

USER MANUAL		
<b>FLANGE GATE VALVES zGAT</b>	<b>019 A(B) K(L) (M)(N)</b> (ex. 019, 19NE)	<b>Edition: 07/2016</b>
	<b>021 A(B) K(L) (M)(N)</b> (ex. 021,021NE)	<b>Date: 01.07.2016</b>

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figure 019

figure 021

## 1. Introduction

Cast iron flange gate valves are manufactured in the following designs:

**Figure 019** - gate valve with handwheel or electric drive

**Figure 021** - gate valve with rising stem and with handwheel or electric drive

Valves may be closed/opened directly from the place of installation, or through the columns with the lower or upper guide of stem, depending on the gate valve relation to the columns (top or bottom of the column). Columns can be operated manually (handwheel) or with an electric drive.

**In the case of applying gate valve for coal gas and natural gas, electric drive should be designed to work in hazardous area and should has required admissions and certificates for operating in such conditions.**

The valves are designed for bi-directional medium flow.

## 2. Basic Specifications

- diameter range DN400 ÷ DN1400
- DN400 ÷ 500 - the maximum allowable pressure PS - 4.0 (bar)
- DN600 - the maximum allowable pressure PS - 2.5 (bar)
- DN800 - the maximum allowable pressure PS - 1.6 (bar)
- DN900÷ DN1400 - the maximum allowable pressure PS - 1.0 (bar)
- Other possible pressure PS - according to catalogue cards, without confirming compliance with PN-EN 1171.
- The maximum allowable temperature TS - 120°C
- Class of closing tightness: Class B according to DIN EN 12266-1. The tightness is tested with water.
- Connection flanges PN10; sealing face type B PN EN1092-2 - for DN400 ÷ DN1000
- Connection flanges PN2,5; sealing face type B PN EN1092-2 - for DN1200 ÷ DN1400
- Length of the valve - FTF series 14 in accordance with PN EN 558-1
- Corrosion protection according to the manufacturer's instructions or by arrangement between the manufacturer and the purchaser.

**When mounting valve at the end flange of pipeline (free outflow) it is recommended to reduce working pressure to 0,5 PS.**

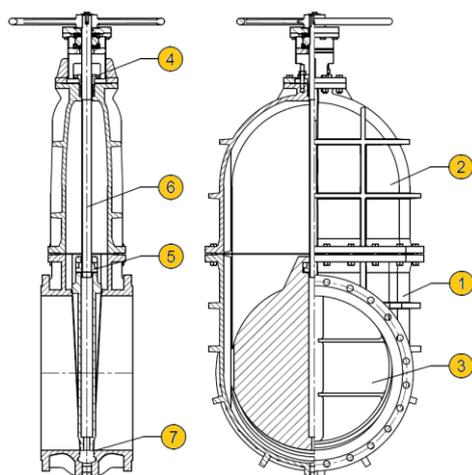
## 3. Marking of gate valves

Valves applied for water and other not dangerous liquids cannot be marked with "CE" due to the cat. SEP (Standard Engineering Practice).

Valves for not dangerous gases are marked with "CE" by the manufacturer.

Gate valves in design ZI/ZI (type of seal cast iron/cast iron) and M/M (type of seal brass/brass) are applied for liquids of group 1, if materials used to their production are resistant to a given medium, they undergo the assessment of conformity as for products classified to category III according to Directive No 2014/68/UE and are marked with "CE" with number of notified body.

## 4. Construction



Drawing 1.

