

## MINIMUM FLOW VALVE TYPE ZM1 and Z1B-M

### APPLICATION:

Minimum flow valves are designed for work in recirculation systems of pumps feeding power station boilers. They protect the pumps from hydraulic and heat overload in the case of a low water reception by the boiler, guaranteeing a minimum flow in a by-pass circuit of the pump.

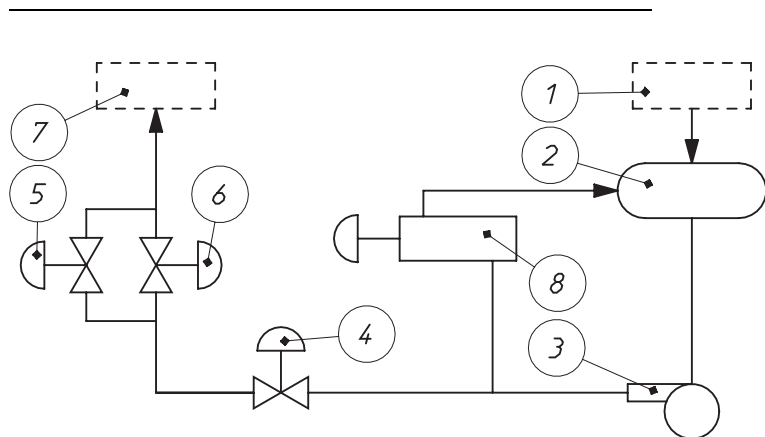


Figure 1. Diagram of installation of power station boiler feedwater.

- 1) Condensate pump.
- 2) Degasser.
- 3) Boiler feedwater pump.
- 4) Cut-off valve.
- 5) Boiler feedwater start-up valve.
- 6) Boiler feedwater control valve.
- 7) Boiler.
- 8) Minimum flow valve type ZM1.

### FEATURES:

- Anti-cavitation manufacture with active and passive choking structures, allowing for valve's work both in the regulation function and in the on-off function,
- Body integrated with a bonnet, which reduces the number of potential leakage places. Another side of the body is protected with a self-tightening closure.
- High tightness of closure achieved thanks to FCT function (pressure closes).
- High durability and effectiveness of bonnet packings achieved, among other things, by placing them in low pressure zone,
- Use of an element protecting regulatory parts of the valve from polluting.

### DESIGN AND TECHNICAL SPECIFICATION:

<b>Body:</b>	forged, single-unit with a bonnet, with welded inlet / outlet stubs.
<b>Nominal size:</b>	DN50
<b>Nominal pressure:</b>	PN320
<b>Body ends:</b>	for welding, $\varnothing 76 \times 13$
<b>Closure tightness:</b>	V class in accordance with PN-EN 60534-4.
<b>Flow direction:</b>	over the plug



**Flow coefficient:**

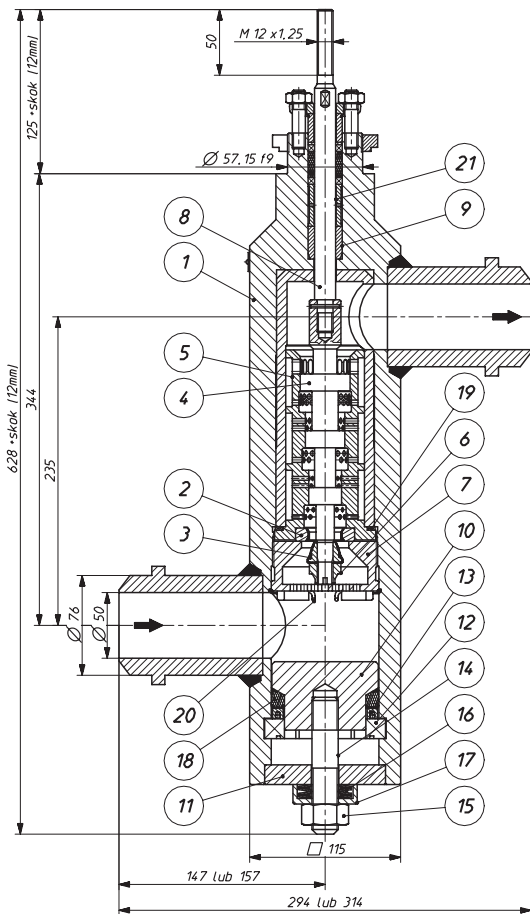
**Kvs 10**

**Characteristics:**

**linear**

Figure 2. Valve intersection.

