

#### APPLICATION

- To close or open flow of operation liquids in common measuring and control circuits of industrial automation systems;
- As non-electrical equipment according to EN 13463-1 in potentially explosive atmospheres category 3 of group II zone 2 according to EN 60079-10-1 and in zone 22 according to ČSN EN 60079-10-2
- For industrial environment with high concentration of SO<sub>2</sub>
- and the environment with sea climate
- For the environment, where mechanical resistance is required pursuant to EN 60068-2-6 (class AH2) and seismic capability of the electrical equipment of the safety system of the nuclear power stations pursuant to IEC 980 (MVZ level SL-2).

Valves in the design for the environment with a threat of explosion are rated products pursuant to the Directive 2014/34 / EU of the European Parliament and the Council and EU Declaration of Conformity **EU-961000** is issued for them.

#### DESCRIPTION

The basis of a valve consists of a brass body, into which a valve unit is screwed. Its seat is a part of the basic body of the valve.

The valves are manufactured in closing and test designs.







By turning the wheel of manual control to the right (left), the valve is CLOSED (OPENED) by means of a relevant ball, which is pressed into (pushed from) the valve seat.

#### TECHNICAL DATA

Technical requirements for valves and dimensions of connecting terminals are specified in ČSN 13 7501; connecting dimensions of the manometric valve comply with ČSN 13 7517.

Explosion protection is ensured by a safe construction according to EN 13463-5

#### Designation of non-explosivity:

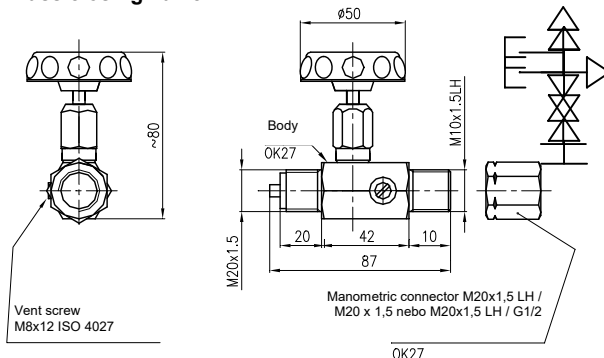
	II 3G c 200 °C	for code W1
	II 3D c 200 °C	
	II 3G c 110 °C	for code W2
	II 3D c 110 °C	
	II 3G c 150 °C	for code W3
	II 3D c 150 °C	

<b>Operation position:</b>		discretionary
<b>Weight:</b>	closing valve	approx. 0.45 kg
	test valve	approx. 0.55 kg
<b>Type of operation:</b>		continuous

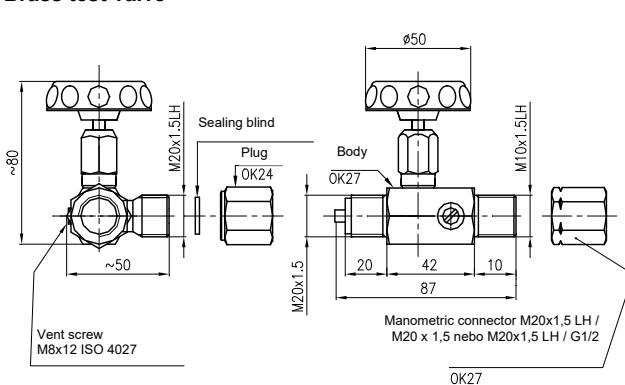
#### Used materials:

Body of valve and valve unit	brass CW617N-R430 (CuZn40Pb2)
Manometric connection	
Valve spindle	steel 1.4541
Nut with plastic head	PP
Spindle sealing - O ring	FPM (Viton)
	NBR (Buna-N)
	EPDM
Supporting ring	PTFE
Seat sealing – ball	steel 1.4571
Differentiating ring	PVC

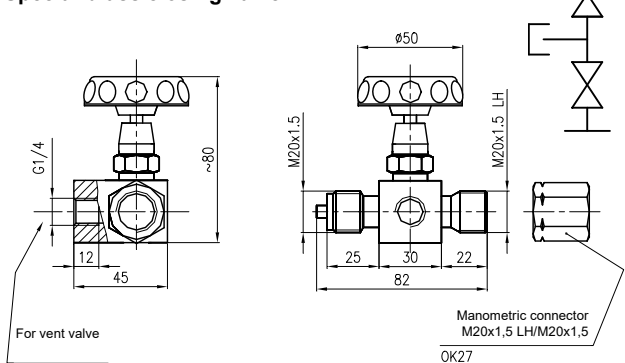
#### Brass closing valve



#### Brass test valve



#### Special brass closing valve



#### OPERATION CONDITIONS

The valves are designed for the environment defined by the group of parameters and their severity grades IE36 pursuant to the standard EN 60721-3-3 and the following operation conditions.