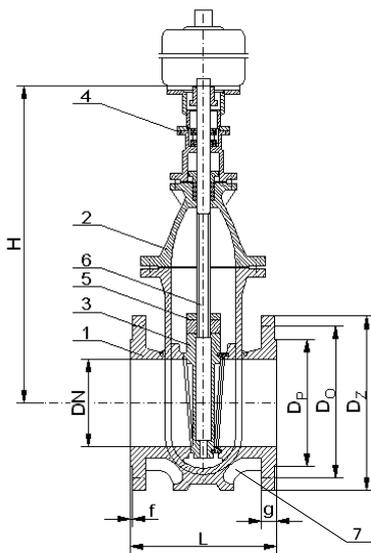
Figure 019 Gate valve with handwheel

Item	Part	Material	
		ZI/ZI	M/M
1	Body	EN GJL 250 / EN-GJS-400 - 15	
2	Bonnet	EN GJL 250 / EN-GJS-400 - 15	
3	Wedge	EN GJL 250 / EN-GJS-400 - 15	
4	Gland Packing	EN GJL 250	
5	Stem nut	CuZn39Pb2 (EN-GJS-500-7)	
6	Stem	X20Cr13	
7	Sealing ring	EN GJL 250	CuZn39Pb2

Table 1. Figure 019

DN	FTF	Max. height*	Flange diameter	Pitch Circle Diameter	Raised face dia.	Flange Thickness/raised face	Diameter/number of holes	Number of turns
	L	H	D <sub>z</sub>	D <sub>o</sub>	D <sub>p</sub>	g/f	d <sub>o</sub> /i	
400	310	1050	565	515	480	32/4	28/16	62
500	350	1150	670	620	582	34/4	28/20	71
600	390	1350	780	725	682	36/5	31/20	91
800	470	1710	1015	950	905	44/5	33/24	100
900	510	1905	1115	1050	1005	46/5	33/28	113
1000	550	2050	1230	1160	110	50/5	36/28	125
1200	630	2445	1375	1320	1280	40/5	30/32	120
1400	710	2850	1575	1520	1480	44/5	30/36	140

\* Design dependent



Drawing 2.

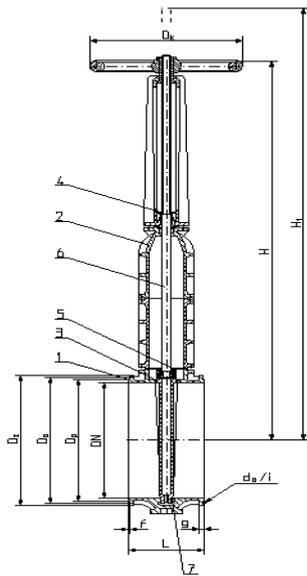
Figure 019 Gate valve for electric drive

Item	Part	Material	
		ZI/ZI	M/M
1	Body	EN GJL 250 / EN-GJS-400 - 15	
2	Bonnet	EN GJL 250 / EN-GJS-400 - 15	
3	Wedge	EN GJL 250 / EN-GJS-400 - 15	
4	Gland Packing	EN GJL 250	
5	Stem nut	CuZn39PB2 (EN-GJS-500-7)	
6	Stem	X20Cr13	
7	Sealing ring	EN GJL 250	CuZn39Pb2

Tabele 2. Figure 019

DN	FTF	Max. height*	Flange diameter	Pitch Circle Diameter	Raised face dia.	Flange Thickness/raised face	Diameter/number of holes	Torque
	L	H	D <sub>z</sub>	D <sub>o</sub>	D <sub>p</sub>	g/f	d <sub>o</sub> /i	
400	310	1150	565	515	480	32/4	28/16	200
500	350	1300	670	620	582	34/4	28/20	250
600	390	1500	780	725	682	36/5	31/20	300
800	470	1890	1015	950	905	44/5	33/24	470
900	510	2070	1115	1050	1005	46/5	33/28	660
1000	550	2275	1230	1160	110	50/5	36/28	800
1200	630	2615	1375	1320	1280	40/5	30/32	1060
1400	710	3045	1575	1520	1480	44/5	30/36	1710

\* Design dependent



Drawing 3.

