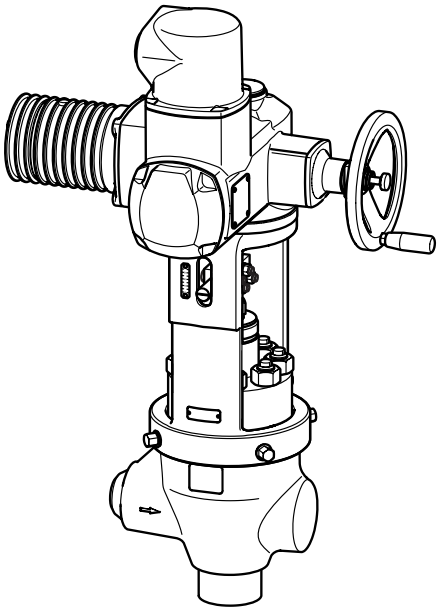
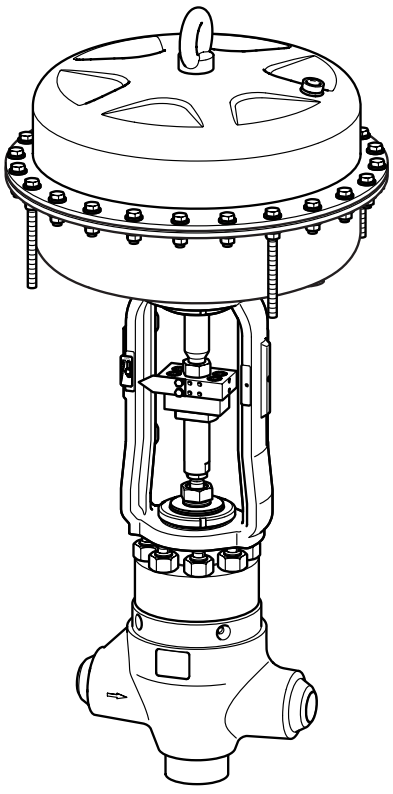


ZK 313-E/11 1" – 3"



ZK 313-D/20 1" – 3"

Control Valve with ZK Radial Stage Nozzle® and Tandem Shut-Off

ZK 313 ASME
CLASS 2500 1" – 6"

Description

Control valve ZK 313 with ZK radial stage nozzle® designed for reducing high differential pressures in industrial installations and power plants and used as:

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

All internals are exchangeable. Leakage rating Class VI acc. to ANSI FCI 70-2-2003.
For equipment in sizes 1" – 3" two body types are available: straight-through and angle pattern. The body of equipment sizes 4" – 6" is hammer forged and of the angle or Z-type.
A sampling valve is available as optional extra on request.

Actuator and operation

The following actuators are available:

02: Handwheel (standard), retrofitting of an electric rotary actuator possible
11: Electric rotary actuator B1-F10 EN ISO 5210
12: Electric rotary actuator B1-F14 EN ISO 5210
13: Electric linear actuator
20: Pneumatically operated diaphragm actuator or piston actuator
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 2500)

Temperature °C	Standard Class 1" – 6"			Limited Class 1" – 2 ½"		
	A105	F22	F91	A105	F22	F91
100	388	429	429	430	430	430
200	365	405	405	421	418	430
300	331	357	357	421	414	430
400	289	304	304	361	406	418
450	–	281	281	–	393	393
500	–	235	235	–	308	308
550	–	130	208	–	182	270
575	–	87	199	–	122	266
600	–	57	155	–	80	217
625	–	–	105	–	–	147

Admissible service pressure psig for body made from ASME materials

(calculated to ASME B16.34-Class 2500)

Temperature °F	Standard Class 1" – 6"			Limited Class 1" – 2 ½"		
	A105	F22	F91	A105	F22	F91
200	5655	6250	6250	6250	6250	6250
300	5450	6070	6070	6170	6160	6250
400	5280	5880	5880	6105	6065	6250
500	5025	5540	5540	6105	6035	6250
600	–	5040	5040	–	6010	6250
700	–	4730	4730	–	5895	6110
800	–	4230	4230	–	5895	6000
900	–	3745	3745	–	5000	5000
1000	–	2230	3030	–	3119	3926
1100	–	–	2485	–	–	3478

Admissible differential pressure Δ PMX:

	barg	psi
Single stage	40	580
Three stages	300	4,350
Three stages with additional nozzle	370	5,365

