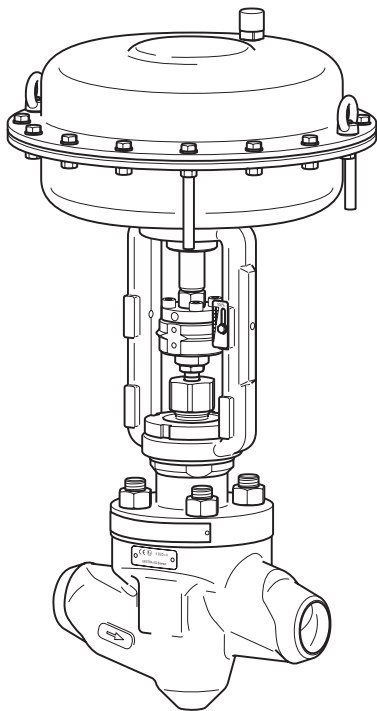


ZK 29/14, 2"



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® designed for reducing high differential pressures in industrial installations and power plants and used as:

- Injection-cooling valve
- Drain valve
- Continuous blowdown valve
- Leak-off valve
- Warm-up valve
- Steam control valve
- Feedwater control valve

All internals are exchangeable. Leakage rating Class VI acc. to ANSI FCI 70-22003.

**Optional extras:**

- Connection for sealing fluid
- Adjustable lift stop in the closing direction
- Self-tightening stuffing box
- Sample valve (on request)

Special angle-type bodies are available for all equipment versions.

**Types of actuators and operation**

The following actuators are available:

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

**Pressure & temperature ratings**

**Admissible service pressure [barg] for body made from ASME materials**

(calculated to ASME B16.34, Class 900)

For higher pressure/temperature limits please contact the manufacturer.

Temperature [°C]	A182 F12	A217 WC6
20	155	155
200	138	143
300	128	128
400	109	109
500	64	77
550	36	38
593	20	20
595	19	—

**Admissible service pressure [psig] for body made from ASME materials**

(calculated to ASME B16.34 Class 900)

Temperature [°C]	A182 F12	A217 WC6
68	2,250	2,250
400	2,005	2,080
600	1,815	1,815
800	1,525	1,525
950	825	955
1,022	522	553
1,100	290	290
1,103	283	—

**Materials**

Component part	ASME
Body 1", 2"	A182 F12 CL.2
Body 3", 4", 6"	A217 WC6
Bonnet	A217 WC6
Cover	A182 F12 CL.2
Threaded bolt	A193 B16
Nuts	A194-7