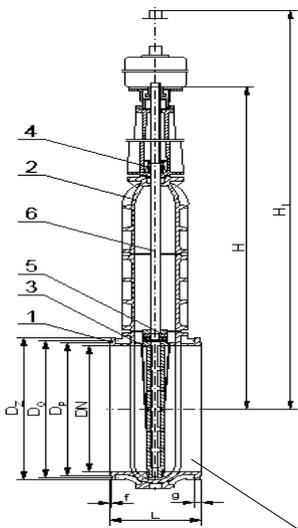
Figure 021 Gate valve with handwheel

Tabele 3. Figure 021

Item	Part	Material	
		ZI/ZI	M/M
1	Body	EN GJL 250 / EN-GJS-400 - 15	
2	Bonnet	EN GJL 250 / EN-GJS-400 - 15	
3	Wedge	EN GJL 250 / EN-GJS-400 - 15	
4	Gland Packing	EN GJL 250	
5	Stem nut	CuZn39PB2 (EN-GJS-500-7)	
6	Stem	X20Cr13	
7	Sealing ring	EN GJL 250	CuZn39Pb2

DN	FTF	Max. height*		Flange diameter	Pitch Circle Diameter	Raised face dia.	Flange Thickness/raised face	Diameter/number of holes	Number of turns
		L	H						
400	310	1270	1750	565	515	480	32/4	28/16	62
500	350	1640	2220	670	620	582	34/4	28/20	71
600	390	1890	2590	780	725	682	36/5	31/20	91
800	470	2570	3515	1015	950	905	44/5	33/24	100
900	510	2820	3990	1115	1050	1005	46/5	33/28	113
1000	550	3070	4270	1230	1160	1110	50/5	36/28	125
1200	630	3720	5100	1375	1320	1280	40/5	30/32	120
1400	710	4290	5995	1575	1520	1480	44/5	30/36	140

\* Design dependent



Drawing 4.

Figure 021. Gate valve for electric drive

Item	Element	Material	
		ZI/ZI	M/M
1	Body	EN GJL 250 / EN-GJS-400 - 15	
2	Bonnet	EN GJL 250 / EN-GJS-400 - 15	
3	Wedge	EN GJL 250 / EN-GJS-400 - 15	
4	Gland Packing	EN GJL 250	
5	Stem nut	CuZn39PB2 (EN-GJS-500-7)	
6	Stem	X20Cr13	
7	Sealing ring	EN GJL 250	CuZn39Pb2

Tabele 4. Figure 021

DN	FTF	Max. height*		Flange diameter	Pitch Circle Diameter	Raised face dia.	Flange Thickness/raised face	Diameter/number of holes	torque
	L	H	H <sub>1</sub>	D <sub>2</sub>	D <sub>o</sub>	D <sub>o</sub>	g/f	d <sub>o</sub> /i	
<b>400</b>	310	1270	1750	565	515	480	32/4	28/16	200
<b>500</b>	350	1640	2220	670	620	582	34/4	28/20	250
<b>600</b>	390	1890	2590	780	725	682	36/5	31/20	300
<b>800</b>	470	2570	3515	1015	950	905	44/5	33/24	470
<b>900</b>	510	2820	3990	1115	1050	1005	46/5	33/28	660
<b>1000</b>	550	3070	4270	1230	1160	1110	50/5	36/28	800
<b>1200</b>	630	3720	5100	1375	1320	1280	40/5	30/32	1060
<b>1400</b>	710	4290	5995	1575	1520	1480	44/5	30/36	1710

\* Design dependent

- The construction of the valves and the materials used are shown in Figures 1 - 4 and in Tables 1 - 4.
- The sealing surfaces of body and wedge can be made of the base material, i.e., grey iron castings, grade EN GJL-250; ductile iron, grade. EN GJS-400-15 (version cast ZL/ZL), or with a ring of pressed material - grade CuZn39Pb2 (version M/M).
- Valves prepared for the drive are equipped with a coupling for drive, the construction depends on the type of the drive used (e.g. NWA; AUMA; MODACT).
- If the valves are opened/closed through the columns, they are made as for the electric drive. Columns can be mounted directly on gate valve via a sleeve coupling or combined with valve extensions, with CARDAN universal joints.
- At the request of the customer, at the bottom of the valve, a drainage to allow removal of impurities from the valve can be made.