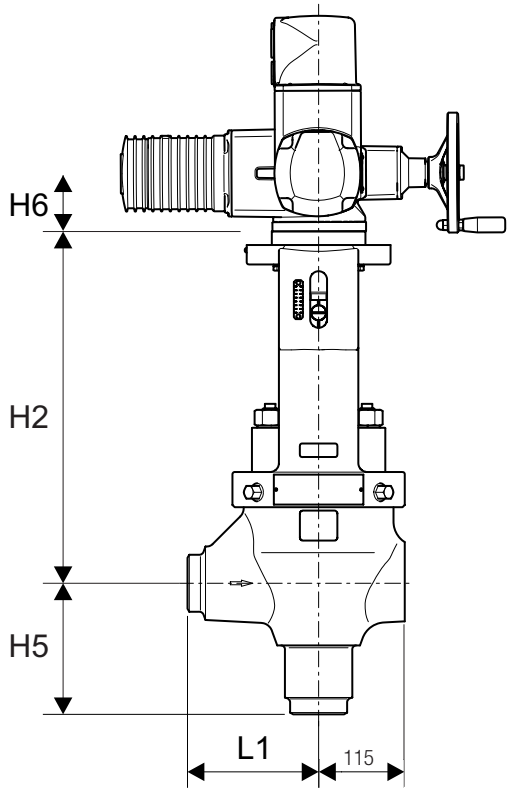
Materials

Component part	ASTM / ASME
Body	SA105
	SA182 F22
	SA182 F91
Upper part of body	SA105
	SA182 F91
Threaded bolt	(S)A193 B16
Nuts	(S)A194-7

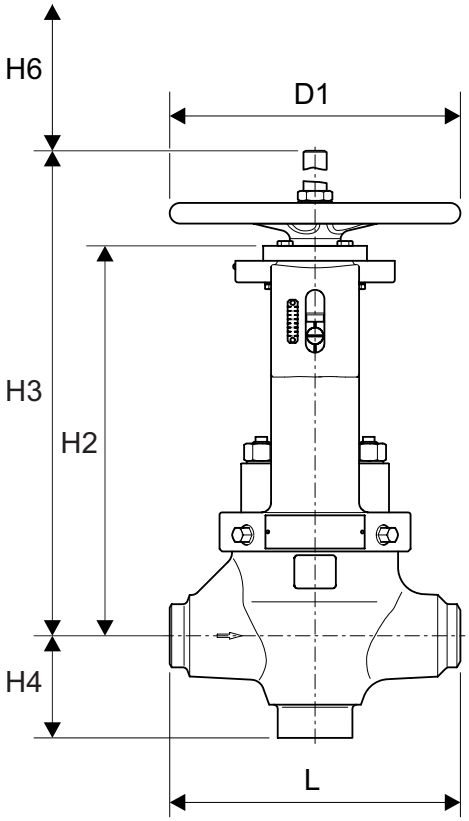
Types of end connections

- Butt-weld ends
- Socket-weld ends
- Optional flange

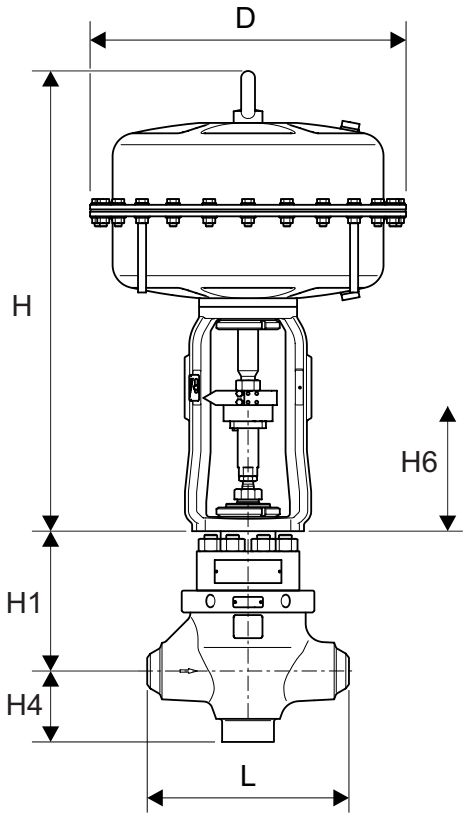
Dimensions and weights



ZK 313-E/11 1" – 3"



