



## UNI-DIRECTIONAL / KNIFE GATE VALVE

### DESCRIPTION

- One-piece cast body with guides to support gate and seat wedges.
- Provides high flow rates with low pressure drop.
- Various seat and packing materials available.
- Face-to-face dimension in accordance with CMO Valves standard.
- It has an arrow on the body indicating the flow direction

### GENERAL APPLICATIONS

This knife gate valve is suitable for working with dry products like powder and grain. It is generally used for gravity discharge of dry solids.

- Mining
- Silo emptying
- Electrical powerstations
- Chemical plants
- Food Industry

### SIZES - ANSI

2" to 48"

*\* Others larger sizes on request*

### WORKING PRESSURE ( $\Delta P$ )

2" to 6"	45 psi
8" to 12"	30 psi
14" to 16"	22 psi
18" to 48"	15 psi

This valve is usually mounted under a hopper, to prevent any kind of solids accumulating on the seat, the valve has a special body design and it is assembled with the body arrow in the same direction as the fluid.

The design of the **FK** valve seat is the same as for the A valve, but the pressures vary to those working the **FK** valves.

### STANDARD FLANGES

- EN1092 PN10.
- ASME B16.5 (class 150).

### OTHER COMMON FLANGES

- PN6.
- PN16.
- PN25.
- BS "D" y "E".
- JIS10K.

*\* Others on request*



fig. 1

### DIRECTIVES

- Pressure Equipment Directive : **(PED) ART 4.3 /CAT.1**
- Potential Explosive Atmospheres Directive (optional) : **(ATEX) CAT.3 ZONA 2 y 22 GD.**

*\* for further information on categories and zones please contact the CMO Valves Technical-Commercial Dept.*

### QUALITY DOSSIER

All valves are tested hydrostatically at CMO and material and test certificates can be provided

- Body test = working pressure x 1.5
- Seat test = working pressure x 1.1

## ADVANTAGES

When a knife gate valve remains open for long periods of time and the body's internal walls are parallel a very large torque is usually required to close it. However, the inside of the body of model FK is cone-shaped, which provides greater space and, this way, when the valve is closed the solids stored inside it can be easily removed.

The **FK** valve is unidirectional and an arrow is marked on the body indicating the flow direction.

The stem protection hood is independent from the handwheel securing nut, this means the hood can be disassembled without the need to release the handwheel. This advantage allows regular maintenance operations to be performed, such as lubricating the stem, etc.

The stem on the CMO valves is made of 18/8 stainless steel. This is another added advantage, as some manufacturers produce it with 13% chrome and it gets rusty very quickly. The handwheel is made of GJS-500 nodular cast iron. Some manufacturers produce them in normal cast iron which can lead to breakages in the event of very high operating torque or knocks.

The yoke has a compact design with the bronze actuator nut protected in a sealed and lubricated box. This makes it possible to move the valve with a key, even without the handwheel (in other manufacturers' products this is not possible).

The pneumatic actuator's upper and lower covers are made of GJS-400 nodular cast iron, making them highly shock resistant. This characteristic is essential in pneumatic actuators.

The pneumatic cylinder sealing joints are commercial products and can be purchased worldwide. This means it is not necessary to contact CMO Valves every time a sealing joint is required.

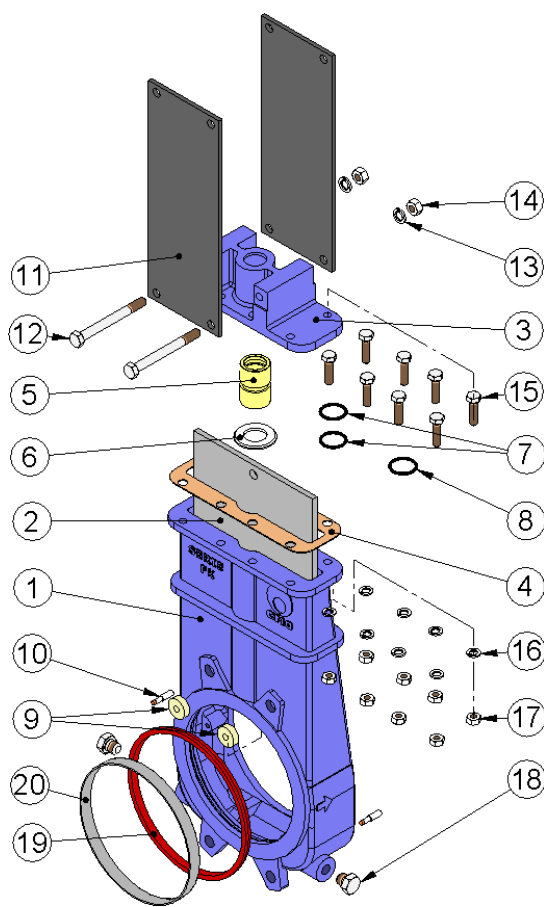


fig. 2

### STANDARD COMPONENTS LIST

COMPONENT		CAST IRON	STAINLE SS STEEL
1	BODY	GJL-250	CF8M
2	THROUGH CONDUIT	AISI304	AISI316
3	COVER	GJL-250	CF8M
4	SEAT SEAL	CARDBOARD	
5	BUSHING	NYLON	
6	STOP WASHER	AISI304	AISI316
7	INTERIOR O-RING SEAL	NITRILE	
8	EXTERIOR O-RING SEAL		
9	SEAT	RCH1000	
10	THROUGH CONDUIT STOPPER	F-111+BRONZE	AISI316+-BRONZE
11	SUPPORT	S275JR	
12	SCREW	5.6 ZINC	A-2
13	WASHER	ST ZINC	A-2
14	NUT	5.6 ZINC	A-2
15	SCREW	5.6 ZINC	A-4
16	WASHER	ST ZINC	A-4
17	NUT	5.6 ZINC	A-4
18	THREADED CAP	A-2	A-4
19	SEAL	EPDM	
20	RING	AISI316	

Table. 1

## DESIGN CHARACTERISTICS

### BODY

- Unidirectional wafer-design knife gate valve. One-piece cast body with guides to support gate and seat wedges.
- For diameters greater than DN1200 the body is machine-welded with the necessary reinforcements to resist the maximum working pressure.
- Full port designed to provide high flow rates with low pressure drop.
- The body's internal design prevents any build up of solids in the seat area.
- The standard manufacturing materials are GJL-250 cast iron and CF8M stainless steel. Other materials, such as GJS-500 nodular cast iron, A216WCB carbon steel and stainless steel alloys (AISI316Ti, Duplex, 254SMO, Uranus B6...) are available on request.
- As standard, iron or carbon steel valves are painted with an anti-corrosive protection of 80 microns of EPOXY (colour RAL 5015). Other types of anti-corrosive protections are available on request.

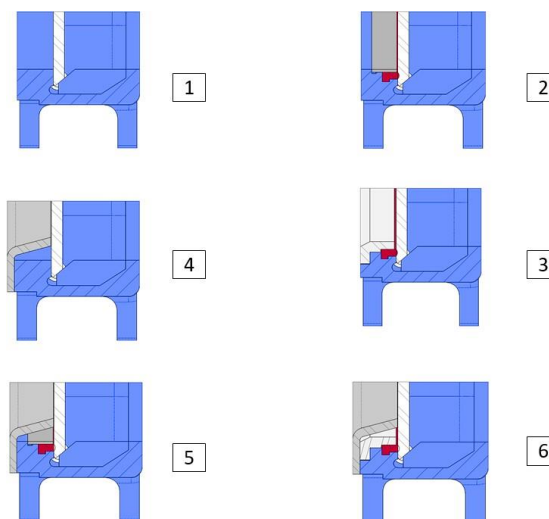


fig. 3

### GATE

- The standard manufacturing materials are AISI304 stainless steel in valves with iron body and AISI316 stainless steel in valves with CF8M body. Other materials or combinations can be supplied on request.
- The gate is polished on both sides to provide a smooth contact surface with the resilient seat. At the same time, the gate is rounded to prevent the seat from being cut.
- Different degrees of polishing, anti-abrasion treatments and modifications are available to adapt the valves to the customer's requirements.

### SEAT (sealtight)

Six types of seats are available according to the working application:

#### SEAT 1

##### Metal / metal seat.

This type of seat does not include any kind of resilient seat and the estimated leakage (considering water as the test fluid) is 1.9% of the pipe flow.

#### SEAT 2

##### Standard soft-seated valve.

This type of seat includes a resilient seat which is fixed to the inside of the body via an AISI316 stainless steel retaining ring.

#### SEAT 3 Soft-seated valve with reinforced socket

Soft-seated valve with reinforced socket. This type of seat includes a resilient seat which is fixed to the inside of the body via a reinforced retaining ring with two functions (to protect the valve from abrasion and clean the gate when working with solids that can stick to it).

#### SEAT 4,5 and 6

The same as seats 1, 2 and 3 but including a deflector. The deflector is a cone-shaped ring located at the valve's entrance with two functions (to protect the valve from abrasion and guide the flow to the centre of the valve).



\*Note: Three materials are available for the reinforced socket and the deflector: Steel CA-15, CF8M and Ni-hard.

## RESILIENT SEAT MATERIALS

**EPDM :** This is the standard resilient seat fitted on CMO valves. It can be used in many applications, however, it is generally used for water and products diluted in water at temperatures no higher than 90°C\*. It can also be used with abrasive products and it provides the valve with 100% watertight integrity.

**NITRILE :** It is used in fluids containing fats or oils at temperatures no higher than 90°C\*. It provides the valve with 100% watertight integrity.

**EPDM :** Suitable for corrosive applications and continuous high temperatures of up to 190°C and peaks of 210°C. It provides the valve with 100% watertight integrity.

**SILICONE :** Mainly used in the food industry and for pharmaceutical products with temperatures no higher than 200°C. It provides the valve with 100% watertight integrity.

**PTFE :** Suitable for corrosive applications and pH between 2 and 12. Does not provide the valve with 100% watertight integrity. Estimated leakage: 0.5% of the tube flow.

**GASKET** The gasket is the area of the valve where the greatest sealtight integrity must be reached to avoid leakages to the atmosphere, in the CMO FK valves, this area is between the body bonnet and the rod. There are two types of gasket :

**Bushing with sealing joints:** This type of seal (fig.4) achieves sealtightness by way of nylon bushing located between the body and the rod. This bushing is introduced inside the cover, until it comes up against the protrusion in the upper section, whilst a washer is located on the lower section; this becomes trapped when fastening the cover and the body, preventing the bushing from moving. This bushing has two interior O-rings to guarantee sealtightness between the rod and the bushing, and an exterior O-ring to guarantee the absence of leakages between the bushing and the body cover. This system is recommended for valves that operate with liquids.

See Table 2 for the different types of seal materials.

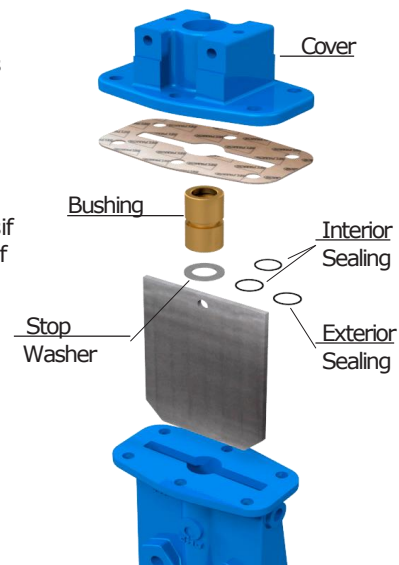
**GREASED COTTON : (Recommended for hydraulic services)** This packing is composed of braided cotton fibres soaked in grease both inside and out. It is for general use in hydraulic applications in both pumps and valves.

**GRAPHITE :** This packing is composed of high-purity graphite fibres. A diagonal braiding system is used and it is impregnated with graphite and lubricant which helps to reduce porosity and improve operation. It has a wide range of applications as graphite is resistant to steam, water, oils, solvents, alkali and most acids.

**CERAMIC FIBRE :** This packing is composed of ceramic material fibres. Its main applications are with air or gas at high temperatures and low pressures.



**Note :** In some applications other types of resilient materials are used, such as hypalon, butile or natural rubber. Please contact us if you require one of these materials.



**SYNTHETIC + PTFE :** This packing is composed of braided synthetic fibres soaked in PTFE both inside and out. It is for general use in hydraulic applications in both pumps and valves and in all types of fluids, especially corrosive ones, including concentrated and oxidising oils. It is also used in liquids with solid particles in suspension.

**DRY COTTON :** This packing is composed of cotton fibres. It is for general use in hydraulic applications with solids.

**COTTON + PTFE :** This packing is composed of braided cotton fibres soaked in PTFE both inside and out. It is for general use in hydraulic applications in both pumps and valves.

SEAT/SEALS			PACKING			
Material	Max. T. (°F)	Applications	Material	P(psi)	Max. T. (°F)	pH
Metal/Metal	>482	High temperatures	Greased cotton	150	212	6-8
EPDM (E)	194 *	Non-mineral oils, acids and water.	Dry cotton (AS)	7.5	212	6-8
Nitrile (N)	194 *	Hydrocarbons, oils and greases	Cotton +PTFE	450	248	6-8
Viton (V)	392	Hydrocarbons and solvents	SYNTHETIC +PTFE	1500	-328+518	0-14
Silicone (S)	392	Food Products	Graphite	580	1202	0-14
PTFE (T)	482	Resistant to corrosion	Ceramic Fibre	4.5	2552	0-14



NOTE : More details and other materials available to order

\*↔ EPDM and nitrile: is possible until serving temperature Max.: 120°C under request.

Table 2



## STEM

The CMO valves spindle is made of stainless steel 18/8. This characteristic makes it highly resistant and provides excellent properties against corrosion. The valve design can be rising stem or non-rising stem. When a rising stem is required for the valve, a stem hood is supplied to protect the stem from contact with dust and dirt, besides keeping it lubricated.

## PACKING GLAND

The packing gland allows uniform force and pressure to be applied to the packing to ensure watertight integrity. As standard, valves with cast iron body include GJS-450 packing glands, whilst valves with stainless steel body have CF8M packing glands.

## ACTUATORS

All types of actuators can be supplied, with the advantage that, thanks to the CMO Valves design, they are fully interchangeable. This design allows the customer to change the actuators themselves and no extra assembly accessories are required. A design characteristic of is that all actuators are interchangeable.

### Manual Actuators

Handwheel with rising stem / **non** rising  
Handwheel with non-rising stem / Chainwheel  
Lever / Gear-Box / Others, (Square nut, etc )

### Wide range of accessories available

Mechanical stops  
Locking devices  
Emergency manual actuators  
Electrovalves  
Positioners  
Limit switches  
Proximity switches  
Straight floor stands (fig.5)  
Leaning floor stand (fig.4)

### Automatic Actuator

Electric actuator  
Pneumatic cylinder  
Hydraulic cylinder

fig.4

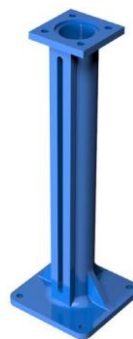
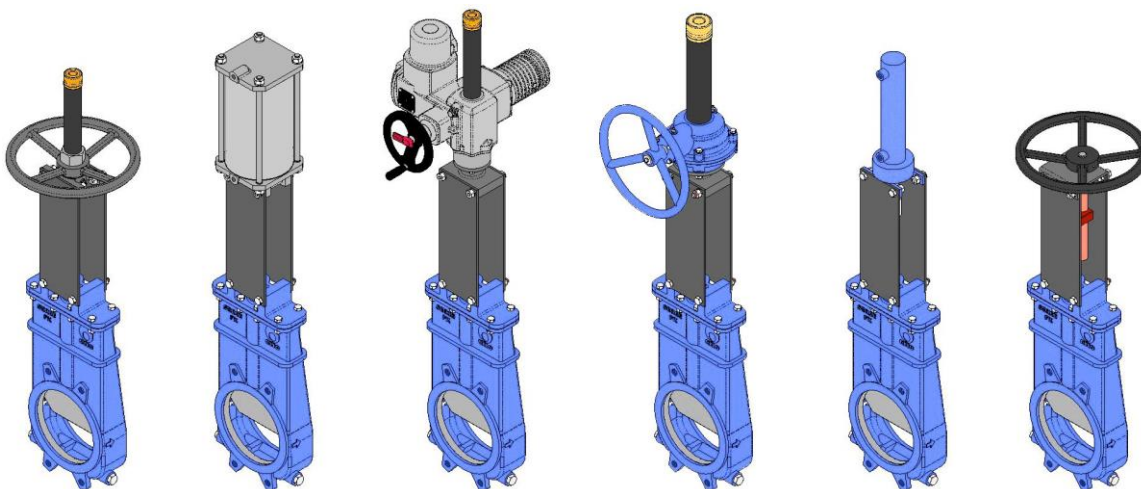


fig.5



Stem extensions have also been developed, allowing the actuator to be located far away from the valve, to suit all needs. Please consult our technicians beforehand.

fig. 6



HANDWHEEL  
RISING STEM

PNEUMATIC  
ACTUATOR

ELECTRIC-MOTOR  
ACTUATOR

HYDRAULIC  
ACTUATOR

HANDWHEEL  
GEAR BOX

HANDWHEEL  
NON RISING STEM

## ACCESSORIES AND OPTIONS

Different accessories are available to adapt the valve to specific working conditions such as :

### PTFE LINED GATE :

As with the mirror polished gate, it improves the valve's resistance to products that can stick to the gate.

### STELLITED GATE:

Stellite is added to the gate's internal circle to protect it from abrasion.

### SCRAPER IN THE PACKING:

Its function is to clean the gate during the opening movement and prevent possible damage to the packing.

### AIR INJECTIONS IN THE PACKING GLAND:

By injecting air in the packing, an air chamber is created which improves the seal-tightness.

### CASED BODY :

Recommended in applications in which the fluid can harden and solidify inside the valve's body. An external jacket keeps the body temperature constant, preventing the fluid from solidifying.

### FLUSHING HOLES IN BODY :

Several holes are drilled in the body to flush air, steam or other fluids out with the aim of cleaning the valve seat before sealing.

### ELECTROVALVES (fig. 7) :

For air distribution to pneumatic actuators.

### CONNECTION BOXES, WIRING AND PNEUMATIC PIPING :

Units supplied fully assembled with all the necessary accessories.

### MECHANICAL LIMIT SWITCHES, INDUCTIVE SWITCHES AND POSITIONERS :

Limit switches or inductive switches are installed to indicate precise valve position, as well as positioners to indicate continuous position (fig. 7).

### MECHANICAL LOCKING SYSTEM :

Allows the valve to be mechanically locked in a set position for long periods.

### STROKE LIMITING MECHANICAL STOPS:

These allow the stroke to be mechanically adjusted, limiting the valve run.

### EMERGENCY MANUAL ACTUATOR (hand wheel / gear box) (Fig. 7):

Allows manual operation of the valve in the event of power or air failure.

### TRIANGULAR (V-NOTCH) AND PENTAGONAL DIAPHRAGM WITH INDICATION RULE :

Recommended for applications in which it is necessary to regulate the flow, it allows flow control according to the valve's opening percentage.

### INTERCHANGEABLE ACTUATORS :

All actuators are easily interchangeable.

### ACTUATOR OR YOKE SUPPORT :

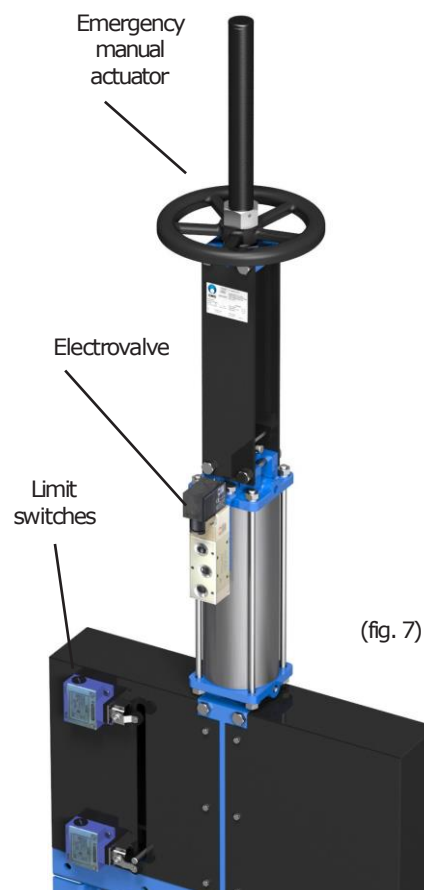
Made of EPOXY-coated steel (or stainless steel to order), its robust design gives it great rigidity in order to resist the most adverse operation conditions.

### EPOXY COATING :

All carbon steel components and bodies of CMO valves are EPOXY coated, giving the valves great resistance to corrosion and an excellent surface finish. CMO valves standard colour is blue RAL-5015.

### BONNET:

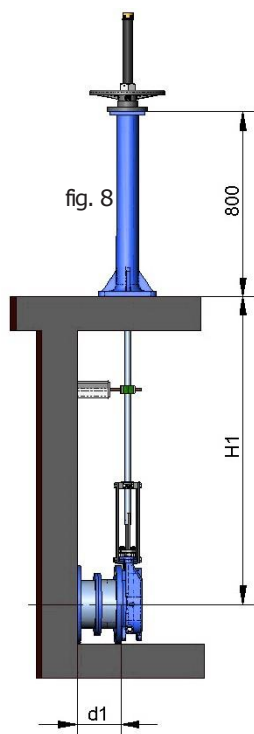
Provides total seal-tightness to the outside, reducing the packing maintenance required.



(fig. 7)

## TYPES OF EXTENSION

When the valve needs to be operated from a distance, the following different types of actuators can be fitted :



### 1- EXTENSION: FLOOR STAND

This extension is performed by coupling a rod to the stem. By defining the length of the rod, the desired extension is achieved. A floor stand is normally installed to support the actuator.

The definition variables are as follows :

**H1:** Distance from the valve shaft to the base of the stand.

**d1:** Separation from the wall to the end of the connecting flange.

### CHARACTERISTICS :

- It can be coupled to any type of actuator.
- A stem support-guide is recommended (fig. 9) every 15m.
- The standard floor stand is 800 mm high (fig. 8). Other floor stand measurements available to order.
- A position indicator can be fitted to determine the valve's percentage of opening.
- Possibility of leaning floor stand (fig. 10).

fig. 9

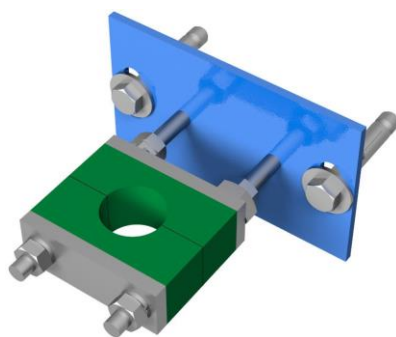


fig. 10



### COMPONENTS LIST

Component	Standard Version
Stem	AISI 303
Spindle	AISI 304
Support-Guide	Carbon steel with EPOXI coating
Slide	Nylon
Column	GJS-500 with EPOXY coating

Table 3

## 2. EXTENSION: PIPE (fig 11)

Consists of raising the actuator. The pipe will rotate with the wheel or key when the valve is operated, although this will always remain at the same height.

The definition variables are as follows :

**H1:** Distance from the valve shaft to the desired height of the actuator.

**d1:** Separation from the wall to the end of the connecting flange.

### CHARACTERISTICS:

- Standard actuators: Handwheel and Square Nut.
- A pipe support-guide is recommended every 1.5m.
- The standard materials are: EPOXY coated carbon steel or stainless steel.

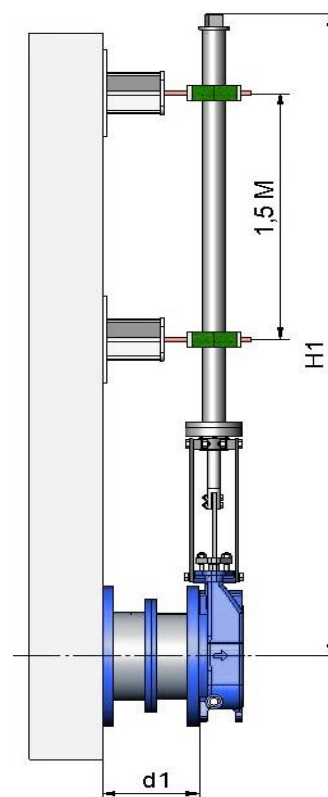


fig. 11

## 3. EXTENSION: Extended Support Plates (fig 12).

When a short extension is required, it can be achieved by extending the support plates. An intermediate yoke can be fitted to reinforce the support plates' structure.

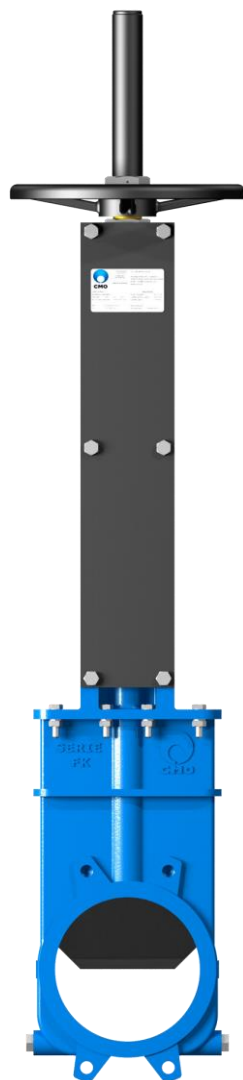


fig. 12

## 4. EXTENSION : CARDAN JOINT (fig 13)

If the valve and the actuator are not in correct alignment, the problem can be resolved by fitting a universal joint.



fig. 13



## HANDWHEEL WITH RISING STEM

The definition variables are as follows :

**B** = Max. width of the valve (without actuator).

**D** = Max. height of the valve (without actuator).

### OPTIONS:

- Locking devices.
- Extensions: stand, pipe, plates,...
- DN higher than those shown in the table.

### ACTUATOR INCLUDING:

- Handwheel.
- Stem.
- Nut.
- Stem protection hood.

### AVAILABLE:

- ND50 to ND1200
- Other ND to order
- From ND600 the actuator is with geared motor.

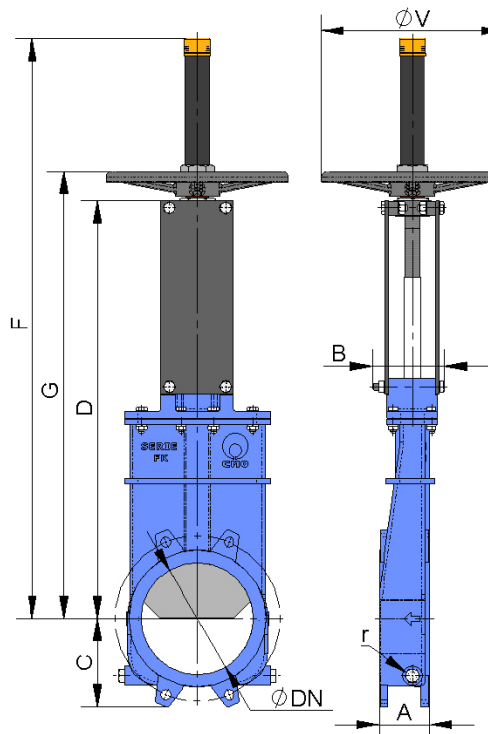


fig. 14

ANSI	DN	$\Delta P$ (bar)	A	B	C	D	F	G	$\phi V$	r (B.S.P.)
2"	50	3	60	91	61	323	492	362	225	1/4"
2 1/2"	65	3	60	91	68	362	531	401	225	1/4"
3"	80	3	64	91	91	404	573	443	225	1/4"
4"	100	3	64	91	104	453	622	492	225	1/4"
5"	125	3	70	101	118	511	730	550	225	3/8"
6"	150	3	76	101	130	574	793	613	225	3/8"
8"	200	2	89	118	158	745	1036	798	325	3/8"
10"	250	2	114	118	196	880	1271	933	325	1/2"
12"	300	2	114	118	230	1005	1396	1058	380	1/2"
14"	350	1,5	127	290	255	1141	1681	1250	450	1/2"
16"	400	1,5	140	290	290	1266	1806	1375	450	1/2"
18"	450	1	152	290	306	1393	2033	1502	450	1/2"
20"	500	1	152	290	340	1529	2169	1638	450	1/2"
24"	600	1	178	290	398	1782	2522	1891	450	1/2"
28"	700	1	178	320	453	2105	2967	2217	--	1/2"
32"	800	1	178	320	503	2376	3338	2488	--	1/2"
36"	900	1	178	320	583	2655	3717	2767	--	1/2"
40"	1000	1	178	320	613	2935	4097	3047	--	1/2"
48"	1200	1	203	340	728	3440	4802	3552	--	1/2"

Table. 4

## HANDWHEEL WITH NON-RISING STEM

The definition variables are as follows :

**B = Max. width** of the valve (without actuator).

**D = Max. height** of the valve (without actuator).

### OPTIONS:

- Square nut.
- Locking devices.
- Extensions: stand, pipe, plates...
- DN higher than those give in the table.

### ACTUATOR INCLUDING:

- Handwheel.
- Stem.
- Guide bearings on the yoke.
- Nut.

### AVAILABLE:

- ND50 to ND1200
- Other ND to order
- From ND600 the actuator is with geared motor.

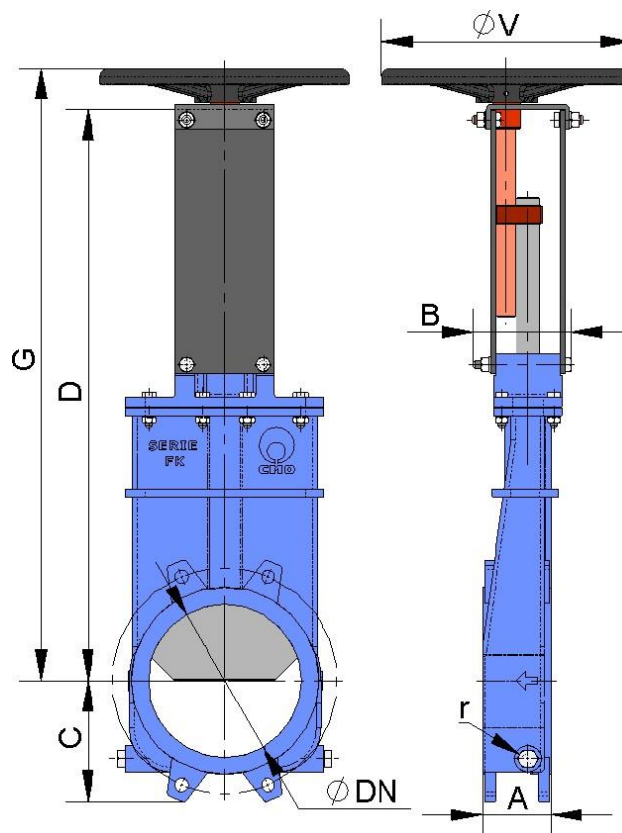


fig. 15

ANSI	DN	$\Delta P$ (bar)	A	B	C	D	G	$\phi V$	r (B.S.P.)
2"	50	3	60	91	61	323	362	225	1/4"
2 1/2"	65	3	60	91	68	362	401	225	1/4"
3"	80	3	64	91	91	404	443	225	1/4"
4"	100	3	64	91	104	453	492	225	1/4"
5"	125	3	70	101	118	511	550	225	3/8"
6"	150	3	76	101	130	574	613	225	3/8"
8"	200	2	89	118	158	745	798	325	3/8"
10"	250	2	114	118	196	880	933	325	1/2"
12"	300	2	114	118	230	1005	1058	380	1/2"
14"	350	1,5	127	290	255	1141	1220	450	1/2"
16"	400	1,5	140	290	290	1266	1345	450	1/2"
18"	450	1	152	290	306	1393	1472	450	1/2"
20"	500	1	152	290	340	1529	1608	450	1/2"
24"	600	1	178	290	398	1782	1861	450	1/2"
28"	700	1	178	320	453	2105	2170	--	1/2"
32"	800	1	178	320	503	2376	2446	--	1/2"
36"	900	1	178	320	583	2655	2725	--	1/2"
40"	1000	1	178	320	613	2935	3005	--	1/2"
48"	1200	1	203	340	728	3440	3510	--	1/2"

Table. 5

## CHAINWHEEL

The definition variables are as follows :

**B** =Max. width of the valve (without actuator).

**D** =Max. height of the valve (without actuator).

Widely used in raised installations with difficult access, the handwheel is fitted in vertical position.

### OPTIONS:

- Square nut.
- Locking devices.
- Extensions: stand, pipe, plates...
- DN higher than those give in the table.

### ACTUATOR INCLUDING:

- Handwheel.
- Stem.
- Guide bearings on the yoke.
- Nut.

### AVAILABLE:

- ND50 to ND1200
- Other ND to order
- From ND600 the actuator is with geared motor.

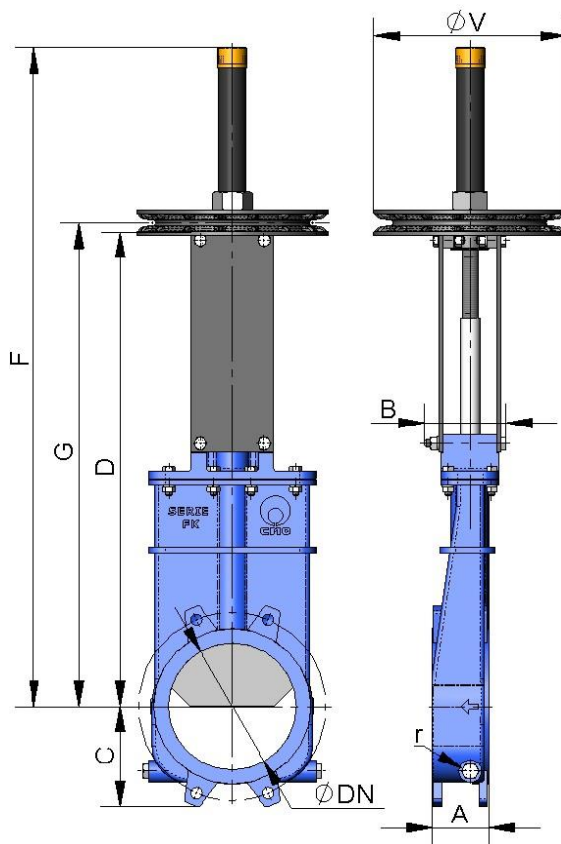


fig. 16

ANSI	DN	ΔP (bar)	A	B	C	D	F	G	øV	r (B.S.P.)
2"	50	3	60	91	61	323	492	362	225	1/4"
2 1/2"	65	3	60	91	68	362	531	401	225	1/4"
3"	80	3	64	91	91	404	573	443	225	1/4"
4"	100	3	64	91	104	453	622	492	225	1/4"
5"	125	3	70	101	118	511	730	550	225	3/8"
6"	150	3	76	101	130	574	793	613	225	3/8"
8"	200	2	89	118	158	745	1036	798	300	3/8"
10"	250	2	114	118	196	880	1271	933	300	1/2"
12"	300	2	114	118	230	1005	1396	1058	300	1/2"
14"	350	1,5	127	290	255	1141	1681	1250	402	1/2"
16"	400	1,5	140	290	290	1266	1806	1375	402	1/2"
18"	450	1	152	290	306	1393	2033	1502	402	1/2"
20"	500	1	152	290	340	1529	2169	1638	402	1/2"
24"	600	1	178	290	398	1782	2522	1891	402	1/2"
28"	700	1	178	320	453	2105	3035	2205	402*	1/2"
32"	800	1	178	320	503	2376	3406	2476	402*	1/2"
36"	900	1	178	320	583	2655	3785	2755	402*	1/2"
40"	1000	1	178	320	613	2935	4165	3035	402*	1/2"
48"	1200	1	203	340	728	3440	4870	3540	402*	1/2"

Table. 6

## LEVER

The definition variables are as follows :

**B =Max. width** of the valve (without actuator).

**D=Max. height** of the valve (without actuator).

### ACTUATOR INCLUDING:

- Lever.
- Rod.
- Guide bearing.
- External limiting switches to maintain the position.

### AVAILABLE:

- Standard from DN50 to DN300

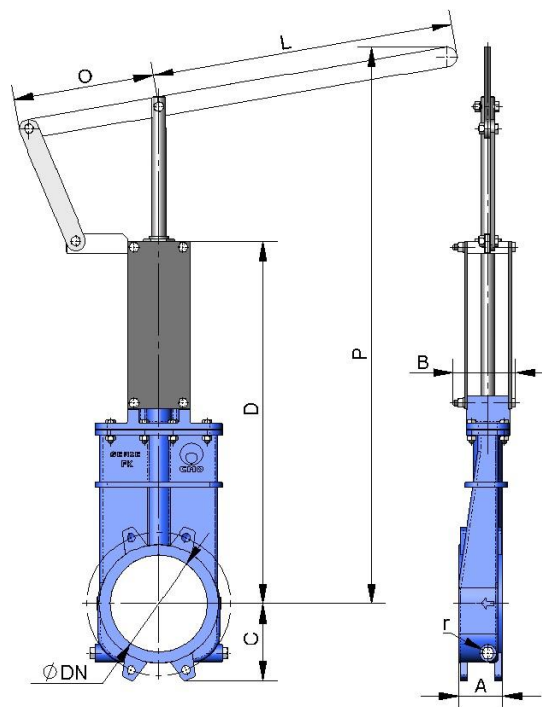


Fig. 17

ANSI	DN	$\Delta P$ (bar)	A	B	C	D	L	O	P	r (B.S.P.)
2"	50	3	60	91	61	323	325	155	586	1/4"
2 1/2"	65	3	60	91	68	362	325	155	620	1/4"
3"	80	3	64	91	91	404	325	155	659	1/4"
4"	100	3	64	91	104	453	325	155	724	1/4"
5"	125	3	70	101	118	511	425	155	1046	3/8"
6"	150	3	76	101	130	574	425	155	1111	3/8"
8"	200	2	89	118	158	745	620	290	1247	3/8"
10"	250	2	114	118	196	880	620	290	1670	1/2"
12"	300	2	114	118	230	1005	620	290	1804	1/2"

Table. 7



## GEAR-BOX

It is recommendable for DN greater than 600.

**B** = Max. width of the valve (without actuator).

**D** = Max. height of the valve (without actuator).

### OPTIONS:

- Chainwheel.
- Locking devices.
- Extensions: stand, pipe, plates...
- Non-rising stem.

### ACTUATOR INCLUDING:

- Stem.
- Yoke.
- Cone-shaped gear box.
- Handwheel.

- Standard ratio = 4 to 1

### AVAILABLE:

- Standard from DN50 to DN1200
- Other ND to order
- From ND600 the actuator is with geared motor.

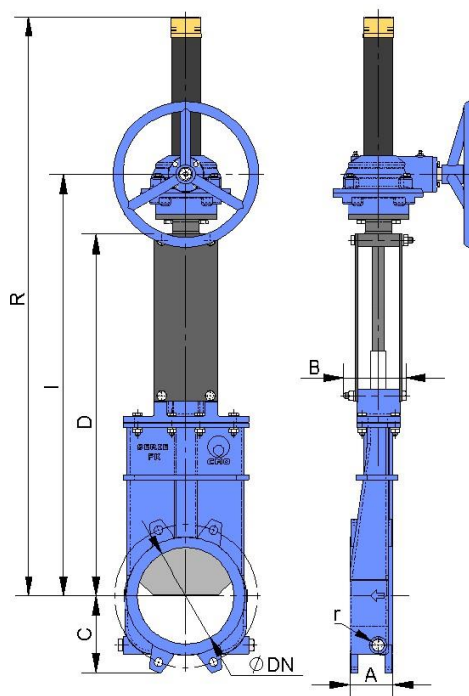


Fig. 18

ANSI	DN	$\Delta P$ (bar)	A	B	C	D	I	R	r(B.S.P.)
2"	50	3	60	91	61	323	447	620	1/4"
2 1/2"	65	3	60	91	68	362	486	659	1/4"
3"	80	3	64	91	91	404	528	701	1/4"
4"	100	3	64	91	104	453	577	750	1/4"
5"	125	3	70	101	118	511	635	808	3/8"
6"	150	3	76	101	130	574	698	871	3/8"
8"	200	2	89	118	158	745	869	1164	3/8"
10"	250	2	114	118	196	880	1004	1299	1/2"
12"	300	2	114	118	230	1005	1129	1424	1/2"
14"	350	1,5	127	290	255	1141	1265	1680	1/2"
16"	400	1,5	140	290	290	1266	989	1805	1/2"
18"	450	1	152	290	306	1393	1390	2082	1/2"
20"	500	1	152	290	340	1529	1653	2218	1/2"
24"	600	1	178	290	398	1782	1903	2471	1/2"
28"	700	1	178	320	453	2105	2257	3000	1/2"
32"	800	1	178	320	503	2376	2528	3371	1/2"
36"	900	1	178	320	583	2655	2807	3745	1/2"
40"	1000	1	178	320	613	2935	3088	4149	1/2"
48"	1200	1	203	340	728	3440	3626	4866	1/2"

Table. 8

## DOUBLE-ACTING PNEUMATIC CYLINDER

The definition variables are as follows :

**B =Max. width** of the valve (without actuator).

**D=Max. height** of the valve (without actuator).

The air supply pressure to the pneumatic cylinder is a minimum of 6 bar and a maximum of 10 bar, the air must be dry and lubricated.

10 bar is the maximum admissible air pressure. For air pressures below 6 bar, please check with CMO Valves

For DN50 to DN200 valves, the cylinder's jacket and covers are made of aluminium, the spindle of AISI304, the piston of rubber-coated steel and the O-ring seals are made of nitrile.

For valves larger than DN200 the covers are made of nodular cast iron or carbon steel.

To order, we can also supply the actuator made entirely of stainless steel, especially for installation in corrosive atmospheres.

### AVAILABLE:

- Standard from DN50 to DN1200
- Other ND to order

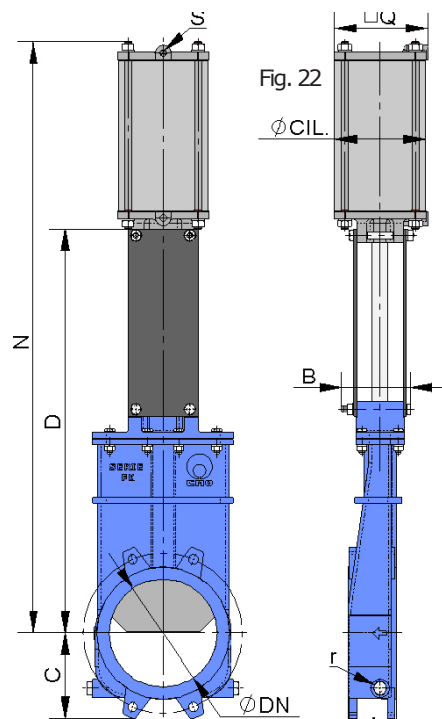


fig. 19

ANSI	DN	ΔP (bar)	A	B	C	D	N	Q	Ø CIL	Ø STEM	S(B.S.P.)	r(B.S.P.)
2"	50	3	60	91	61	323	498	90	80	20	1/4"	1/4"
2 1/2"	65	3	60	91	68	362	550	90	80	20	1/4"	1/4"
3"	80	3	64	91	91	404	608	90	80	20	1/4"	1/4"
4"	100	3	64	91	104	453	680	110	100	20	1/4"	1/4"
5"	125	3	70	101	118	511	774	135	125	25	1/4"	3/8"
6"	150	3	76	101	130	574	866	135	125	25	1/4"	3/8"
8"	200	2	89	118	158	745	1090	170	160	30	1/4"	3/8"
10"	250	2	114	118	196	880	1287	215	200	30	3/8"	1/2"
12"	300	2	114	118	230	1005	1462	215	200	30	3/8"	1/2"
14"	350	1,5	127	290	255	1141	1724	270	250	40	3/8"	1/2"
16"	400	1,5	140	290	290	1266	1899	270	250	40	3/8"	1/2"
18"	450	1	152	290	306	1393	2081	382	300	45	1/2"	1/2"
20"	500	1	152	290	340	1529	2267	382	300	45	1/2"	1/2"
24"	600	1	178	290	398	1782	2620	382	300	45	1/2"	1/2"
28"	700	1	178	320	453	2105	3085	444	350	45	1/2"	1/2"
32"	800	1	178	320	503	2376	3455	444	350	45	1/2"	1/2"
36"	900	1	178	320	583	2655	3870	508	400	50	1/2"	1/2"
40"	1000	1	178	320	613	2935	4249	508	400	50	1/2"	1/2"
48"	1200	1	203	340	728	3440	4957	508	400	50	1/2"	1/2"

Table. 9

## SINGLE-ACTING PNEUMATIC CYLINDER

**B =Max. width** of the valve (without actuator).

**D=Max. height** of the valve (without actuator).

The air supply pressure to the pneumatic cylinder is a minimum of 6 bar and a maximum of 10 bar, the air must be dry and lubricated.

10 bar is the maximum admissible air pressure. For air pressures below 6 Kg/cm<sup>2</sup> please consult manufacturer.

Available for opening or closing in case of air supply failure (spring opening or closing).

The jacket is made of aluminium, the covers of nodular cast iron or carbon steel, the rod of AISI304, the piston of rubber-coated steel, the O-ring seals of nitrile and the spring is made of steel.

The actuator design is spring activated for valves with diameters up to DN300. For larger diameters the actuator contains a double-acting cylinder and an air tank which stores the volume of air necessary to perform the last movement in the event of a air supply failure.

### AVAILABLE:

- Standard from DN50 to DN300
- Other ND to order
- Please see the "CMO Pneumatic Actuators" catalogue if you require further information.

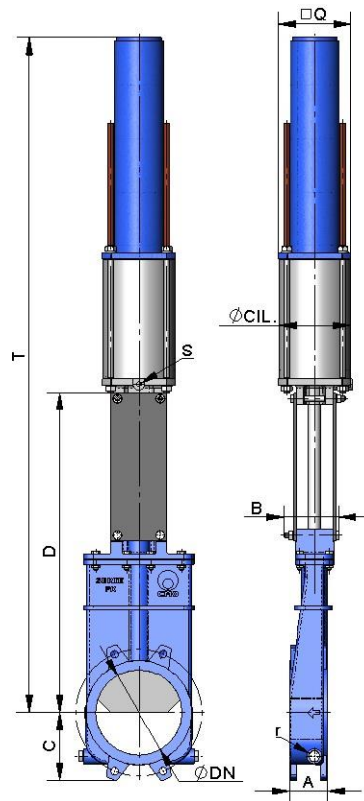


fig. 20

ANSI	DN	ΔP (bar)	A	B	C	D	Q	T	ØCIL	ØVAST.	S(B.S.P.)	r(B.S.P.)
2"	50	3	60	91	61	241	135	781	125	25	1/4"	1/4"
2 1/2"	65	3	60	91	68	268	135	806	125	25	1/4"	1/4"
3"	80	3	64	91	91	294	135	833	125	25	1/4"	1/4"
4"	100	3	64	91	104	334	135	873	125	25	1/4"	1/4"
5"	125	3	70	101	118	367	170	909	160	30	1/4"	3/8"
6"	150	3	76	101	130	419	170	961	160	30	1/4"	3/8"
8"	200	2	89	118	158	525	215	1357	200	30	3/8"	3/8"
10"	250	2	114	118	196	616	270	1844	250	40	3/8"	1/2"
12"	300	2	114	118	230	704	270	2005	250	40	3/8"	1/2"

Table 10

## ELECTRIC ACTUATOR

This actuator is automatic and includes the following parts:

- Electric motor.
- Stem.
- Yoke.

### THE ELECTRIC MOTOR INCLUDES :

- Emergency manual handwheel.
- Limit switches.
- Torque limiters.

### OPTIONS:

- Different types and brands.
- Non-rising stem.

- ISO 5210/ DIN 3338 Flanges.

### AVAILABLE:

- Standard from DN50 to DN1200
- Other ND to order.
- From DN450 the motor is assisted with a gear box.

**B** = Max. width of the valve (without actuator).

**D** = Max. height of the valve (without actuator).

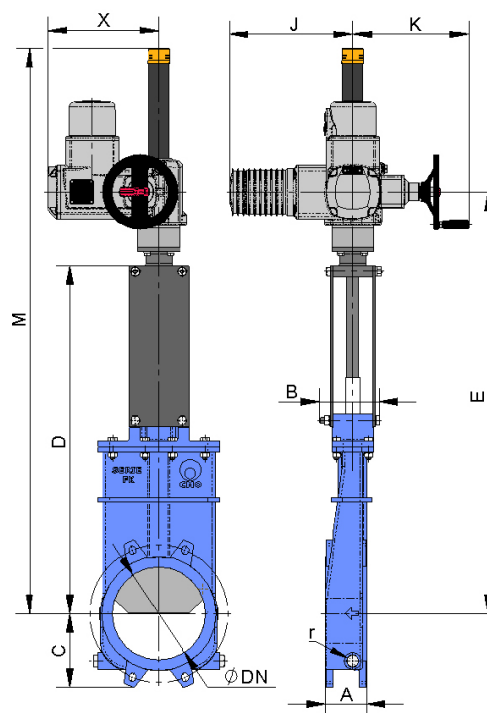


fig. 21

ANSI	DN	$\Delta P$ (bar)	A	B	C	D	E	J	K	M	X	r(B.S.P.)
2"	50	3	60	91	61	323	479	265	250	674	238	1/4"
2 1/2"	65	3	60	91	68	362	518	265	250	713	238	1/4"
3"	80	3	64	91	91	404	560	265	250	755	238	1/4"
4"	100	3	64	91	104	453	609	265	250	804	238	1/4"
5"	125	3	70	101	118	511	667	265	250	862	238	3/8"
6"	150	3	76	101	130	574	730	265	250	925	238	3/8"
8"	200	2	89	118	158	745	903	265	250	1209	238	3/8"
10"	250	2	114	118	196	880	1038	265	250	1344	238	1/2"
12"	300	2	114	118	230	1005	1163	265	250	1469	238	1/2"
14"	350	1,5	127	290	255	1141	1281	283	254	1648	248	1/2"
16"	400	1,5	140	290	290	1266	1406	283	254	1823	248	1/2"
18"	450	1	152	290	306	1393	1578	283	254	2160	248	1/2"
20"	500	1	152	290	340	1529	1714	283	254	2296	248	1/2"
24"	600	1	178	290	398	1782	1967	265	250	2549	422	1/2"
28"	700	1	178	320	453	2105	2297	283	254	3000	422	1/2"
32"	800	1	178	320	503	2376	2568	283	254	3371	422	1/2"
36"	900	1	178	320	583	2655	2847	283	254	3745	425	1/2"
40"	1000	1	178	320	613	2935	3127	283	254	4149	425	1/2"
48"	1200	4	203	340	728	3440	3676	389	340	4866	480	1/2"

Table. 11



## HYDRAULIC ACTUATOR (Oil pressure: 135 bar)

The definition variables are as follows :

**B = Max. width** . of the valve (without actuator).

**D = Max. height** of the valve (without actuator).

### HYDRAULIC ACTUATOR INCLUDES :

- Hydraulic cylinder.
- Yoke.

### OPTIONS:

- Different types and brands available according to customer's requirements.

### AVAILABLE:

- Standard from DN50 to DN1200
- Other ND to order.

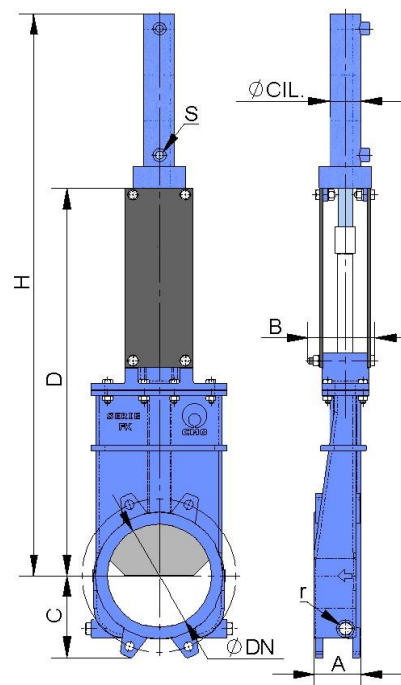


fig. 22

ANSI	DN	ΔP (bar)	A	B	C	D	H	Ø CIL	Ø VAS T	S (B.S.P.)	Cap.Oil (dm3)	r(BSP.)
2"	50	3	60	91	61	323	539	25	18	3/8"	0.03	1/4"
2 1/2"	65	3	60	91	68	362	593	25	18	3/8"	0.03	1/4"
3"	80	3	64	91	91	404	670	25	18	3/8"	0.04	1/4"
4"	100	3	64	91	104	453	739	32	22	3/8"	0.09	1/4"
5"	125	3	70	101	118	511	827	32	22	3/8"	0.11	3/8"
6"	150	3	76	101	130	574	906	40	28	3/8"	0.20	3/8"
8"	200	2	89	118	158	745	1146	50	28	3/8"	0.42	3/8"
10"	250	2	114	118	196	880	1331	50	28	3/8"	0.52	1/2"
12"	300	2	114	118	230	1005	1545	50	28	3/8"	0.62	1/2"
14"	350	1.5	127	290	255	1141	1720	50	28	3/8"	0.73	1/2"
16"	400	1.5	140	290	290	1266	1895	63	36	3/8"	1.31	1/2"
18"	450	1	152	290	306	1393	2112	63	36	3/8"	1.47	1/2"
20"	500	1	152	290	340	1529	2297	63	36	3/8"	1.62	1/2"
24"	600	1	178	290	398	1782	2650	80	45	3/8"	3.12	1/2"
28"	700	1	178	320	453	2105	3124	80	45	3/8"	3.62	1/2"
32"	800	1	178	320	503	2376	3495	100	56	1/2"	6.44	1/2"
36"	900	1	178	320	583	2655	3874	100	56	1/2"	7.25	1/2"
40"	1000	1	178	320	613	2935	4294	125	70	1/2"	10.25	1/2"
48"	1200	4	203	340	728	3440	4995	125	70	1/2"	15.1	1/2"

Table. 12

## INFORMATION ON FLANGE DIMENSIONS

### EN 1092-2 PN10

DN	$\Delta P$ (bar)	•	o	MÉTRIC	PROF.	ØK
50	3	4	-	M 16	8	125
65	3	4	-	M 16	8	145
80	3	4	4	M 16	9	160
100	3	4	4	M 16	9	180
125	3	4	4	M 16	9	210
150	3	4	4	M 20	10	240
200	2	4	4	M 20	10	295
250	2	8	4	M 20	12	350
300	2	8	4	M 20	12	400
350	1,5	12	4	M 20	21	460
400	1,5	12	4	M 24	21	515
450	1	16	4	M 24	22	565
500	1	16	4	M 24	22	620
600	1	16	4	M 27	22	725
700	1	20	4	M 27	22	840
800	1	20	4	M 30	22	950
900	1	24	4	M 30	20	1050
1000	1	24	4	M 33	20	1160
1200	1	28	4	M 36	22	1380

Table. 13

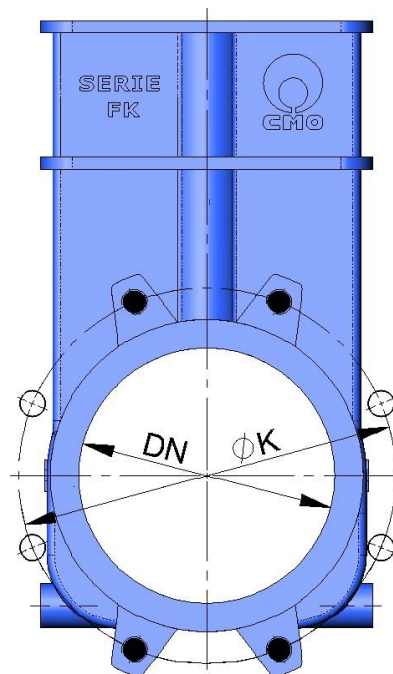


fig. 23

• BLIND TAPPED  
o THROUGH HOLE

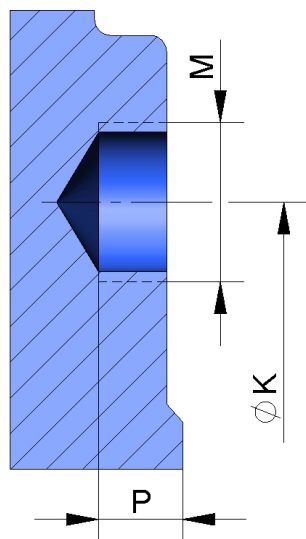


fig. 24

### ANSI B16, Class 150

DN	$\Delta P$ (bar)	•	o	RUNC	PROF.	ØK
2"	3	4	-	5/8"	8	120,6
2 1/2"	3	4	-	5/8"	8	139,7
3"	3	4	-	5/8"	9	152,4
4"	3	4	4	5/8"	9	190,5
5"	3	4	4	3/4"	9	215,9
6"	3	4	4	3/4"	10	241,3
8"	2	4	4	3/4"	10	298,4
10"	2	8	4	7/8"	12	361,9
12"	2	8	4	7/8"	12	431,8
14"	1,5	8	4	1"	21	476,2
16"	1,5	12	4	1"	21	539,7
18"	1	12	4	1 1/8"	22	577,8
20"	1	16	4	1 1/8"	22	635
24"	1	16	4	1 1/4"	22	749,3
28"	1	24	4	1 1/4"	22	863,6
32"	1	24	4	1 1/2"	22	977,9
36"	1	28	4	1 1/2"	20	1085,9
40"	1	32	4	1 1/2"	20	1200,2

Table. 14

## ANSI B16, classe 150

ND	ΔP (bar)	ROUND FLANGE			SQUARE FLANGE								RUNC		P
		•	o	ØK	N	T	U	W	•	o	ØK				
2"	7	4	-	120,6		= ROUND FLANGE			4	-	120,6	5/8"		8	
2 1/2"	7	4	-	139,7		= ROUND FLANGE			4	-	139,7	5/8"		8	
3"	7	4	4	152,4		= ROUND FLANGE			4	-	152,4	5/8"		9	
4"	7	4	4	190,5		= ROUND FLANGE			4	4	190,5	5/8"		9	
5"	7	4	4	215,9		= ROUND FLANGE			4	4	215,9	3/4"		9	
6"	7	4	4	241,3		= ROUND FLANGE			4	4	241,3	3/4"		10	
8"	7	4	4	298,4		= ROUND FLANGE			4	4	298,4	3/4"		10	
10"	7	8	4	361,9		= ROUND FLANGE			4	4	361,9	7/8"		12	
12"	7	8	4	431,8	2x148	---	400	---	6	4	431,8	7/8"		12	
14"	7	8	4	476,2	3x100	300	460	460	12	4	476,2	1"		21	
16"	7	12	4	539,7	3x110	330	515	515	12	4	539,7	1"		21	
18"	7	12	4	577,8	4x116	344	565	565	14	4	577,8	1 1/8"		22	
20"	4	16	4	635	4x130	360	620	620	14	4	635	1 1/8"		22	
24"	4	16	4	749,3	4x155	415	725	725	14	4	749,3	1 1/4"		22	
28"	4	24	4	863,6	6x120	115+305+115	832	832	22	4	863,6	1 1/4"		22	
32"	4	24	4	977,9	6x137	145+360+145	940	940	22	4	977,9	1 1/2"		22	
36"	4	28	4	1085,9	6x155	160+410+160	1042	1042	22	4	1085,9	1 1/2"		20	
40"	4	32	4	1200,2	162+(5x164)+162	(2x170)+465+(2x170)	1144	1145	24	4	1200,2	1 1/2"		20	



CMO VALVES

## UNIDIRECTIONAL GATE VALVE - SERIE D

### DESCRIPTION

- Unidirectional flanged gate valve (bidirectional option to order), designed for high pressure applications, with self-cleaning seal.
- Single piece die-cast body with screwed-down bonnet and wedges to guarantee the seal.
- Provides high flow rates with low pressure drop.
- Various seal and packing materials available.
- Face-to-face distance in accordance with CMO Valves standard.
- It has an arrow on the body indicating the flow direction.

### GENERAL APPLICATIONS

The gate valve is suitable for working with clean liquids or liquids with a concentration of solids:

Designed for a wide range of applications such as :

- Drying plants
- Paper industry
- Water Treatment
- Chemical Plants
- Food sector
- Mining
- Oil extraction
- Sludge

### SIZES - ANSI

- 2" to 80" (larger sizes to order).

### WORKING PRESSURE ( $\Delta P$ )

- From PN 2.5 up to PN 100
- Each valve is designed according to work conditions.

### BORING

- DIN PN10 and ANSI B16.5 (150 LB)

### OTHER COMMON FLANGES

- |         |                 |
|---------|-----------------|
| • PN6.  | • PN25.         |
| • PN16  | • BS "D" y "E". |
| • PN25. | • JIS10K.       |

\* Others on request..

### DIRECTIVES

Pressure Equipment Directive :  
**(PED) ART.3 /CAT.1**

Potentially Explosive Atmospheres  
Directive :  
**(ATEX) CAT.3 ZONA 2 y 22 GD.**

\* For information on categories and zones please contact **CMO VALVES** Technical-Sales Department..



fig.1

### QUALITY DOSSIER

All valves are tested hydrostatically at CMO Valves and material and test certificates can be provided.

- Body test = working pressure x 1.5.
- Seal test = working pressure x 1.1.