## 5. Assembly

- The installation and access to the valve mounted on the installation is the responsibility of the designer of the installation or user of the valve. Errors of the design and installation of the valve can affect the correctness of its operation and create a threat to the environment.
- At the design or installation phase, sufficient space should be provided so that it will be possible to disassembly/assembly the internal parts of the valve.
- Installation of valves on the system should minimize the possibility of transferring the load from pipelines to the gate valve.
- Valves should be installed on horizontal pipelines in vertical position with handwheel/drive at the top.
- In the case of columns mounted directly on gate valve, connection of the columns stem with gate valve stem is made with a coupling sleeve. When the columns are mounted above / below the valve, for connecting the valve stem with the columns stem, use the extension and CARDAN joints that allow to shift the valve axis relative to the axis of the columns axis by max. 30°.
- Drives applied to the opening / closing of the gate valves should be connected to the electrical system by a qualified electrician, after reading the operation and maintenance manual of drives.
- Flange facings should be clean and without defects. Before mounting, flanges should be carefully set, and when bolting the flanges use factory-made drill holes only. Screws, nuts and gaskets should be made of materials approved for use on connecting elements in pressure equipment/systems. The bolts must be tightened with the right tools, evenly and criss-cross with appropriate torque.
- It is recommended that the yield strength of a screw connection did not exceed 240 N/mm<sup>2</sup> (according to DIN EN 1092-2 5.3).

## 6. Launching the valve

### 6.1. Cleaning and flushing of pipelines

During the pickling, in place of valves inserts should be applied. If this is not possible at pickling, gate valves installed on the pipeline should be fully open for the pickle liquor not to destroy the seals. Process and pickle liquor has to be secure for pipelines and the valve material. Liability for any damage to the valves at the pickling process are to the one conducting the process.

### 6.2. Blowing the pipelines

Opening and closing of valves in the pipeline during the blowing process greatly increases the possibility of sealing surfaces damage. Therefore, at the time of blowing, in place of valves inserts should be applied, and if this is not possible, gate valves engaged in blowing should be checked and possibly regenerated. In the case of iron valves, blowing with steam at a high temperature is unacceptable.

Due to the diversity of methods used, the guidance provided in paragraphs 5.1 and 5.2 are only general recommendations.

### 6.3. First run

- Opening/closing of the valves with manual drive is done by turning the wheel to the right/left.
- Valves with electric drive must be set manually at half open position, and then it is required to check the direction of rotation of the drive motor, the operation of torque and limit switches and overload protection. It is important to follow the instructions contained in the Operation Manual of the drive manufacturer.
- After installation and prior to first run, check the correct functioning of the valve through the run of at least 1 full cycle.
- During first run, check the tightness of the gland and other connections with the possible of leaks, with safe method acc. for operating conditions and the medium flowing.
- After reaching the operating parameters and "resting" the installation, checking the valve connections leak test must be repeated. In the event of a leak, tighten the appropriate connecting bolts or gland. It is important to pay attention if the gland sealing did not cause a significant increase in resistance of moving the stem.

## 7. Operation

### Opening and closing of valves

- The valve with hand wheel - closing / opening is done using handwheel.
- Valves with electric drive - closing / opening is done using an electric drive.

**Attention: Manually operated gate valve can only be operated manually. Using rods and other "extensions" of the arm is not permitted because of possible damage or injury hazards.**

In the case of the valve with electric drive you must keep the recommendations contained in Operation Manual of the drive.

In order to maintain full technical efficiency, valves should be operated with use of the following principles:

- The valves are designed to operate in the fully open or closed position. Do not use valves to control the flow of the medium.
- Valves should be installed only in vertical position(wheel/drive at the top).
- Gate valves with electric drive should be closed with torque appropriate for the particular size of the valve.