ZK 313-D/02 1" – 3"



ZK 313-D/20 1" – 3"

Dimensions

Valve size		1" – 3"	4" – 6"
H1	mm	243	243
	in	9.6"	9.6"
H2 max.	mm	484	484
	in	19.1"	19.1"
H3 (design/02)	mm	585	585
	in	23.0"	23.0"
H4	mm	123	–
	in	4.8"	–
H5	mm	175	260
	in	6.9"	10.2"
H6 (space required for servicing)	mm	120	120
	in	4.7"	4.7"
H6 (space required for servicing, design/02)	mm	290	290
	in	11.4"	11.4"
L	mm	350	–
	in	13.8"	–
L1	mm	175	260
	in	6.9"	10.2"
D1	mm	315	315
	in	12.4"	12.4"

Other dimensions available on request.

Weight, without actuator

Type	1" – 3"		4" – 6"	
	kg	lb	kg	lb
ZK313/02	100	220	–	–
ZK313/11	90	198	–	–
ZK313/12	90	198	–	–
ZK313/20	70	154	–	–
ZK313-E0, ZK313-Z0	–	–	on request	on request

Dimensions and weights of pneumatic diaphragm actuator

	PB 700		PB 1502		PB 3002	
Dimensions	mm	in	mm	in	mm	in
D	405	15.9"	548	21.5"	548	21.6"
H	600	23.6"	800	31.5"	1140	44.9"
Weight	kg	lb	kg	lb	kg	lb
	40	88	124	273	240	528

Flow characteristics

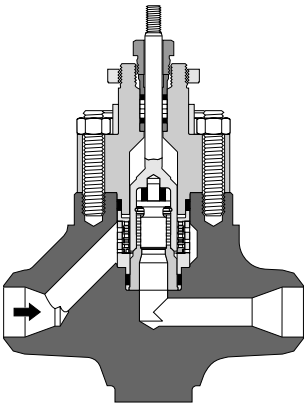
Kv_S values

	Kv_s											Lift
	m^3/h											
	equal percentage / linear										linear	mm
	Δp 300 bar								Δp 370 bar		Δp 40 bar	
1" – 3"	1	1.5	2.3	3.6	5.5	8	11	13	4.5	9.5	30	35
4" – 6"	–	–	2.3	3.6	5.5	11	14.5	17	4.5	9.5	46	35

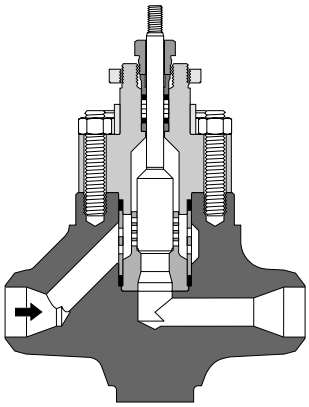
C_V values

	C_V											Lift
	US gal/min											
	equal percentage / linear										linear	in
	Δp 4350 psi								Δp 5365 psi		Δp 580 psi	
1" – 3"	1.2	1.7	2.7	4.2	6.4	9.2	12.7	15	5.2	11	34.7	1.4"
4" – 6"	–	–	2.7	4.2	6.4	12.7	16.8	19.7	5.2	11	53	1.4"

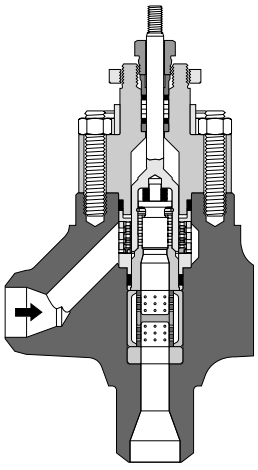
ZK Radial stage nozzle



Standard nozzle
Δpmax 300 bar/4350 psi



Special nozzle without tandem seat
Δpmax 40 bar/580 psi



Special nozzle
Δpmax 370 bar/5365 psi

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 orfices 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.