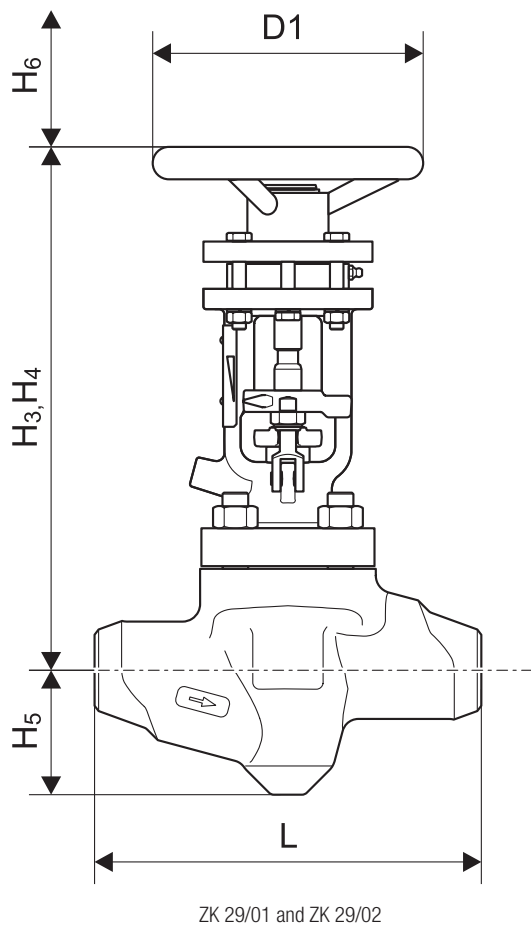
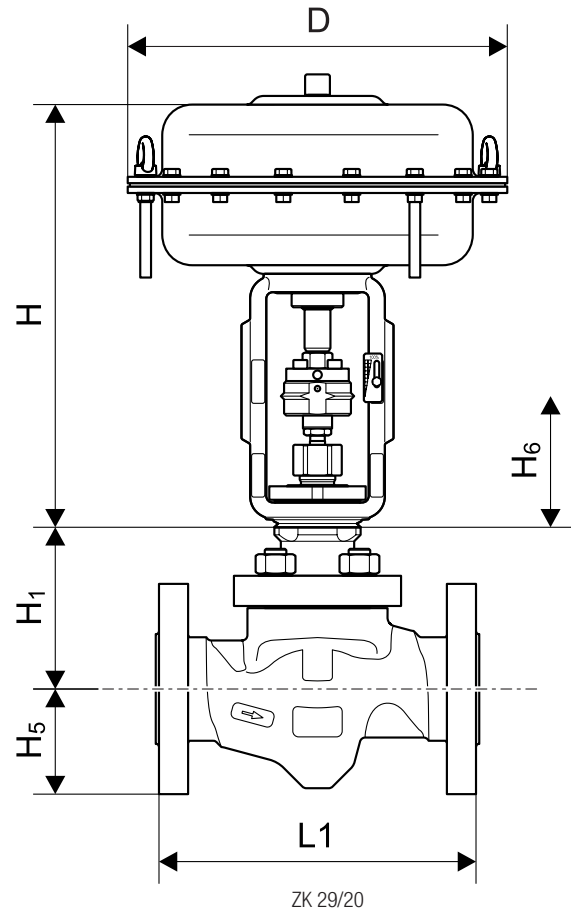
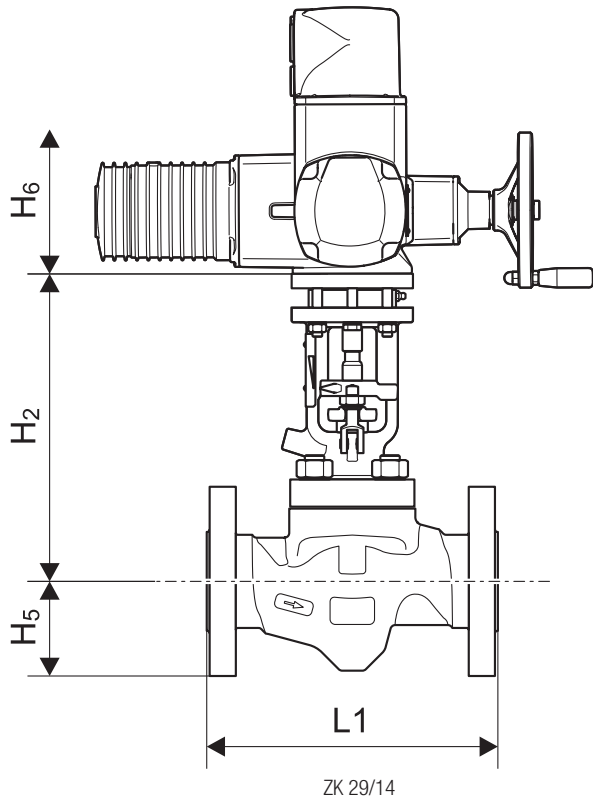
**Admissible differential pressure Δ PMX:**

	[barg]	[psi]
Single stage	40	580
Multi stage	100	1,450

**Types of end connections**

- 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 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 optionally possible for CL6000)						
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 optionally possible for CL900)						
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. tube to Sched 80)	[mm]	33.4 × 4.5	60.3 × 5.5	88.9 × 7.6	114.3 × 8.6	168.3 × 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 BW	[kg]	15	25	54	–	–
	[lb]	33	55	119	–	–
ZK 29/02 FL	[kg]	21	47	71	121	208
	[lb]	46	103	156	267	458
ZK 29/02 BW	[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 BW	[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 BW	[kg]	9	24	46	64	137
	[lb]	20	53	101	141	302

FL: Flange, BW: Butt-weld ends

### Dimensions and weights of pneumatic diaphragm actuator

		PB 502	PB 700	PB 1502	PB 3002
D	[mm]	352	405	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 value

Valve size	Characteristic	Kvs [m³/h]				Lift [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 value

Valve size	Characteristic	Cv [US gal/min]				Lift [in]
		Δp 1.450 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 ultra tight shut-off, combining the function of a control valve with a shut-off valve.

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

This system consists of several sleeves nesting within one another, containing radial orifices drilled in them. By rotation of the sleeves, the orifices are shifted relative to one another, thus forming a large number of throttling points in parallel, with turbulence chambers (expansion chambers) in between.