- In the case of the valve with electric drive you must keep the recommendations contained in Operation Manual of the drive.

Valves being elements of the pressure pipelines require support, maintenance, periodic inspections and repairs. Periodic maintenance and repairs are defined by the user of the valve on the basis of existing legislation and their own experience.

When operating the valves, in order to prevent threats, observe the rules of the use the pressure equipment and electrical connections (the valves with electric drives) as well as specific provisions applicable to this type of equipment. In particular:

- Adequate selection, both in terms of size and performance of materials, of the valve for installation by its designer.
- When selecting columns and Cardan joints for valves attention should be made to proper sizing of these elements (corresponding to the moment of opening / closing of the valve).
- The use of valves to work on the operating parameters not to exceed those guaranteed by the manufacturer of the valves.
- Compliance with the generally applicable rules for pressure equipment, including compliance with the recommendations set out in this manual valves and Operation Manual of drives for valves with electric drive.
- Do not make any disassembly operations if the gate valve is under pressure.
- It is unacceptable to tighten the bolts connecting the body with a bonnet, if the gate valve is under pressure.

## **8. Elimination of faults and defects**

### **8.1. Internal leakage**

The cause of internal leaks of the valve may be:

- Damage to the sealing surface smoothness through solid materials contained in the working medium.
- The deformation of the sealing surface flatness by unacceptable high mechanical or thermal stresses.
- Corrosion or erosion of the sealing surfaces, e.g. as a result of improper selection of the diameter of the valve or the use of the valve made of materials not resistant to the medium.

Removal of the above defects is possible through grinding of the sealing surface. This operation requires the right tools and qualified and trained personnel. It is recommended to perform this operation at the manufacturer's plant or by technicians authorized by the manufacturer of the valves.

### **8.2. Drive malfunction**

In the event of drive malfunction, follow the Operation Manual of the drive.

## **9. Packing and transport**

Valves without handwheel, without the an electric drive and without column can be transported on sledges, in properly reinforced boxes or without packaging depending on the method of transport and customer requirements. In any case, protection is required before moving the valves. Electric drive should be protected during transport and storage in accordance with the requirements of the drive manufacturer.

Valves are transported in a closed state, and their internal spaces are protected by caps.

**Transport and loading/unloading should be carried out so as not to damage the fittings and to respect the applicable health and safety regulations. When loading / unloading and during installation - use lifting slings adapted to the weight of the valve. Mounting location should be determined according to the centre of gravity marked on the gate**

**valve in order to maintain stability during the movement of the valve. It is forbidden to mount a the valve using the stem. In case of loading / unloading valves on slides - the mounting location is indicated on the slides by the manufacturer, and the weight the valve with slides is indicated on the tag.**

Storage should be stored in such places that the valves are secured against damage, dirt, corrosion, and the influence of climatic factors and corrosive substances.

Throughout the storage period longer than nine months, you should periodically review them in the scope of painting and maintenance. Any losses of covering should be supplemented to date.

## **10. Final Remarks**

Gate valve should be assembled on horizontal pipelines in vertical position.

In case if gate valve is assembled on end flange of pipeline (outlet to atmosphere), it is recommended to reduce working pressure to 0,5 PS.

In case of applying gate valve for coke-oven gas or natural gas – electric drive should be adjusted for work in the area endangered with explosion and possess required for such conditions admissions and certificates.

## **11. Warranty**

ZETKAMA grants quality warranty with assurance for proper operation of its products, providing that assembly of them is done according to the user's manual and they are operated according to technical conditions and parameters described in ZETKAMA's catalogue cards. Warranty period is 18 months starting from assembly date, however not longer than 24 months from the sales date.

Other warranty terms are to be agreed between the manufacturer of the valve and the purchaser. **The manufacturer reserves the right to introduce technical changes as the result of improving construction and manufacturing technology.** Failure to comply by the user with the regulations and indications included in this user's manual shall exempt the manufacturer from any liability and warranty.

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