



## KNIFE GATE VALVES TD SERIES

30/10/2013

### UNIDIRECTIONAL Knife Gate Valve

- Unidirectional knife gate valve, with wafer design and quick opening and closing.
- Body made up of two screwed-down halves, with slides to provide smooth operation.
- It has two opposing gates which come together in the centre of the mouth, and all the components which are liable to deteriorate can be easily replaced.
- Provides high flow rates with low pressure drop.
- Various seal and packing materials available.
- Face-to-face distance in accordance with CMO standard.

#### General Applications:

- This knife gate valve is designed to work in the most demanding conditions, it being commonly used in the paper industry in pulp facilities and purification plants, rejecting soft lightweight materials such as plastic.

**Sizes:** DN50 to DN1200 (larger sizes to order).

<b>Working (<math>\Delta P</math>):</b>	DN50 to DN250	10 kg/cm <sup>2</sup>
	DN300 to DN400	6 kg/cm <sup>2</sup>
	DN450	5 Kg/cm
	DN500 to DN600	4 Kg/cm
	DN700	3 Kg/cm
	DN800 to DN1200	2 Kg/cm

**Standard flanges:** DIN PN10 and ANSI B16.5 (class 150)

#### Other common flanges:

DIN PN 16	JIS Standard	Australian standard
DIN PN 6	DIN PN25	British Standard

#### Directives:

- Machinery Directive: **DIR 2006/42/EC (MACHINERY)**
- Pressure Equipment Directive: **DIR 97/23/EC (PED) ART.3, P.3**
- Potentially Explosive Atmospheres Directive (optional): **DIR 94/9/EC (ATEX) CAT.3 ZONE 2 and 22 GD**, for information on categories and zones please contact CMO Technical-Sales Department.

#### Quality dossier:

- All valves are tested hydrostatically at CMO and material and test certificates can be provided.
- Body test = working pressure x 1.5.
- Seal test = working pressure x 1.1.

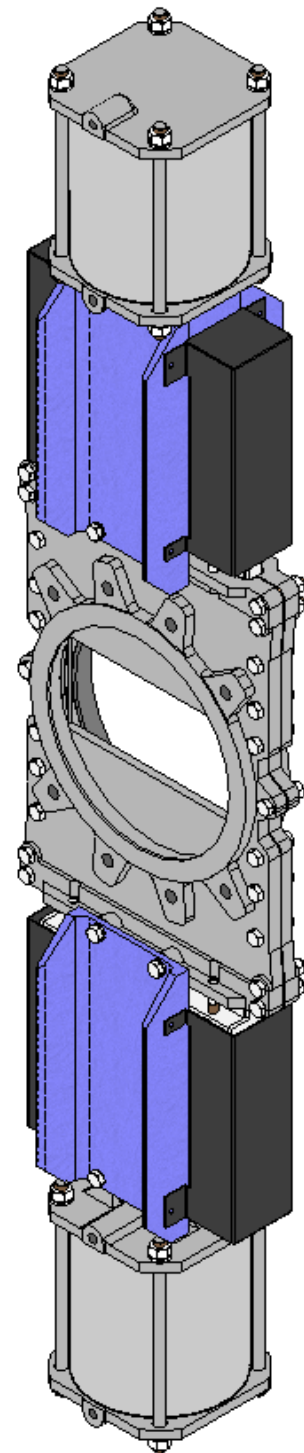


fig. 1



## KNIFE GATE VALVES TD SERIES

### Advantages of CMO "TD Model"

The **TD** valve body comprises two half-bodies; the inside of these two parts is machined and joined with screws to form a solid block. In the steel and stainless steel valve versions, the gate slides smoothly thanks to the RCH 1000 nylon slides inserted inside both parts of the body; these guides can optionally be made of PTFE or bronze.

Other manufacturers produce similar valves with interiors completely of PTFE, but this results in the solids becoming attached to the PTFE and the gate ends up blocked.

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 CMO valve spindle is made of stainless steel 18/8. This is another added advantage, as some manufacturers supply it with 13% chromium, resulting in quick oxidation.

The operating wheel is manufactured in nodular cast GJS-500. Some manufacturers supply it in common cast-iron, which can lead to breakage in the event of very high operation torque or a bang. 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 upper and lower pneumatic actuator covers are manufactured in aluminium, and GJS-400 nodular cast iron for  $\varnothing$  cylinder > 250 mm, meaning shock resistance is high. This characteristic is essential in pneumatic actuators.

