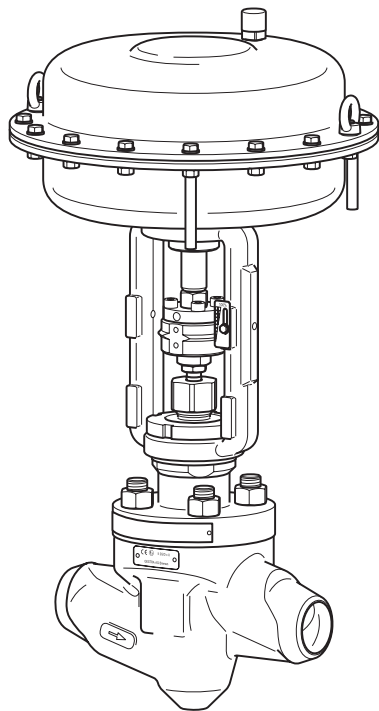


ZK 29/14, 2"



ZK 29/20, 2"

Control Valve with ZK Radial Stage Nozzle®
**ZK 29 ASME
Class 900
1", 2", 3", 4", 6"**
Description

Control valve ZK 29 with ZK radial stage nozzle® for reducing high differential pressures in industrial installations and power plants and used as follows:

- Injection control valve
- Drain valve
- Continuous blowdown valve
- Recirculation control valve (leak off valve)
- Warm-up valve
- Steam control valve
- Feedwater control valve

All internal parts are exchangeable. Leakage rating Class VI according to ANSI FCI 70-2 2003.

Optional extras:

- Connection for sealing fluid
- Adjustable stroke limitation in the closing direction
- Self-tightening stuffing box
- Sampling valve (on request)

Special angled designs are available for all equipment versions.

Types of actuator

The following actuators are available:

- 01: Handwheel (retrofitting an electric rotary actuator is not possible)
- 02: Handwheel (standard design, retrofitting an electric rotary actuator (with insert bush type B1 to EN ISO 5210) is possible)
- 12: Electric rotary actuator (with threaded bush type A to EN ISO 5210)
- 13: Electric thrust actuator
- 14: Electric rotary actuator (with insert bush type B1 to EN ISO 5210)
- 20: Pneumatic diaphragm actuator
- 30: Lever actuator without part-turn actuator attached
- 31: Lever actuator with part-turn actuator attached
- 40: Hydraulic cylinder

Pressure and temperature ratings
Admissible service pressure (bar) for a body made of ASME materials

(calculated to ASME B16.34, Class 900)

For higher pressure/temperature ratings, please contact the manufacturer.

| Temperature °C | SA182 F12 | SA217 WC6 |
|----------------|-----------|-----------|
| 20 | 155 | 155 |
| 200 | 138 | 143 |
| 300 | 128 | 128 |
| 400 | 109 | 109 |
| 500 | 64 | 77 |
| 550 | 36 | 38 |
| 575 | 26 | 26 |

Admissible service pressure (psi) for a body made of ASME materials

(calculated to ASME B16.34, Class 900)

| Temperature °C | SA182 F12 | SA217 WC6 |
|----------------|-----------|-----------|
| 100 | 2,250 | 2,250 |
| 400 | 2,005 | 2,080 |
| 600 | 1,815 | 1,815 |
| 800 | 1,525 | 1,525 |
| 950 | 825 | 955 |
| 1,022 | 595 | 650 |
| 1,100 | 290 | 290 |

Materials

| Component | ASME |
|-----------------|----------------|
| Body 1", 2" | SA182 F12 CL.2 |
| Body 3", 4", 6" | SA217 WC6 |
| Cap | SA217 WC6 |
| Cover | SA182 F12 CL.2 |
| Threaded bolt | (S)A193-B16 |
| Nuts | (S)A194-7 |