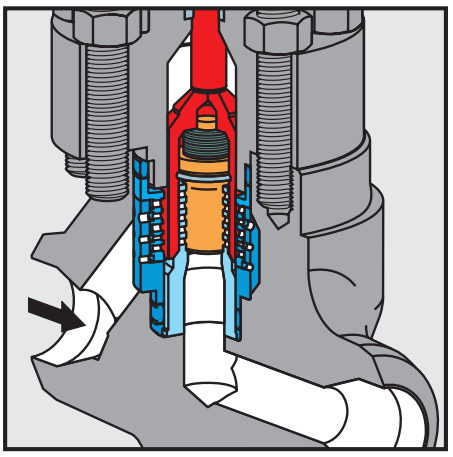
As a result of this design, the pressure drop is reduced in steps and the medium flowing through is split up into many partial flows. This ensures high resistance to wear and reduces the noise level.

In addition the ZK 313 is provided with a dual shut-off system (tandem seat).

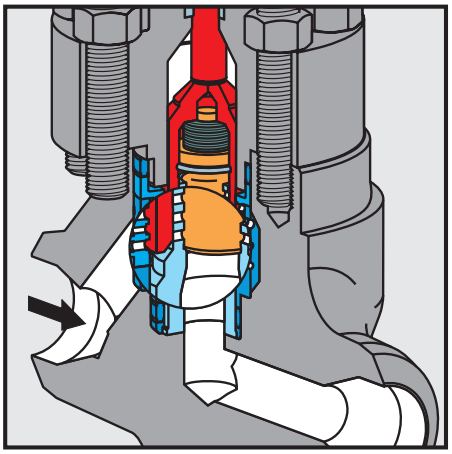
Function of the tandem seat

At the beginning of the opening process the valve plug first lifts off the mean seat. The valve cone follows only after a certain lift of the valve plug. As a result, the flow velocities across the sealing surface are almost zero during the opening and closing process and, consequently, wire drawing is eliminated.

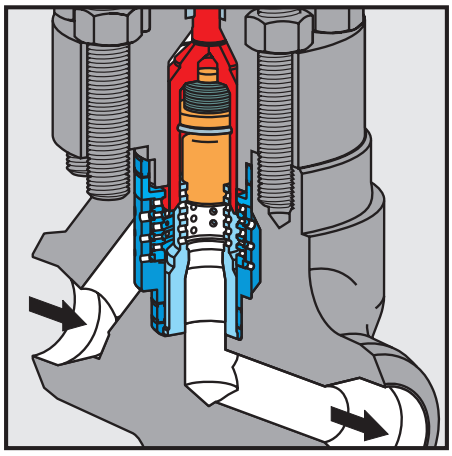
ZK Radial stage nozzle® with tandem seat



Valve plug in closed position



Valve no longer in closed position,
but inner valve cone still closed



Valve plug in control position

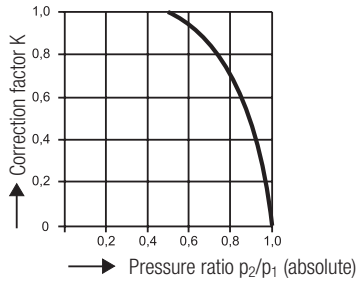
Control Valve with ZK Radial Stage Nozzle® and Tandem Shut-Off

ZK 313 ASME CLASS 2500 1" – 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



	Kv_S value	Cv value
1	1	1.2
2	1.5	1.7
3	2.3	2.7
4	3.6	4.2
5	5.5	6.4
6	8	9.4
7	11	12.7
8	13	15
9	30	35.1

Specification Text

GESTRA Control Valve with Radial Stage Nozzle® ZK 313.

Design data: p = . . . barg / psig, t = . . . °C / °F or Class

Operation: Load conditions (1to 3)

	1	2	3
P_1 bara/psia			
t_1 °C/°F			
P_2 bara/psia			
M kg/h/lb/h			

Please enter data.

Fluid:
Actuation: Electric ..... (make)
ON / OFF or MODULATING CONTROL
Voltage/Hz
Actuation: Pneumatic ..... (make)
Spring to open:
Spring to close:
Handwheel: yes/no
Positioner: yes/no

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.