The pneumatic cylinder's seals are commercial products and can be purchased worldwide. This means it is not necessary to contact CMO every time a seal is required.

STANDARD COMPONENTS LIST		
COMPONENT	VERSION STEEL	VERSION STAINLESS STEEL
1A- Body	GJL-250/A216WCB	CF8M
1A- Counterbody	GJL-250/A216WCB	CF8M
2- Gate	AISI304	AISI316
3- Packing gland	S275JR	AISI316
4- Support plates	STEEL	STEEL
5- Seal	EPDM	EPDM
6- Reinforced ring	CF8M	CF8M
7- Packing	SYNTH + PTFE	SYNTH + PTFE
8- Packing gland seal	EPDM	EPDM
9- Body seal	CARDBOARD	CARDBOARD
10- Fork	STEEL	STEEL
11- Pneumatic cylinder	MISCELLANEOUS	MISCELLANEOUS
12- Protection	STEEL	STEEL

table 1

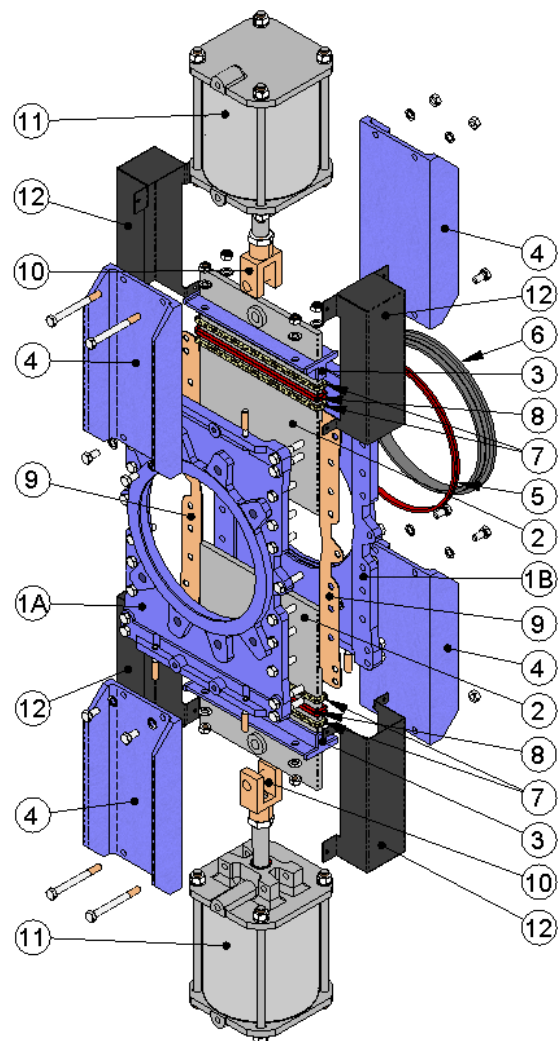


fig. 2



## KNIFE GATE VALVES TD SERIES

### DESIGN CHARACTERISTICS

#### 1- BODY

The **TD** valve body consists of two cast half-bodies with reinforcements. The interior of these two parts is machined and joined by screws with a paper seal in between, creating a solid block.

Designed with full passage to provide large flows with small losses of load. For larger diameters, the body is mechanically welded with the reinforcements necessary to withstand the maximum working pressure. The body can also be supplied with blowers for minor cleaning tasks without having to dismount any parts. The steel and stainless steel bodies will be fitted with slides.

Standard manufacturing materials are GJL-250, A216WCB steel and CF8M stainless steel. Other materials such as GJS-500 and stainless steel alloys (AISI316Ti, Duplex, 254SMO, Uranus B6, etc) are available on request. As standard, carbon steel or iron valves are painted with an anti-corrosive protection of 80 microns of EPOXY (colour RAL 5015). Other types of anti-corrosive protections are available to order.

