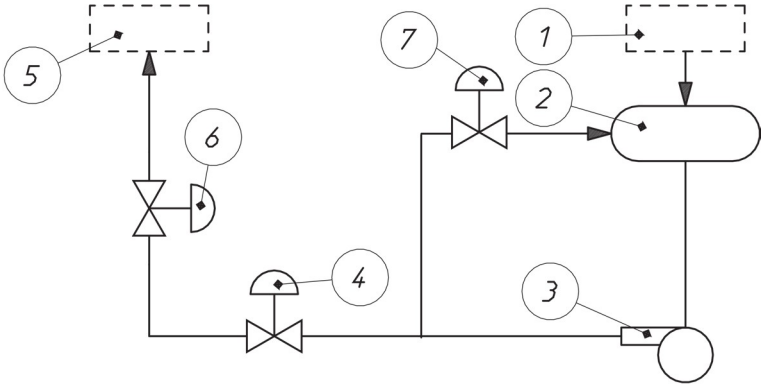
VALVES FOR POWER SYSTEMS OF ENERGY BOILERS **TYPE Z1B-M**

SCOPE OF APPLICATION:

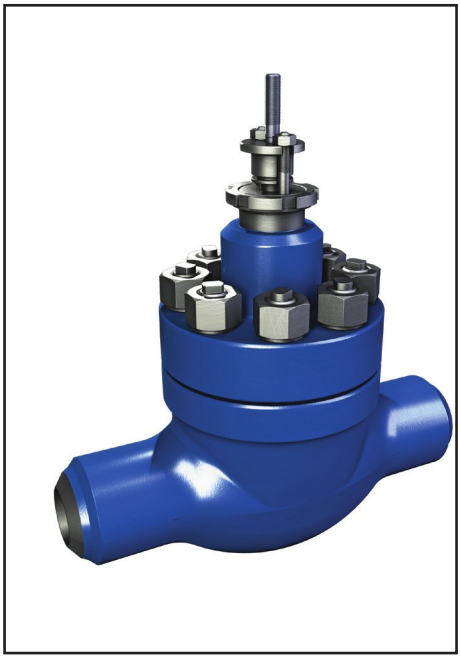
Two types of control valves are used in power systems of energy boilers:
- minimum flow valves, intended for use in the recirculation circuits of pumps powering boilers,
- starting - feed check valves, designed to control the flow of water to boilers.

SCHEMA OF POWER SUPPLY SYSTEM OF BOILER



Drawing No 1. Schema of installation supplying water to energy boiler.

1) Pump of condensate,
2) Deaerator
3) Pump of water to boiler,
4) Cut-off valve,
5) Energy boiler,
6) Starting - feed valve,
7) Minimum flow valve.



CHARACTERISTICS:

- The design of the valve makes it resistant to cavitation as a result of the application of the multi-cage labyrinthine throttling (multi-way) and the selection of appropriate materials such as: full stellite in case of plug and seat, titanium in case of stem, highly hardened throttling cages, alloy cast steel in case of body,
- special design enabling control of low flows in the conditions of high drops of pressure, as well as large flows in the conditions of small drops of pressures,,
- high leaktightness of the closure,
- guaranteed leaktightness of outer seals, according to the requirements of the provisions of TA Luft, located in the zone of low pressure
- easy access to internal components of the valve,
- control or on-off function,
- the possibility of applying electrical, hydraulic or pneumatic drives,
- a wide range of assortments, the ability to adapt the valve to individual customer's requirements in terms of connections, flow parameters, and other,
- additional equipment: quick exhaust valve for pneumatic actuators (quick opening), spring shock absorber for hydraulic or electric actuators (flexible contact of the plug onto seat),
- hydraulic impact resistance (water hammer),
- high durability and reliability.

DESIGN AND TECHNICAL DATA

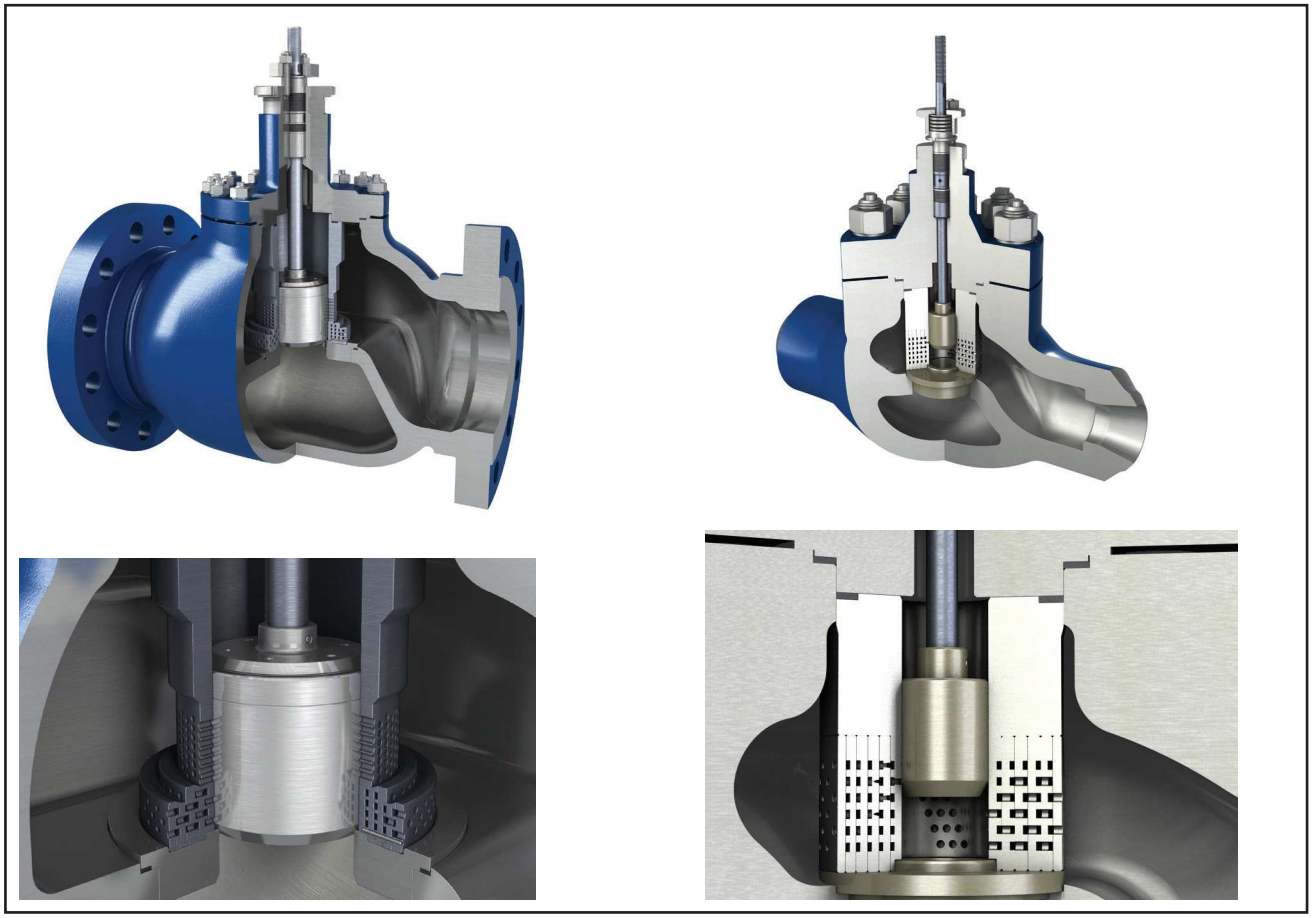
Body:	cast, straight type
Nominal diameter:	DN50; 65; 80; 100 / 2”; 2,5”; 3”; 4”
nominal pressure:	PN250; 320 / CL1500; 2500
Flow coefficient:	according to the Table 1
Characteristics:	linear or modified
Flow direction:	under the plug (FTO)
Way ofe flow in cages:	wg Rys. 5
Pressure recovery factor:	F_L=0,975
Leaktightness of closure:	min. cl V acc. to PN-EN 60534-4
Permissible operating pressure:	250 bar
Permissible operating temperature:	+250°C
Variants:	according to the Table 1
List of parts and materials:	according to the Table 2