From time to time, the valves may be exposed to the sea climate pursuant to EN 60068-2-52, severity grade 2.

Valves in category 3 of group II are designed to use in areas, where is not probable emergence of explosive atmosphere (gas mixture or dust with aer), if an explosive atmosphere arises, will be present only rarely and for a short period of time.

#### Relative ambient humidity:

10 to 100 % with condensation, with upper limit of water content 29 g H<sub>2</sub>O/kg of dry air

**Atmospheric pressure:** 70 to 106 kPa

#### PRESSURE AND TEMPERATURE CHARACTERISTICS

Values of pressure and temperature, for which the valve may be used, are determined, in particular, by the selected material of spindle sealing and sealing elements of valve unit seats. The charts provide dependency of pressure on temperature for various materials of such sealing elements and for valve body material. When selecting the material, it is necessary to consider both the chart for the spindle sealing material and the chart for seat sealing material. Operation characteristics of the valve are determined by the material with worse parameters.

Chart 1  
Pressure and temperature characteristics of elastomer O-rings

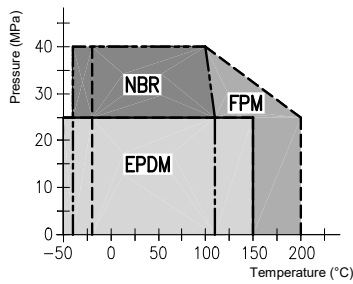


Chart 2  
Pressure and temperature characteristics of seat sealing material

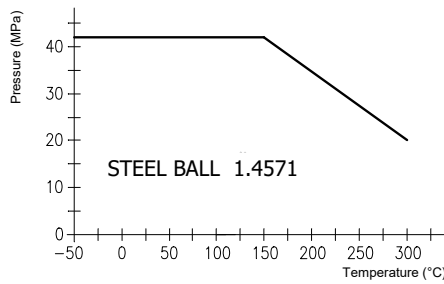
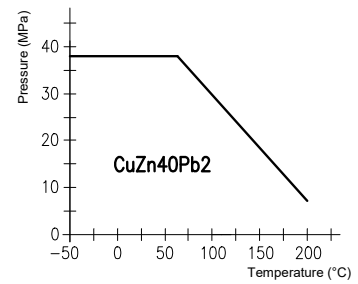


Chart 3  
Pressure and temperature characteristics of body material



**CHEMICAL RESISTANCE OF SEALING MATERIALS**

Chemical resistance of materials of sealing elements represents an important parameter, which determines reliability of the valve. The following table includes informative data of the most frequently used substances together with chemical resistance of sealing element materials. If other substances are used, chemical resistance tests shall be performed directly at the customer in the expected operation conditions (temperature, pressure, concentration ...)

**Table of chemical resistances of sealing element materials**

Medium		Elastomer O-ring			
		FPM	NBR	EPDM	
Acetone		-	-	-	
Acetylene		+	+	+	
Petrol		+	*	-	
Ammonia	aqueous solution	-	-	+	
	liquid	-	*	+	
	gaseous	*	*	-	
Ethylene		+	+	+	
Hydraulic fluids	not flammable	*	-	+	
Hydroxides		*	*	+	
ACIDS	Boric	+	+	+	
	Citric	+	*	+	
	Nitric	-	-	-	
	Hydrofluoric	< 65%	*	-	*
		> 65%	*	-	*
	Phosphoric	10%	+	+	+
		concentrate	+	+	+
	Hydrochloric	boiling conc.	+	-	+
		10%, 80°C	*	-	+
	Hydrochloric	36%, 20°C	*	*	+
		Chromic	+	-	*
	Malic		+	+	+
	Carbolic		-	-	-
	Hydrocyanic		+	*	*
	Butyric		*	*	*
	Lactic		+	*	+
	Formic	10%	-	-	*
		concentrate	-	-	*
	Acetic	10%	-	-	*
		concentrate	-	-	-
Salicylic		+	+	+	
		*	*	+	
Sulphuric	25%	-	-	*	
	80%	-	-	*	
Oxalic	10%	+	+	+	
Carbonic		+	+	+	
Tartaric		+	+	+	
Oxygen		+	-	+	
Oils		+	*	-	
Steam	< 200°C	*	-	*	
	> 200°C	-	-	-	
Perchloroethylene		+	*	-	
Kerosene		+	*	-	
Radioactive radiation		*	*	*	
Compressed air		+	+	+	
Toluene, trichloroethylene		*	-	-	
Hydrocarbons	natural gas	+	+	-	
Water	< 80°C	+	+	+	
	> 80°C	+	*	+	
Hydrogen	cold	+	+	+	
	hot	+	*	+	