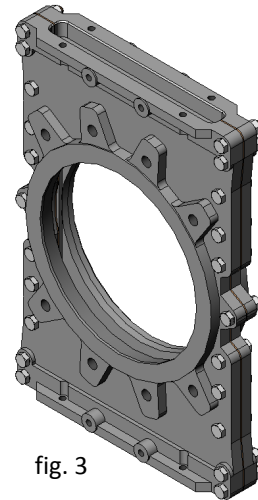


fig. 3

#### 2- GATE

Due to the harsh working conditions in which **TD** valves are often installed, the gate usually has extra thickness. The standard manufacturing materials are AISI304 stainless steel in valves with carbon steel body and AISI316 stainless steel in valves with CF8M body. Other materials or combinations can be supplied to order. The gate is polished on both sides to provide a smooth contact surface with the resilient seal. At the same time, the gate is rounded to prevent the seal from being cut. Different degrees of polishing, anti-abrasion treatments and modifications are available to adapt the valves to the customer's requirements. **TD** valves can be supplied with two types of gate: with flat or "V" seal, the latter being suitable when working with fluids laden with soft lightweight solids, in order to stop the fluid and for easy shut-off.

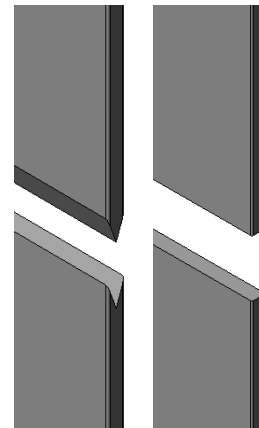


fig. 4

#### 3- SEAT (seal-tight)

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

- **Seat 1:** Metal / metal seal (fig. 5). This type of seat includes a resilient seal which is fixed to the inside of the body by way of a reinforced ring with two functions (to protect the valve from abrasion and to clean the gate when working with solids that can stick to the gate); this ring can be removed and easily replaced. The estimated leakage (considering water as the test fluid) is 1.5% of the flow in pipes.

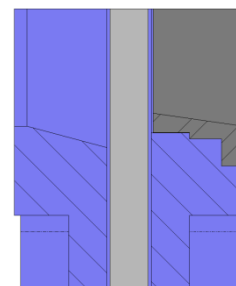


fig. 5



## KNIFE GATE VALVES TD SERIES

- **Seat 2:** Metal / rubber seal (fig. 6). This type of seat includes a resilient seal which is fixed to the inside of the body by way of a reinforced ring with two functions (to protect the valve from abrasion and to clean the gate when working with solids that can stick to the gate); this ring can be removed and easily replaced.

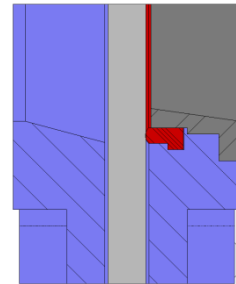



fig. 6

 **Note:** Three materials are available for the reinforced ring: 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.

#### **VITON**


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.

 **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.

### **4- PACKING**

The **TD** valves, since they have two half gates, also have two packing glands, one at each end of the body. Each CMO standard packing comprises three lines with a specially designed EPDM seal in the middle which provides seal-tightness between the body and the gate, preventing any type of leakage to the atmosphere. It is located in an easily accessible place and can be replaced without dismantling the valve from the pipeline. Below we indicate various types of packing available according to the use to be given to the valve:

#### **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.

#### **DRY COTTON**

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



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### 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.

### 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.

### LUBRICATED PTFE

This is made with PTFE filaments and designed to work at great speed. It is braided with a diagonal system. Suitable for valves and pumps which work with almost all types of fluids, particularly with the most corrosive, such as oxidant and concentrated oils. It is also used in liquids with solid content.

### 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.

SEAT/SEALS			PACKING			
Material	Max. T. (°C)	Applications	Material	P(bar)	Max. T. (°C)	pH
Metal/Metal	>250	High temp./Low watertight integ.	Greased cotton	10	100	6-8
EPDM (E)	90 *	Non-mineral oils, acids and water.	Dry cotton (AS)	0.5	100	6-8
Nitrile (N)	90 *	Hydrocarbons, oils and greases	Cotton + PTFE	30	120	6-8
Viton (V)	200	Hydrocarbons and solvents	SYNTHETIC + PTFE	100	-200+270	0-14
Silicone (S)	200	Food Products	Graphite	40	650	0-14
PTFE (T)	250	Resistant to corrosion	Ceramic Fibre	0.3	1400	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

### 5- STEM or SPINDLE

The CMO valve 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.

TD valves are normally supplied with pneumatic actuators, meaning they have spindles instead of stems.

In both spindles and stems the connection to the gate is made with a reinforced fork, in order to guarantee a resistant joint for the high number of day-to-day operations carried out by these valves.