Table 1. Variants

		50	65	80	100
Kv_{max}	1	10	16	25	40
	2	25	40	63	125
q_{MAX}[t/h]		50	65	130	200

$Kv_{max}1$ - minimum flow valves
$Kv_{max}2$ - starting-feed valves

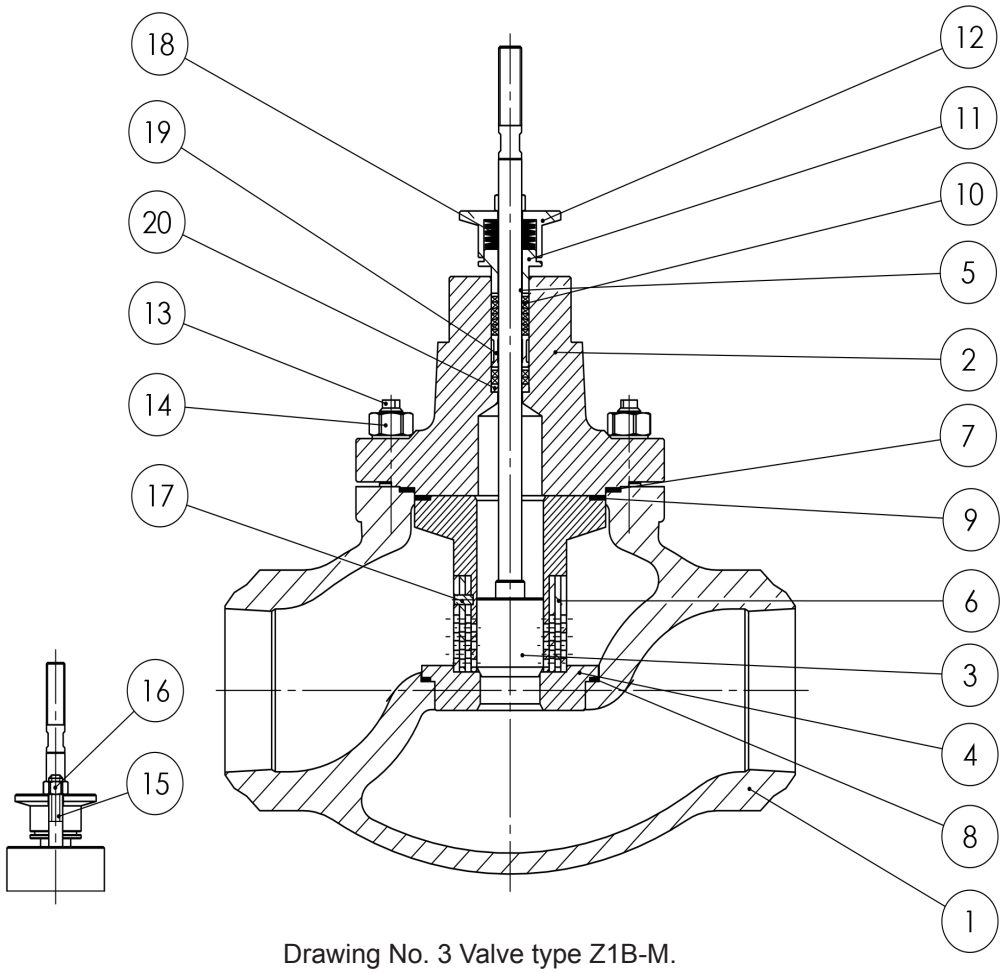
NOTE:
- maximum flow qmax was defined assuming maximum flow rate not exceeding 8m/s,
- other types of end connectors and Kv – on request.



Starting - feed valve

Minimum flow valve

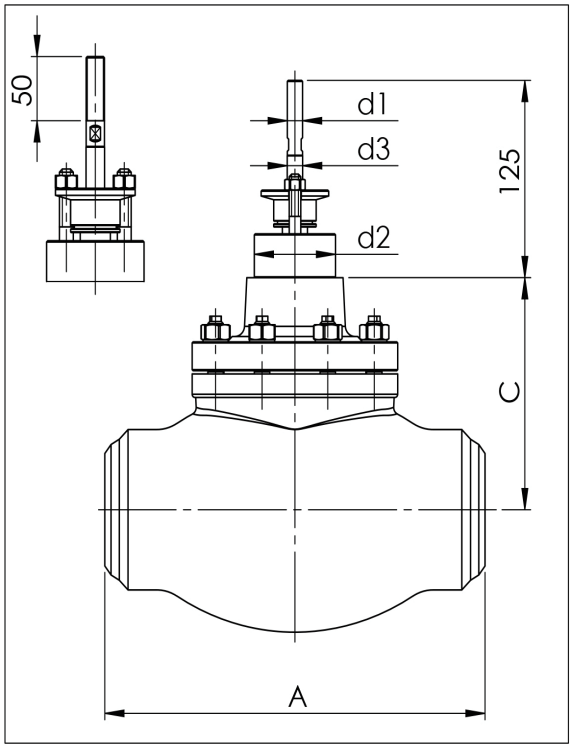
Drawing No. 2 Design variants



Drawing No. 3 Valve type Z1B-M.