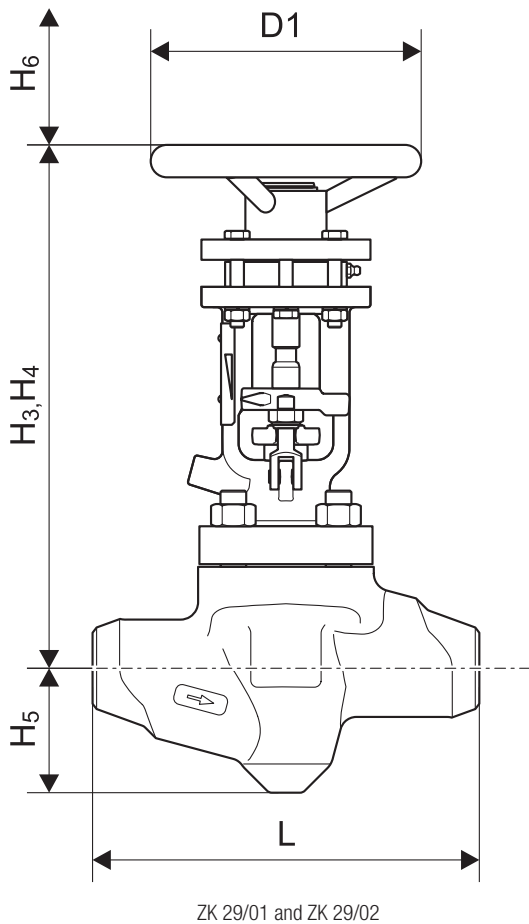
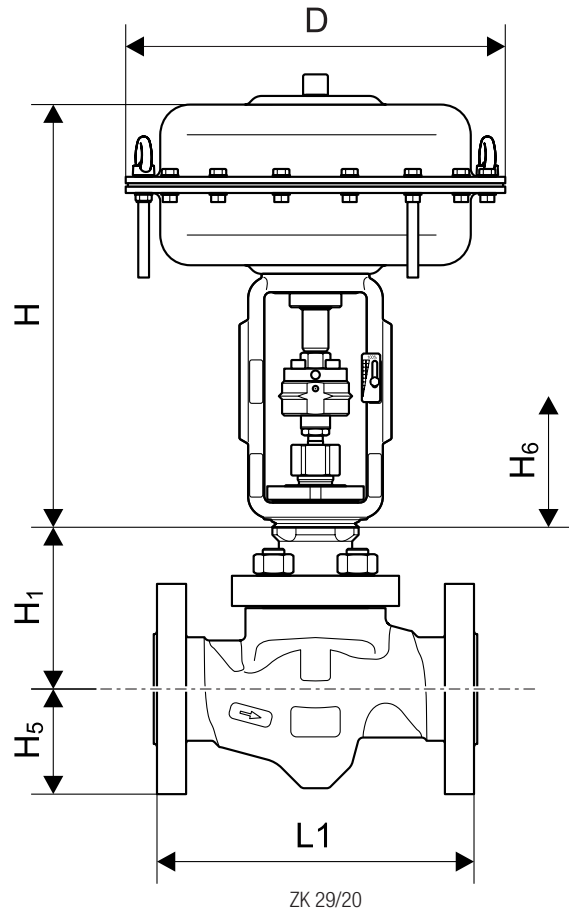
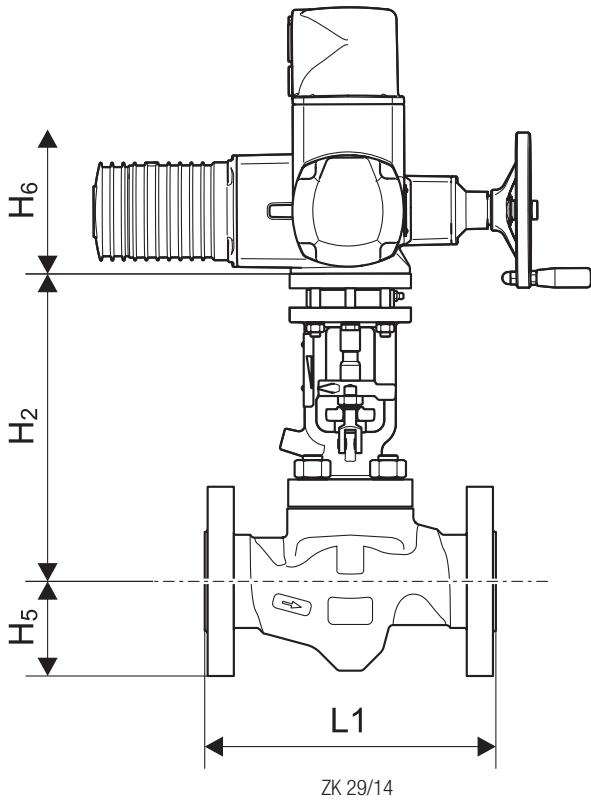
Admissible differential pressure ΔPMX

| | bar | psi |
|--------------|-----|-------|
| Single-stage | 40 | 580 |
| Multi-stage | 100 | 1,450 |

Types of end connection

- Flange Class 300, Class 600, Class 900
 - Butt-weld ends: Schedule 40, Schedule 80
 - Socket-weld ends: Class 3000, Class 6000
- Other sizes available on request

Dimensions and weights



Dimensions

| Valve size | | 1" | 2" | 3" | 4" | 6" |
|---|----|--------|--------|--------|---------|---------|
| H1 | mm | 123 | 150 | 213 | 242 | 275 |
| | in | 4.8" | 5.9" | 8.4" | 9.5" | 10.8" |
| H2 | mm | 266 | 317 | 402 | 545 | 661 |
| | in | 10.5" | 12.5" | 15.8" | 21.5" | 26.0" |
| H3 (ZK 29/01) | mm | 272 | 330 | 415 | – | – |
| | in | 10.7" | 13.0" | 16.3" | – | – |
| H4 (ZK 29/02) | mm | 322 | 387 | 472 | 595 | 740 |
| | in | 12.7" | 15.2" | 18.6" | 23.4" | 29.1" |
| H5 | mm | 55 | 92 | 100 | 114 | 162 |
| | in | 2.2" | 3.6" | 3.9" | 4.5" | 6.4" |
| H6 (space required for servicing) | mm | 103 | 115 | 156 | 209 | 135 |
| | in | 4.1" | 4.5" | 6.1" | 8.2" | 5.3" |
| D1 | mm | 125 | 200 | 200 | 320 | 500 |
| | in | 4.9" | 7.9" | 7.9" | 12.6" | 19.7" |
| Overall length of flange L1 | | | | | | |
| CL300 | mm | 197 | 267 |) |) |) |
| | in | 7.8" | 10.5" |) |) |) |
| CL600 | mm | 210 | 286 | 337 | 394 | 508 |
| | in | 8.3" | 11.3" | 13.3" | 15.5" | 20.0" |
| CL900 | mm | 292 | 375 | 387 | 511 | 714 |
| | in | 11.5" | 14.8" | 15.2" | 20.1" | 28.1" |
| Socket-weld end L (overall length CL3000, possible for CL6000 as an option) | | | | | | |
| CL3000 | mm | 210 | 286 | – | – | – |
| | in | 8.3" | 11.3" | – | – | – |
| CL6000 | mm | 279 | 375 | – | – | – |
| | in | 11.0" | 14.8" | – | – | – |
| Butt-weld ends L (overall length CL600, possible for CL900 as an option) | | | | | | |
| CL300 | mm | 210 | 286 | 337 | 394 | 508 |
| | in | 8.3" | 11.3" | 13.3" | 15.5" | 20.0" |
| CL600 | mm | 210 | 286 | 337 | 394 | 508 |
| | in | 8.3" | 11.3" | 13.3" | 15.5" | 20.0" |
| CL900 | mm | 279 | 375 | 460 | 530 | 768 |
| | in | 11.0" | 14.8" | 18.1" | 20.9" | 30.2" |
| Connection (e.g. Sched 80 pipe) | mm | 33.4 × | 60.3 × | 88.9 × | 114.3 × | 168.3 × |
| | | 4.5 | 5.5 | 7.6 | 8.6 | 11.0 |