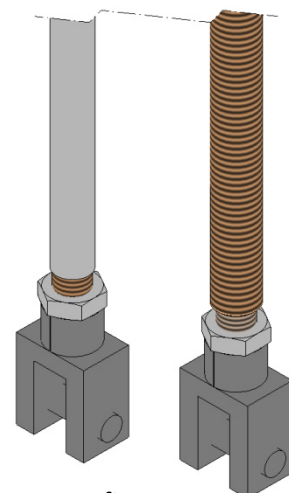


fig. 7





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### 6- PACKING GLAND

The packing gland allows uniform force and pressure to be applied to the packing to ensure seal-tightness. As standard, valves with carbon steel or cast iron body include a carbon steel packing gland, while for valves with stainless steel body this is made of stainless steel.

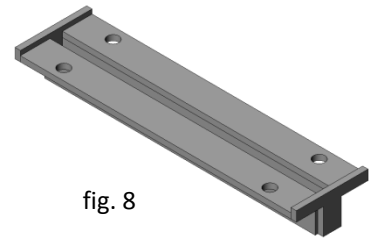


fig. 8

### 7- ACTUATORS

TD valves are commonly supplied with dual pneumatic coupling, although it is also possible to supply with other types of actuators; as they have two gates, there are always two actuators, one on each side of the body.

All types of actuators can be supplied, with the advantage that thanks to the CMO 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 CMO valves is that all actuators are interchangeable.

#### Manual:

Handwheel with rising stem  
Handwheel with non-rising stem  
Chainwheel  
Lever  
Geared motor  
Others (square nut, etc)

#### Automatic:

Electric actuator  
Pneumatic cylinder  
Hydraulic cylinder

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.

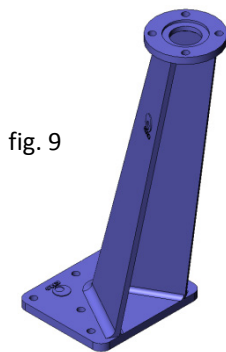


fig. 9

#### Wide range of accessories available:

Mechanical stops  
Locking devices  
Emergency manual actuators  
Electrovalves  
Positioners  
Limit switches  
Proximity switches  
Straight floor stands (fig. 10)  
Leaning floor stand (fig. 9)  
Etc.

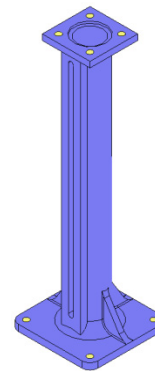


fig. 10

## ACCESSORIES AND OPTIONS

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

#### Mirror polished gate:

The mirror polished gate is especially recommended in the food industry and, as standard, in applications in which solids can stick to the gate. It is an alternative to ensure the solids slide off and do not stick to the gate.

#### PTFE lined gate:

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



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### Stellited gate:

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

### Square or rectangular inlet:

Valves can be built with square or rectangular mouths (fig. 11), in order to adapt to the needs of the customer.

### 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. 12):

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. 12).

### Mechanical locking system:

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

### Stroke limiting mechanical stops:

Allow the stroke to be mechanically adjusted, limiting the valve run.

### Emergency manual actuator (hand wheel / gear box) (fig. 12):

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's standard colour is blue RAL-5015.

### Gate safety guard:

In accordance with European Safety Standards ("EC" marking), CMO automated valves are equipped with gate guards, to prevent any objects from being accidentally caught or dragged in the gate.