Table 2 List of parts and materials

No.	Name of the part	Material	Standard
1.	Body	**G17CrMo9-10; (1.7379)**	PN-EN 10213-2
2.	Bonnet	**13CrMo4-4; (1.7335)**	PN-EN 10028
3.	Plug	**X17CrNi16-2; (1.4057)**	-
4.	Seat	**X17CrNi16-2; (1.4057)**	-
5.	Stem	**X17CrNi16-2; (1.4057)**	ASTM 3348-08a
6.	Set of cages	**X17CrNi16-2; (1.4057)**	PN-EN 10088
7.	Body gasket	**GRAPHITE (98%) + 1.4404**	-
8.	Seat gasket	**GRAPHITE (98%) + 1.4404**	-
9.	Control cage gasket	**GRAPHITE (98%) + 1.4404**	-
10.	Stem sealing	**PTFE /GRAPHITE**	-
11.	Pressure sleeve	**X6CrNiMoTi17-12-2; (1.4571)**	PN-EN 10088
12.	Pressure plate	**X6CrNiMoTi17-12-2; (1.4571)**	PN-EN 10088
13.	Body screw	**21CrMoV5-7; (1.7709)**	PN-EN 10269
14.	Body nut	**21CrMoV5-7; (1.7709)**	PN-EN 10269
15.	Bonnet screw	**A4-70**	PN-EN ISO 3506-2
16.	Bonnet nut	**A4-70**	PN-EN ISO 3506-2
17.	Pin	**X6CrNiMoTi17-12-2; (1.4571)**	PN-EN 10088
18.	Disk springs	**X10CrNi18-2; (1.4310)**	PN-EN 10088
19.	Spacing sleeve	**X6CrNiMoTi17-12-2; (1.4571)**	PN-EN 10088

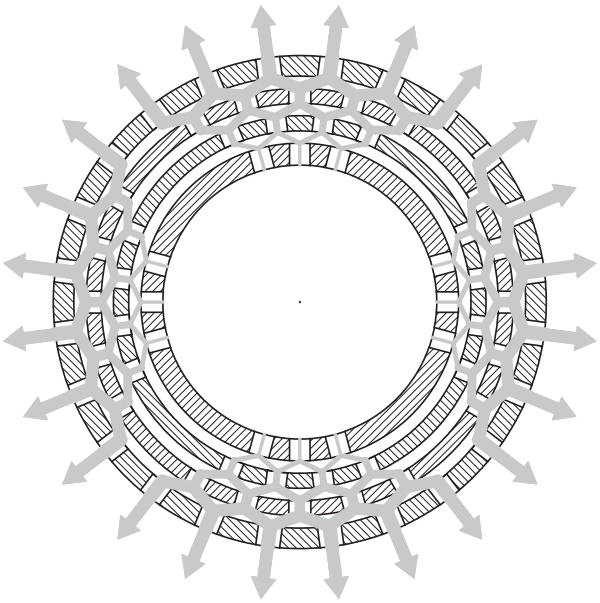


* - other materialn to request.

Drawing No. 4 Connection dimensions of the valve

Table 3. Connection dimensions of the valve

DN	50		65		80		100	
PN	250	320	250	320	250	320	250	320
A	400		400		500		580	
C	237		237		257		329	
d1	M12x1,25				M16x1,5			
d2	57,15 / 2 1/4" - 16UN2A				84,15 / 3 5/16" - 16NS2A			
d3	12				16			



Drawing No. 5 Ways of flow in cages

NOTE:
Other data concerning the valves, are included in the catalogue cards ZIB, and information about the selection of pneumatic membrane-spring actuators is included in cards P/R, P1/R1.

MARKING:

Actuator type:

- pneumatic with direct action:	**P ; P1**
- pneumatic with reverse action:	**R ; R1**
- pneumatic with side-mounted handwheel:	**P1B;R1B**
- pneumatic with top-mounted handwheel:	**PN; RN**
- electric:	**E**
- manual:	**20**

Bonnet:

- standard:	**1**
- extension:	**2**
- bellow seal:	**3**
- other	**X**

Packing:

- PTFE, braided	**A**
- PTFE, V type	**B**
- PTFE, for oxygene	**C**
- graphite, braided	**D**
- graphite, expanded	**E**
- TA-Luft, PTFE	**F**
- TA-Luft, graphite	**G**

Leakage class:

- basic: class IV	**4**
- enhanced: class V	**5**
- tight (special) class VI	**6**

Valve plug:

- unbalanced	**7**
- balanced with gasket	**8**
- balanced with pilot	**9**

Choke cages:

- two	**2**
- three	**3**
- four	**4**
- five	**5**

Characteristics:

- linear	**L**
- modified	**M**
- other	**X**

Body material:

- carbon steel	**3**
- alloy steel	**4**
- stainless steel	**5**
- other	**X**

MARKING EXAMPLE:

Control valve type Z1B-M with pneumatic actuator of reverse type, complete with top-mounted handwheel, extension bonnet, packing: expanded graphite, leakage class cl.IV, with three throttling cages, plug balanced with gasket, linear characteristic, body material: stainless steel.:

RN-Z1B-M-2E483L5

Marking is shown on valve nameplate.
Additionaly, it shows:
- nominal size [DN],
- nominal pressure [PN],
- max working temperature [TS],
- max working pressure [PS],
- test pressure [PT],
- flow ratio [Kvs],
- plug stroke [H],
- plug stroke fluid group [1 or 2],
- serial number and year of manufacture.