) Other dimensions available on request

Dimensions and weights continued

Weight, without actuator

| Type | Nominal size | 1" | 2" | 3" | 4" | 6" |
|-------------|--------------|----|-----|-----|-----|-----|
| ZK 29/01 FL | kg | 18 | 44 | 69 | – | – |
| | lb | 40 | 97 | 152 | – | – |
| ZK 29/01 SE | kg | 15 | 25 | 54 | – | – |
| | lb | 33 | 55 | 119 | – | – |
| ZK29/02 FL | kg | 21 | 47 | 71 | 121 | 208 |
| | lb | 46 | 103 | 156 | 267 | 458 |
| ZK29/02 SE | kg | 14 | 26 | 50 | 82 | 162 |
| | lb | 31 | 57 | 110 | 181 | 357 |
| ZK 29/14 FL | kg | 20 | 45 | 69 | 115 | 193 |
| | lb | 44 | 99 | 152 | 254 | 425 |
| ZK 29/14 SE | kg | 13 | 24 | 48 | 76 | 147 |
| | lb | 29 | 53 | 106 | 168 | 324 |
| ZK 29/20 FL | kg | 16 | 45 | 67 | 103 | 183 |
| | lb | 35 | 99 | 148 | 227 | 403 |
| ZK 29/20 SE | kg | 9 | 24 | 46 | 64 | 137 |
| | lb | 20 | 53 | 101 | 141 | 302 |

FL: flange, BW: butt-weld end

Dimensions and weights of pneumatic diaphragm actuator

| | | PB 503 | PB 701 | PB 1502 | PB 3002 |
|--------|----|--------|--------|---------|---------|
| D | mm | 355 | 390 | 548 | 548 |
| | in | 13.8" | 15.9" | 21.5" | 21.6" |
| H | mm | 460 | 600 | 800 | 1,140 |
| | in | 18.1" | 23.6" | 31.5" | 44.9" |
| Weight | kg | 28 | 40 | 124 | 240 |
| | lb | 62 | 88 | 273 | 528 |

Flow characteristics

Kvs values

| Valve size | Characteristic | Kvs m ³ /h | | | | Stroke mm |
|------------|------------------|-----------------------|-----|-----|-----------|-----------|
| | | Δp 100 bar | | | Δp 40 bar | |
| 1" | linear | 0.7 | 1.4 | 2.1 | 2.5 | 16 |
| | equal percentage | | | | – | |
| 2" | linear | 3 | 6 | 9 | 12 | 33 |
| | equal percentage | | | | – | |
| 3" | linear | 14 | 21 | 28 | 35 | 45 |
| | equal percentage | | | | – | |
| 4" | linear | 20 | 33 | 46 | 55 | 60 |
| | equal percentage | | | | – | |
| 6" | linear | 70 | 100 | 130 | 158 | 90 |
| | equal percentage | | | | – | |

Cv values

| Valve size | Characteristic | Cv US gal/min | | | | Stroke in |
|------------|------------------|---------------|-------|-------|------------|-----------|
| | | Δp 1450 psi | | | Δp 580 psi | |
| 1" | linear | 0.8 | 1.6 | 2.4 | 2.9 | 0.63" |
| | equal percentage | | | | – | |
| 2" | linear | 3.5 | 7.0 | 10.4 | 14.0 | 1.30" |
| | equal percentage | | | | – | |
| 3" | linear | 14.0 | 24.3 | 32.4 | 41.0 | 1.77" |
| | equal percentage | | | | – | |
| 4" | linear | 20.0 | 38.2 | 53.2 | 64.4 | 2.36" |
| | equal percentage | | | | – | |
| 6" | linear | 70.0 | 115.6 | 150.3 | 184.9 | 3.54" |
| | equal percentage | | | | – | |

Function

The ZK radial stage nozzle[®] guarantees maximum wear resistance and an ultra-tight seal, combining the function of a control valve with a shut-off valve.

Each control valve is equipped with a ZK radial stage nozzle[®].

The ZK radial stage nozzle[®] is a system consisting of several sleeves nesting inside one another, with radial orifices drilled in them. The rotation of the sleeves shifts the orifices relative to one another, forming a large number of throttling points in parallel, with turbulence (expansion) chambers between them.

The valve plug determines the flowrate through the radial stage nozzle[®]. Depending on its position, this valve plug opens the individual orifices partially or completely, producing different flowrates.