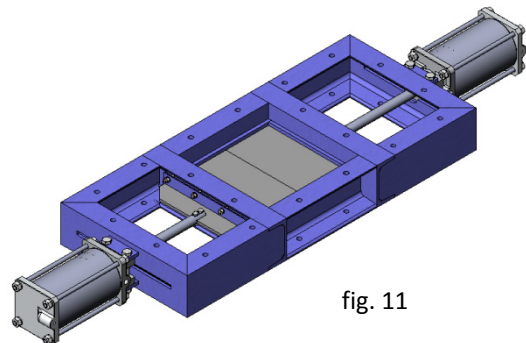


fig. 11

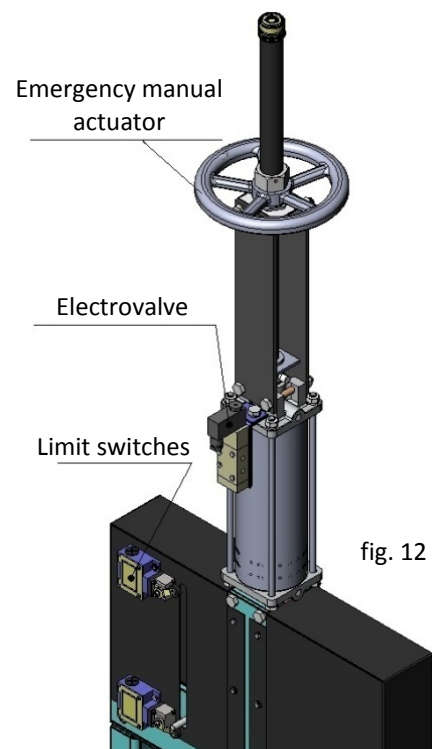


fig. 12



## KNIFE GATE VALVES TD SERIES

### TYPES OF EXTENSION

Several types of extensions can be positioned if the valve needs to be operated from a far-off position.

**1 - Floor stand:** this extension is done by coupling a spindle to the stem. By defining the length of the spindle, the desired extension is achieved. A floor stand is normally installed to support the actuator.

- Can be coupled to any type of actuator.
- We recommend a stem support-guide every 1.5 m (fig. 13).
- The standard floor stand is 800 mm high and may be straight or leaning (fig. 9 and 10).
- A position indicator can be fitted to determine the valve's percentage of opening.

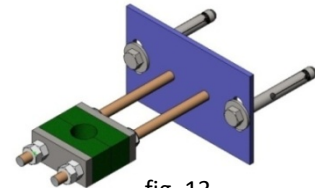


fig. 13

**2 - Pipe extension:** this extension is done by coupling a pipe to the spindle by way of a flange. When the valve is operated, the pipe will turn along with the wheel or key, which will always remain at the same height.

- The most common actuators with pipe extension are the wheel and square nut.
- We recommend a pipe support-guide every 1.5 m (fig. 13).
- The standard materials in this type of extension are EPOXI-coated carbon steel epoxy or stainless steel.

**3 -Extended support plates:** This type of extension is common when a small extension is required. It is done by extending the support plates, inserting an intermediate bridge if necessary due to the increased length of the plates. (fig.14).

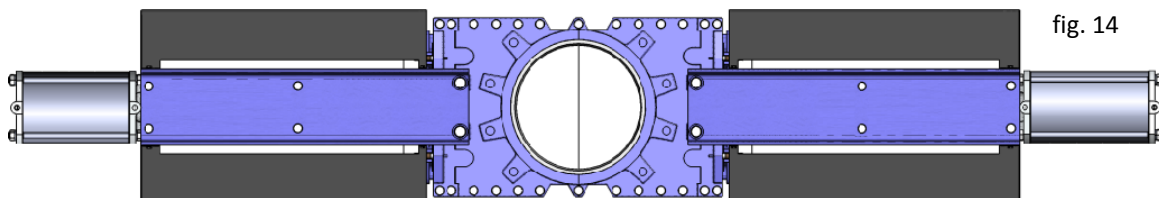


fig. 14

**4 - Cardan type extension:** This type of extension is used when there is a misalignment between the valve and actuator. This problem can be overcome by using a cardan-type joint (fig. 15).

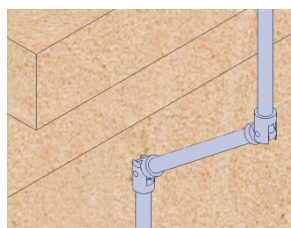


fig. 15





## KNIFE GATE VALVES TD SERIES

### DOUBLE-ACTING PNEUMATIC CYLINDER

- The air supply pressure to the pneumatic cylinder is a minimum of 6 Kg/cm<sup>2</sup> and a maximum of 10 Kg/cm<sup>2</sup>, the air must be dry and lubricated.
- 10 Kg/cm<sup>2</sup> is the maximum admissible air pressure. For air pressures below 6 Kg/cm<sup>2</sup>, please check with CMO.
- For cylinders of up to Ø200, 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 over 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.
- **B = Max. width** of the valve (without actuator)  
**Dx2 = Max. height** of the valve (without actuator).
- Available: DN50 to DN1200, other DN to order.