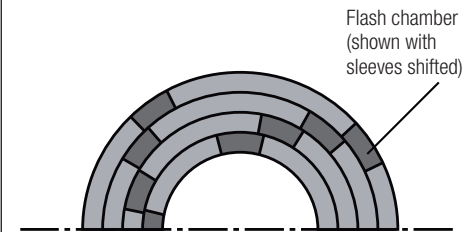
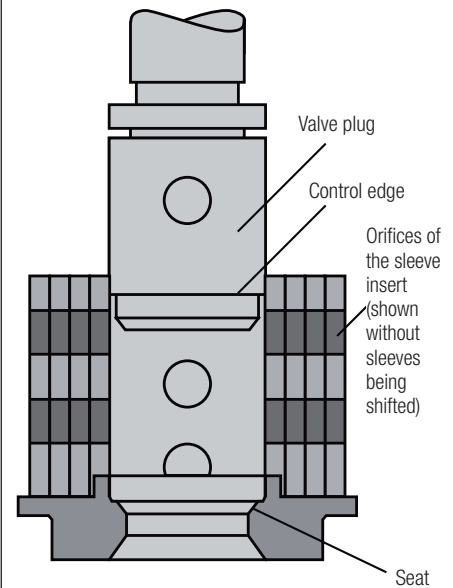
The valve plug determines the flowrate through the ZK radial stage nozzle. Depending on its position, this valve plug opens up the individual orifices partially or completely, thus producing different flowrates.

As a result of this design, the pressure drop is reduced in steps and the medium flowing through is split up into many partial flows. This ensures high resistance to wear and reduces the noise level.

### Function of the control edge

On the valve plug, there is a control edge which is separate from the seat surface and which closes the orifices of the sleeve insert before the valve plug comes to rest completely against the seat ring. As a result, wear is prevented on the surface of the seat. Because of the multiple, step-by-step expansion in the turbulence chambers, the pressure drop in the region of the seat is minimized.

## Sectional view of ZK radial stage nozzle



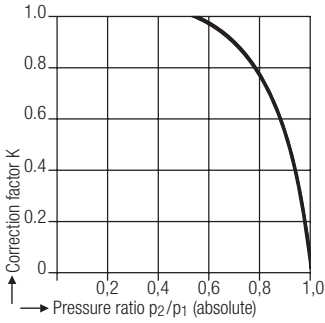
Flow through ZK 29 radial stage nozzle

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

**Capacity Charts**

The charts show the max. flowrates of cold and hot (condensed) water at the extreme regulation position with linear characteristic curves and maximum  $Kv_S$  value.

**Backpressure chart for hot water**



**Order & Enquiry Specification**

GESTRA Control Valve with Radial Stage Nozzle® ZK 29  
Design data:  $p = \dots$  barg/psig,  $t = \dots$  °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]			
$\dot{m}$ [kg/h]/[lb/h]			

Please enter data.

Fluid: .....

Actuation: Electric ..... (make)  
ON / OFF or MODULATING CONTROL  
Voltage/Hz ..... / .....  
Pneumatic.....(make)

Spring to open:   
Spring to close:   
Handwheel:   
Positioner:

**Inspection & Certification**

Documentation regarding material tests and in-house examination with inspection certificate to EN 10204-3.1 or EN 10204-3.2 available at extra cost.

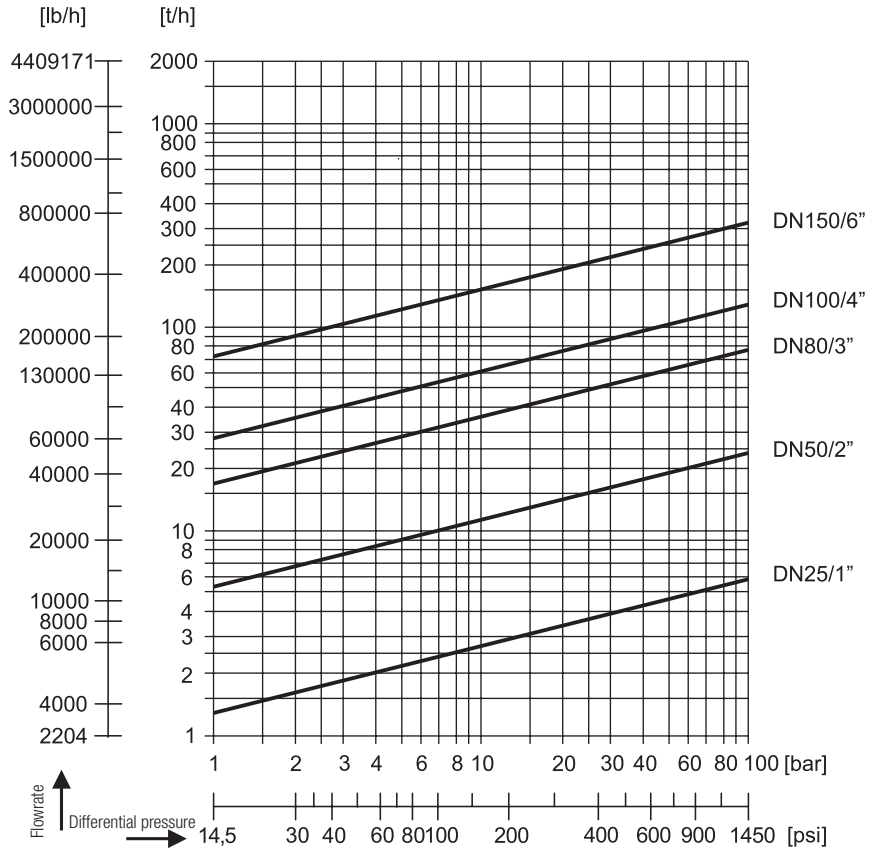
Please state the inspection and certification requirements when inquiring or ordering. After supply of the equipment certification cannot be established.

Charges and extent of the above mentioned certificates as well as the different tests confirmed therein are listed in our price list "Test and Inspection Charges for Standard Equipment".

For other test certificates please consult us.

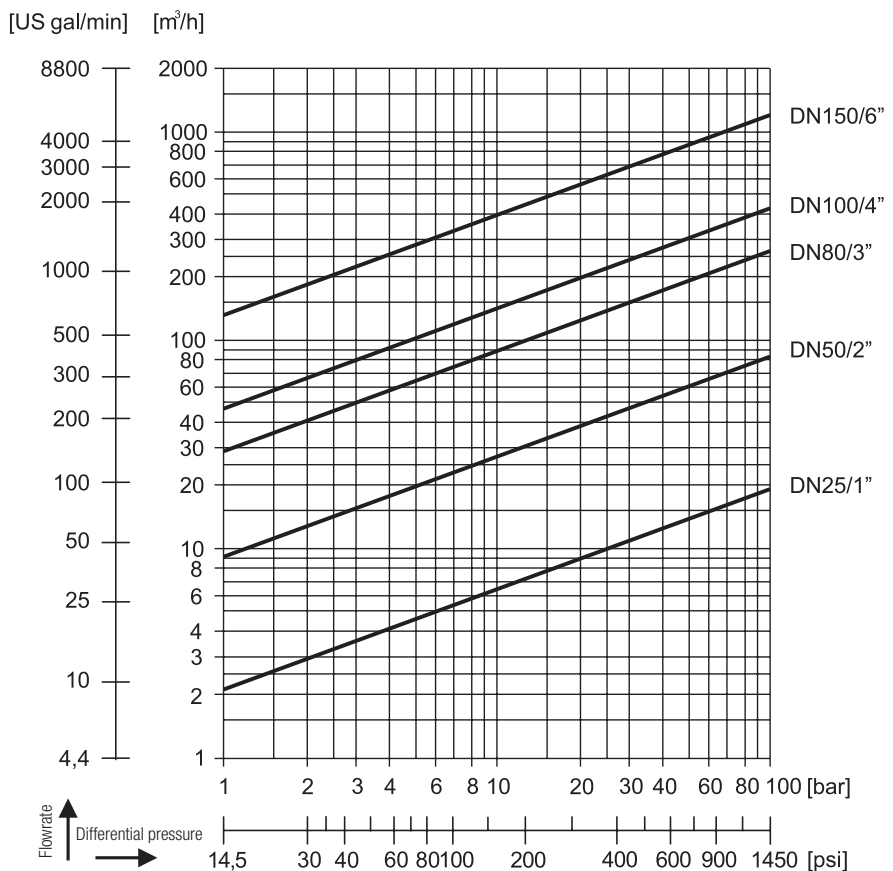
Supply in accordance with our general terms of business.

**Capacity chart for hot water  $t_s -5K$**



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

**Capacity chart for cold water**



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