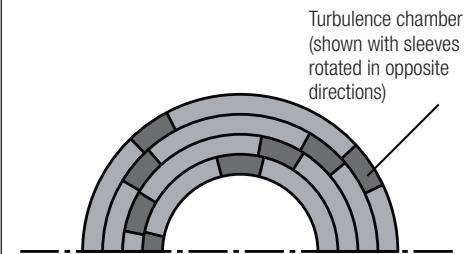
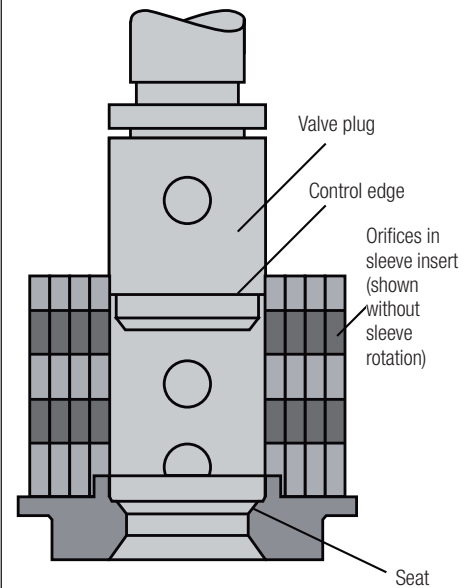
Thanks to this design, the pressure drop is reduced in stages and the fluid flowing through is split up into many partial flows. This ensures high wear resistance and reduces the noise level.

Function of the control edge

On the valve plug, there is a control edge that is separate from the seat surface and which closes the orifices in the sleeve insert before the valve plug fully comes to rest against the seat ring. This prevents wear to the seat surface.

The multiple, step-by-step expansion in the turbulence chambers minimises the pressure drop in the region of the seat.

Sectional view of ZK radial stage nozzle



Flow through ZK 29 radial stage nozzle

Control Valve with ZK Radial Stage
Nozzle®

ZK 29 ASME

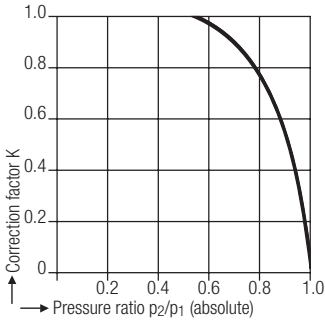
Class 900

1", 2", 3", 4", 6"

Capacity charts

The charts show the maximum flowrates of cold and hot water (condensate) at the extreme regulated position with linear characteristic curves and maximum K_V s value in a multi-stage design.

Backpressure chart for hot water



How to order

GESTRA Control Valve with Radial Stage Nozzle® ZK 29
Design data: p = . . . barg/psig, t = . . . °C/°F or Class
Operation: load conditions (1 to 3)

| | 1 | 2 | 3 |
|--------------------------|---|---|---|
| p ₁ bara/psia | | | |
| t ₁ °C/°F | | | |
| p ₂ bara/psia | | | |
| ṁ kg/h/lb/h | | | |

Please enter data here.

Fluid:

Actuation: Electric(make)
ON/OFF or MODULATING CONTROL
Voltage/Hz/
Pneumatic(make)
Spring to open:
Spring to close:
Handwheel:
Positioner:

Inspection and certification

Documentation regarding material tests and in-house examination with inspection certificate to EN 10204-3.1 or EN 10204-3.2 available for an additional charge.

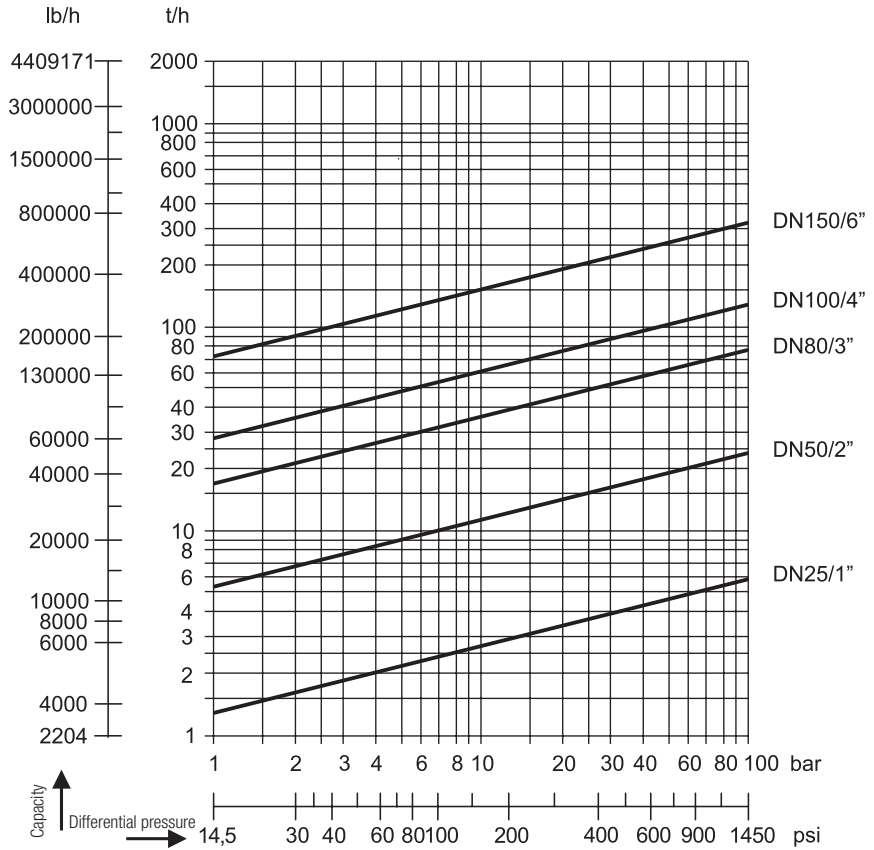
Please state your inspection and certification requirements in your enquiry or order. Certification cannot be issued after the equipment has been delivered.