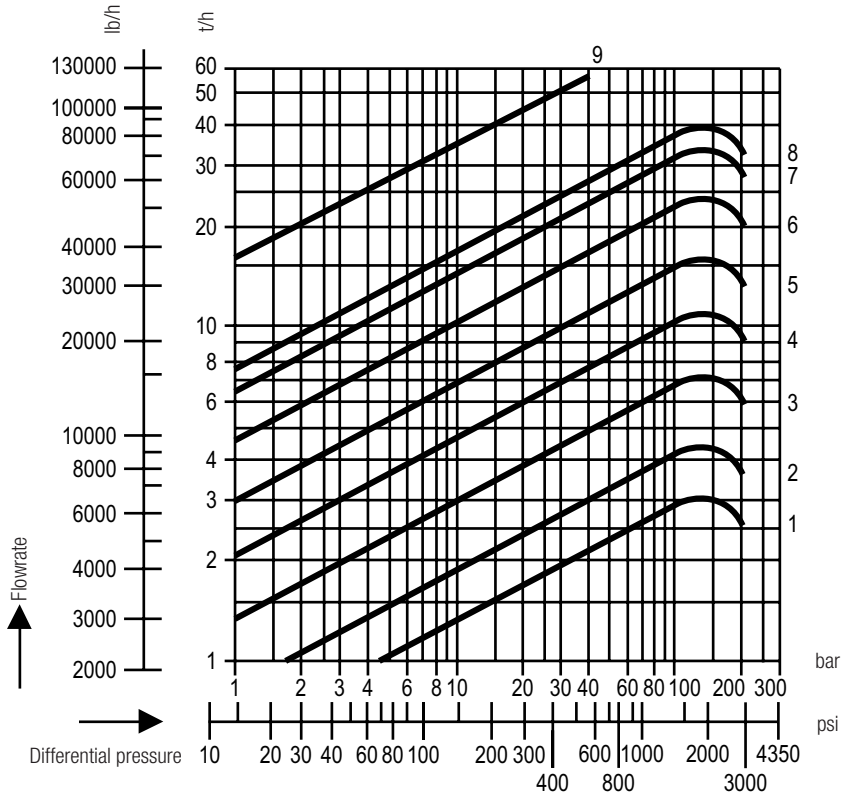
Please state the inspection and certification requirements when inquiring or ordering. After supply of the equipment certification cannot be established.

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.

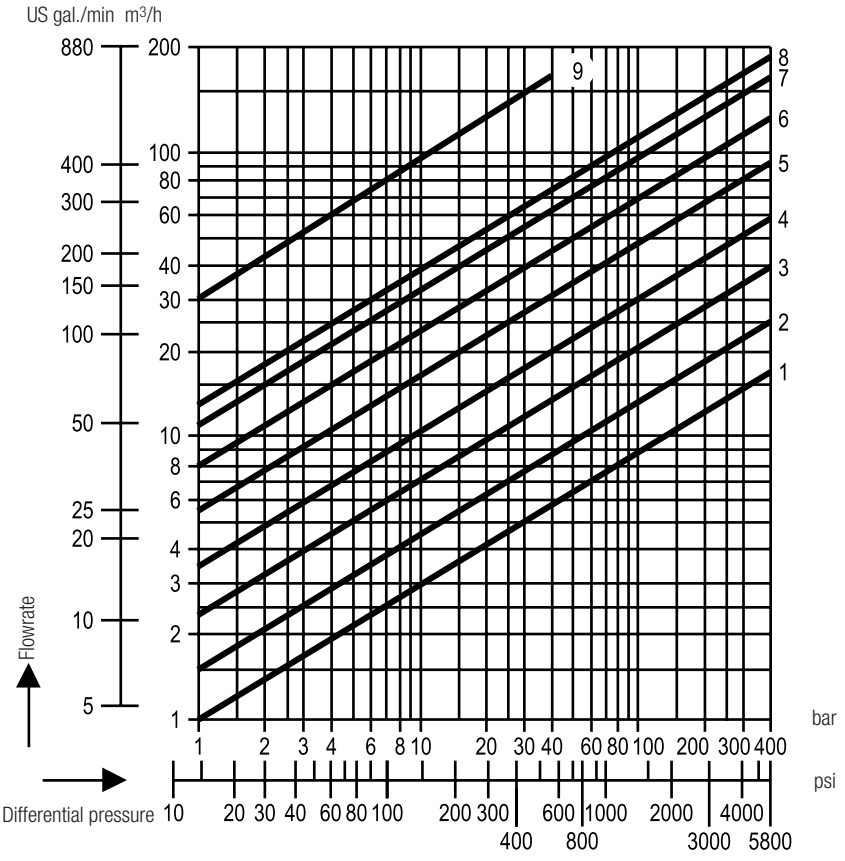
Supply in accordance with our general terms of business.

Capacity chart, hot water t_S –5K



If p2/p1 > 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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