Table 1 Parts and Materials List



Item	Name of part	Material	Norm
1	Body with sleeve	S 355 J2G3 (1.0570) + X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10025
2	Seat	X6CrNiMoTi 17-12-2; (1.4571) + stellite	PN-EN 10088
3	Plug	X6CrNiMoTi 17-12-2; (1.4571) + stellite	PN-EN 10088
4	Piston	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
5	Sleeve	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
6	Nut	X17CrNi 16-2 ; (1.4057)	PN-EN 10088
7	Screw plug	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
8	Stem	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
9	Guiding sleeve	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
10	Clamp	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
11	Cover	X17CrNi 16-2 ; (1.4057)	PN-EN 10088
12	Divided ring	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
13	Ring	X17CrNi 16-2 ; (1.4057) + heat processing	PN-EN 10088
14	Screw M20x75	8.8	EN 20898-1
15	Nut M20	8	PN-EN 20898-2
16	Plate spring	X10CrNi18-8 (1.4310)	PN-EN 10088
17	Spring cover	X17CrNi 16-2 ; (1.4057)	PN-EN 10088
18	Tightening ring	SPETOGRAF GUS 962 APX	SPETECH
19	Seat packing	Spiraltherm GRAFIT (98%) + 1.4404 (spiral)	BURGMANN
20	Protective ring	12R10	SANDVIK
21	Tightening set	GRAFIT	SPETECH

**NOTE:**

As part of the technology of hardening the internal elements of the valve, the following means are used:

- a) stellite – surface padding with stellite: ~ 40HRC
- b) heat processing: (35...45HRC depending on the function of a part)

Table 2. Acceptable working pressures depending on working temperature in accordance with PN-EN 1092-1.

t [C°]	100	200	250	300
p [bar]	320	266,6	243,8	220,9

**Actuator type:**

**Pneumatic actuator: membrane, multi-spring, type R-400; R1-400 or R5-400.**

**Spring range:** basic: 120...280 kPa,  
actual (12mm): 180...280 kPa

**Supply pressure:** 400 kPa

**Electrical actuator:**

**Disposition force:** 10kN

Note: other data as in catalogue sheets of actuators type P/R, P1/R1, P5/R5.

**MARKING EXAMPLE:**

In the marking, the actuator's symbol and valve type have to be given, e.g. **R-400-ZM1; R1-400-ZM1; R5N-400-ZM1.**

The mark is placed on the data plate of the valve.

Besides, the following items are given:

nominal size of the valve [DN], marking of nominal pressure of the valve [PN], max. working temperature [TS], max. working pressure [PS], test pressure [PT], flow coefficient [Kvs], leap of plug [H], fluid group [1 or 2], serial number and year of manufacture.

**ORDERING:**

An order should include information necessary for calculating the valve's properties in accordance with the technical data questionnaire. You can be assisted with selecting valves by workers of the Marketing and Sales Department and the Technical Department.

## **MINIMUM FLOW VALVE TYPE Z1B-M**

### **APPLICATION:**

Valve type Z1B-M, owing to its design, material choice and manufacturing technology, adjusted to operation under most demanding working conditions, at high pressure drop and with the risk of cavitation occurring.

The valve, as presented herein, can be used as a minimum flow valve in by-pass systems of feeding pumps in power boilers.

### **CHARACTERISTICS:**

Minimum flow valve type Z1B-M is anti-cavitation valve designed for liquid at pressure drop of up to 200 bar and flow of 70 t/h.

Valve design provides for division of pressure drop on the valve into six steps, so that the pressure reductions do not exceed critical levels causing cavitation.