For the standard scope of inspection and cost of inspection certificates, please refer to our price list *Test and Inspection Charges for Standard Equipment*.

If you require different inspections or certifications, please contact the manufacturer.

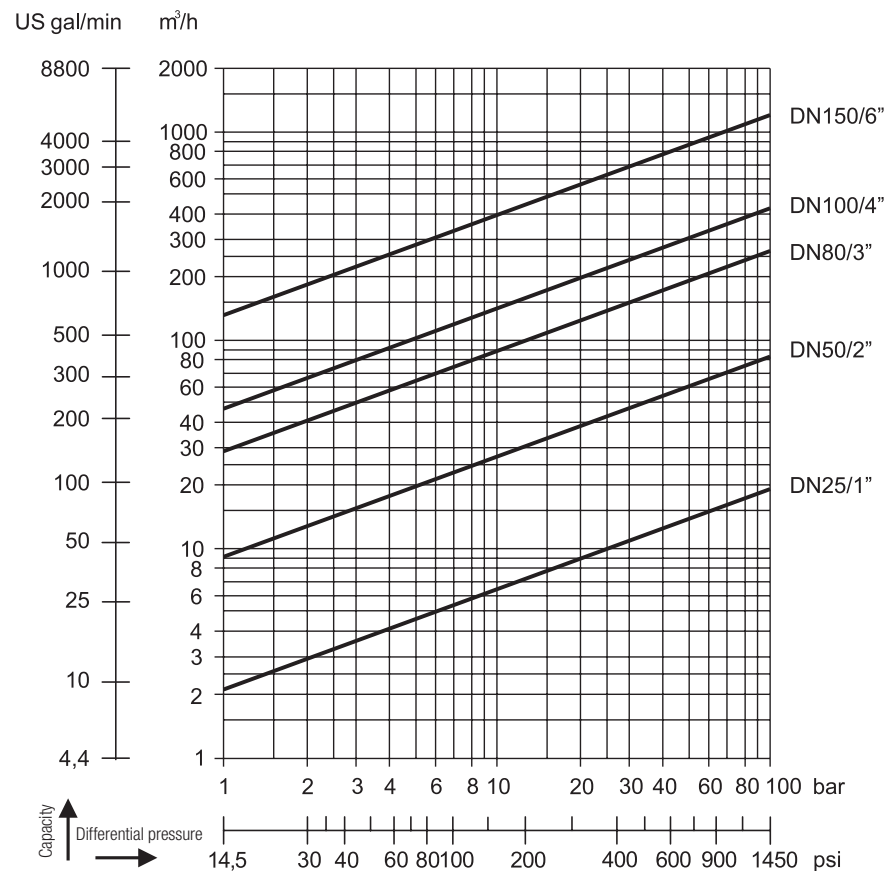
Please note our general terms of business.

Capacity chart for hot water t_s -5K



If $p_2/p_1 > 0.5$, multiply the capacity by the correction factor K taken from the backpressure chart.

Capacity chart for cold water



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