+ great resistance  
\* good or conditional resistance  
- not resistant  
vacant no information is available

**Table of maximum values of operation pressures and temperatures that are specified in test report**

CODE	W1 (FPM)	W2 (NBR)	W3 (EPDM)
S1 (steel)	25MPa 120°C 6MPa 200°C	25MPa 110°C -	25MPa 120°C 15MPa 150°C

**Maximum surface temperature of valves** corresponds to maximum temperature of the measured medium.

**Maximum surface temperature for equipment working in area with explosive atmosphere of gas and steam** by EN 1127-1:

for category 3, must not exceed the minimum value of ignition of flammable gas or liquid during normal operation

**Maximum acceptable surface temperature for the equipment working in dust explosive atmosphere** by EN 1127-1:

- a) temperature limit due to preasence of the whirl dust:  
 $T_{max} = 2/3 T_{cl}$   
where  $T_{cl}$  is temperature of the ignition whirl dust
  - b) temperature limit due to layers of the dust up to 5mm thickness:  
 $T_{max} = T_5 \text{ mm} - 75 \text{ °C}$   
where  $T_5 \text{ mm}$  is temperature for ignition the layers of dust 5mm thickness
  - c) layers of the dust over 5 mm by EN 1127-1
- Maximum acceptable surface temperature is given lower value from the above values.  
Temperature limit for category 3 apply during normal operation

**Mechanical resistance of the complete valve (vibration):**

Frequency range 10 až 150 Hz  
Amplitude of deflection 0,35 mm  
Amplitude of acceleration 70 ms<sup>-2</sup>

**DESIGNATION**

(pursuant to ČSN 13 3005-1)

**Data on basic body**

- Trade mark of the manufacturer
- Maximum operation pressure
- Mark of performed pressure test
- Mark of non-explosiveness (design for explosive atmosphere)
- Product ordering number
- Serial number
- Mark CE (design for explosive atmosphere)
- Heat number of body material (for orders of special importance)

**Data on valve unit**

- Code of valve spindle sealing (W1, W2, W3)
- Code of valve seat sealing (S1)

**Data on test report**

- Maximum operation pressure and temperature

**DELIVERY**

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Products pursuant to the purchase order
- Accompanying technical documentation in Czech:
  - o Product quality and completeness certificate, which also serves as the warranty certificate
  - o EU Declaration of Conformity (design for explosive atmosphere)
  - o Test report and list of used materials
  - o Product manual

If it is established in the purchase contract or agreed otherwise, the following documentation can be also delivered with the product:

- Copy of inspection certificate 3.1 pursuant to EN 10204 for body material with heat number
- Declaration of Conformity with purchase order 2.1 pursuant to EN 10204
- Test report about the seismic and the vibration qualification
- Copy of the resistance test report of the environment
- Declaration of Conformity of the supplier pursuant to EN ISO/IEC 17050-1

**PACKING**

Both products and accessories are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations.

**TRANSPORT**

The products may be transported on conditions corresponding to the set of combinations of classes IE 21 pursuant to EN 60721-3-2 (i.e. by airplanes and trucks, in premises that are ventilated and protected against atmospheric conditions).

**STORAGE**

The products may be stored on conditions corresponding to the set of combinations of classes IE 13/1C3 for SO2 pursuant to EN 60721-3-1, with ambient temperature from -30 to + 55 °C (i.e. in places providing minimum protection against daily fluctuations of outdoor climate, exposed to sun radiation, impact of precipitations carried by wind, with danger of growth of fungi and attacks by animals, with the exceptions of termites, in close vicinity of sources of dust and sand, with vibrations of low importance)..