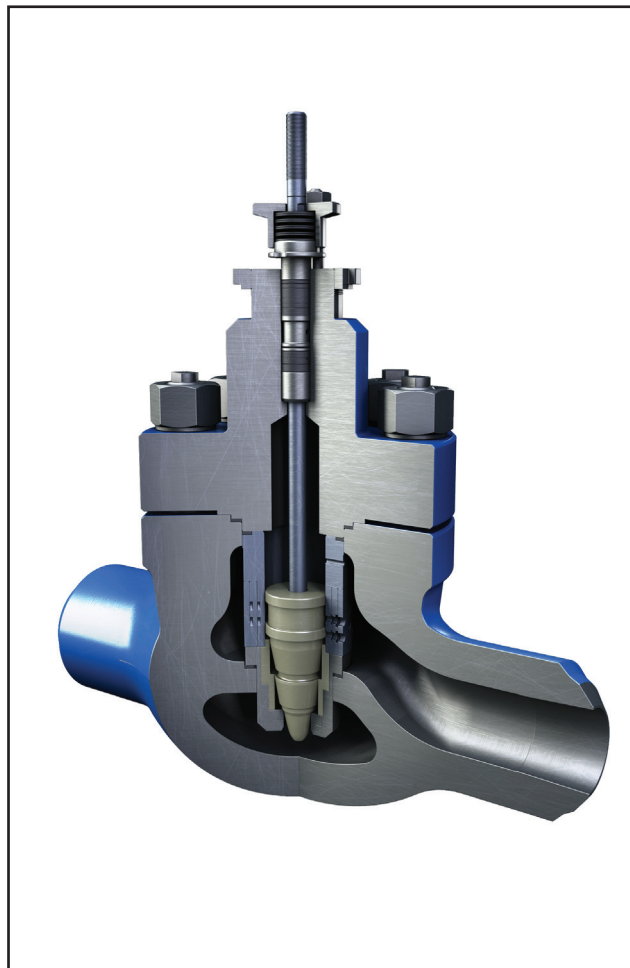
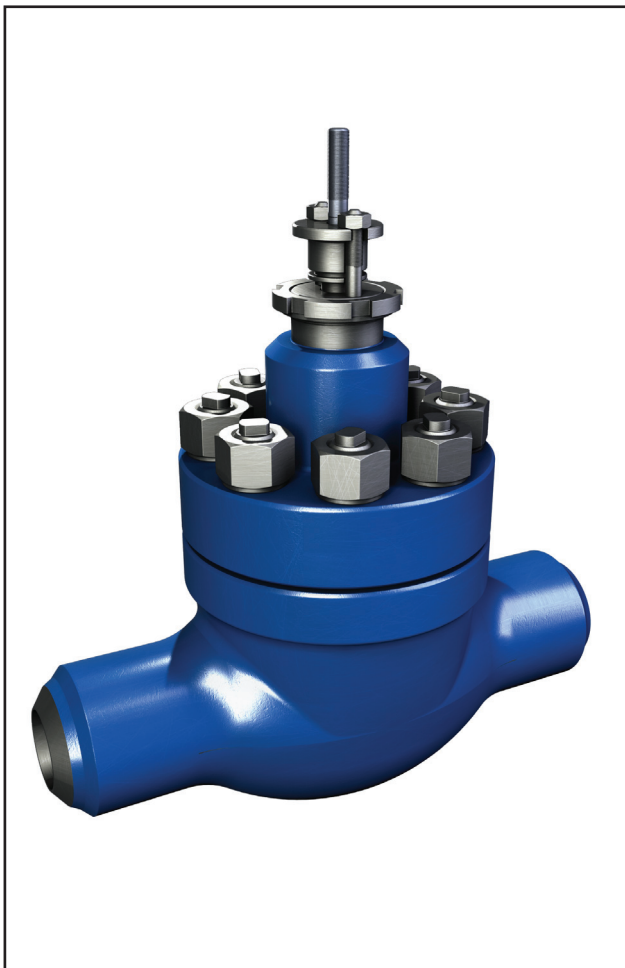
High quality of control, durability and reliability has been achieved due to appropriate design of internal parts and material selection.

Seat and three-step plug are made of  $ZrO_2$  ceramics, which features excellent durability and chemical resistance.

Further pressure drop is achieved through active throttling in three multihole hardened sleeves with radial flow. Valve stem is made of titanium and it co-operates with bonnet packing set, which provides for external tightness in accordance with TA Luft regulations.

The valve guarantees high shut-off tightness.

It is also possible to adapt this design solution to other demanding applications in globe and angle designs.



NOTES: