operating conditions
 Pressure: p1 in psia (absolute pressure)
 p2 in psia (absolute pressure) at minimum, normal, and maximum flow rate
 Valve accessories: Versions according to T 8350



Specifications subject to change without notice.



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