**ORDERING**

The purchase order shall specify:

- Name
- Product ordering number
- Other (special) requirements
- Number of pieces

**PURCHASE ORDER EXAMPLE**

**Standard design:**

Brass valve  
961 4E 31 33  
50 pcs

**Special requirement:**

Brass valve  
961 4E 31 33  
50 pcs  
with manometric connector M20x1.5LH / G1/2 at outlet

**DESIGN OF VALVES, TYPE 961**

SPECIFICATIONS		ORDERING NUMBER						
		961	xx	xx *)	xx *)	xx **)	xx **)	x
Valve design	Manometric closing		4E					
	Manometric test		5E					
	Manometric closing, special		41		33	W1		
Inlet code	Manometric screw-joint M20x1.5			31				
Outlet code	Manometric screw-joint M20x1.5LH with nut M20x1.5LH/M20x.5 with nut M20x1.5LH/G1/2 ***)				33			
					39			
Spindle sealing	O – ring – FPM (max. 200°C)					W1		
	O – ring – NBR (max. 110°C)					W2		
	O – ring – EPDM (max. 150°C)					W3		
Seat sealing	Stainless ball – 1.4571						S1	
Design for explosive atmosphere								x

\*) As a special requirement, the valve with different input and output terminals can be delivered pursuant to the catalogue of accessories, type 981.

\*\*) If none of these codes is specified, the standard design of the valve will be delivered, i.e. with sealing W1 and S1.

**INSTALLATION AND CONNECTION**

The valve may only be installed by a worker of the installation or service organization.



**WARNING**

**Installation of piping in explosive gas atmospheres and flammable dust must be in accordance with EN 1127-1. Protection against for hazard ignition gas, steam and dust of static electricity is provided metal connection of valves with construction parts or piping witch must grounded.**

**PIPING CLEANNESS**

Before the valve is connected, the impulse piping shall be perfectly cleaned. To prevent any deposit of impurities in the valve, cleanness of medium in the piping shall be ensured in a suitable way (drain tanks, etc.).

**CONNECTION OF IMPULSE PIPING**

The valve shall be connected to the piping by means of connecting terminals.

Recommended torque of terminals is 60 Nm.

**COMMISSIONING**

After the valve installation and venting of the piping, the equipment is prepared for operation.

To realize venting, use either condensate (cold, if possible) or flood the whole system with clean service water.

In case of valve design with a venting screw, these screws can be used for venting. Venting shall be realized within the shortest possible time so that the armature could not warm up excessively. By knocking on the piping, air blisters are released, which could stick on the piping walls when the piping is flooded. Therewith the venting is completed.

**OPERATION AND MAINTENANCE**

**CONTROL MOMENT OF SPINDLE**

The table specifies informative values of control moments of spindle and moments required for closing the valve for various types of sealing subjected to various medium pressures.

	Control moment (Nm)	Closing moment (Nm)
Medium pressure (MPa)	W1, W2, W3	W1, W2, W3
0 to 10	0.1 to 0.5	2.5 to 4.0
10 to 25	0.5 to 1.0	4.0 to 4.5

**VALVE CLEANING**

This activity may only be performed by service workers of the valve manufacturer.

**RELIABILITY**

Reliability indicators in operation conditions and ambient conditions specified herein

- Mean time of operation between failures 96 000 hours (inf. value)
- Expected service life 10 years

**SPARE PARTS**

The valve design does not require any delivery of spare parts.

**WARRANTY**

The warranty period is 36 months from the receiving of the product by the customer, unless established otherwise in the contract. The manufacturer warrants for the parts, which are subjected to natural wear and are replaceable as a part of

common maintenance of the product (plug sealing, sealing O-rings, etc.), for the period of 24 months.

Rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall identify the product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and the subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

## REPAIRS

The valves shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package without accessories.

## DISABLING AND LIQUIDATION

The product and its package do not include any parts that could impact the environment.

Products that are withdrawn from operation, including their packages, may be disposed of to sorted or unsorted waste pursuant to the type of waste.

The package of the product can be recycled completely. Metal parts of the product are recycled, non-recyclable plastic materials shall be disposed of in accordance with applicable legislation.



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