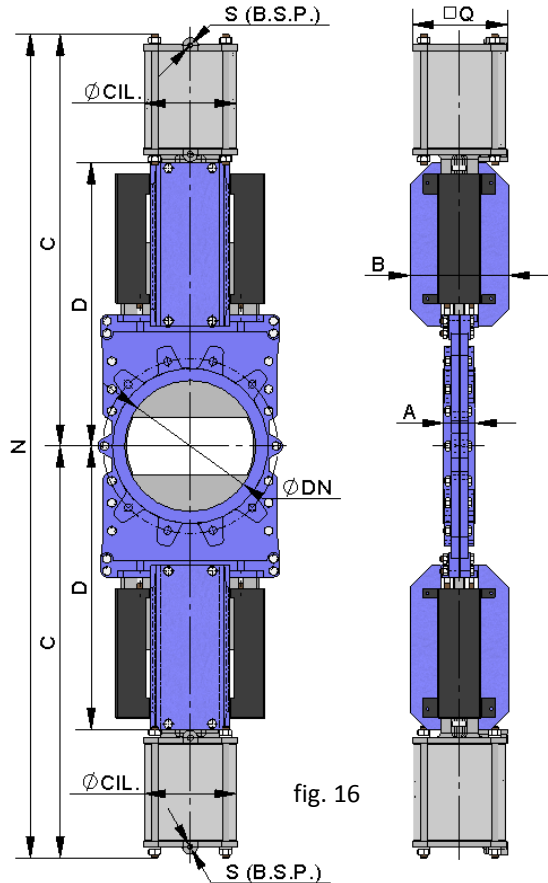


fig. 16

DN	ΔP (Kg/cm <sup>2</sup> )	DRAW (Nw)	A	B	C	D	N	Q	Ø ROD	Ø STEM.	S (B.S.P.)
50	10	402	40	92	370	235	740	96	80	20	1/4"
65	10	686	40	92	398	256	796	96	80	20	1/4"
80	10	1039	50	92	435	285	870	96	80	20	1/4"
100	10	1617	50	92	493	328	985	110	100	20	1/4"
125	10	2529	50	92	548	371	1095	110	100	20	1/4"
150	10	3636	60	102	595	395	1190	135	125	25	1/4"
200	10	6468	60	119	730	495	1460	170	160	30	1/4"
250	10	10104	70	119	855	585	1710	215	200	30	3/8"
300	6	8732	70	119	937	645	1874	215	200	30	3/8"
350	6	11878	96	290	1098	705	2195	270	250	40	3/8"
400	6	15514	100	290	1215	790	2429	270	250	40	3/8"
450	5	16366	106	290	1318	850	2635	382	300	45	1/2"
500	4	16161	110	290	1420	930	2840	382	300	45	1/2"
600	4	23275	110	290	1590	1055	3180	382	300	45	1/2"
700	3	23765	110	290	1880	1260	3760	444	350	45	1/2"
800	2	20688	110	290	2034	1365	4067	444	350	45	1/2"
900	2	26186	110	350	2208	1475	4415	508	400	50	1/2"
1000	2	32331	110	350	2378	1595	4756	508	400	50	1/2"
1100	2	39112	150	350	2548	1720	5095	508	400	50	1/2"
1200	2	46550	150	400	2765	1885	5530	508	400	50	1/2"

table 3

C.M.O.

Amategui Aldea 142, 20400 Txarama-Tolosa (SPAIN)

TEC-TD.EN05

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## KNIFE GATE VALVES TD SERIES

### SINGLE-ACTING PNEUMATIC CYLINDER

- The air supply pressure to the pneumatic cylinder is a minimum of 6 Kg/cm<sup>2</sup> and a maximum of 10 Kg/cm<sup>2</sup>, the air must be dry and lubricated.
- 10 Kg/cm<sup>2</sup> is the maximum admissible air pressure. For air pressures below 6 Kg/cm<sup>2</sup>, please check with the manufacturer.
- Available for opening or closing in the event of air supply failure (spring opens or closes).
- The casing is made of aluminium, the covers of nodular cast iron or carbon steel, the spindle of AISI304, the piston of rubber-coated steel, the O-ring seals of nitrile and the spring is made of steel.
- The casing is made from aluminium, the spindle from AISI304, the piston from rubber coated steel and the O rings from nitrile.
- 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 an air supply failure.
- **B = Max. width** of the valve (without actuator)  
**Dx2 = Max. height** of the valve (without actuator).
- Available: DN50 to DN300, other DN to order.
- Please see the "CMO Pneumatic Actuators" catalogue if you require further information.

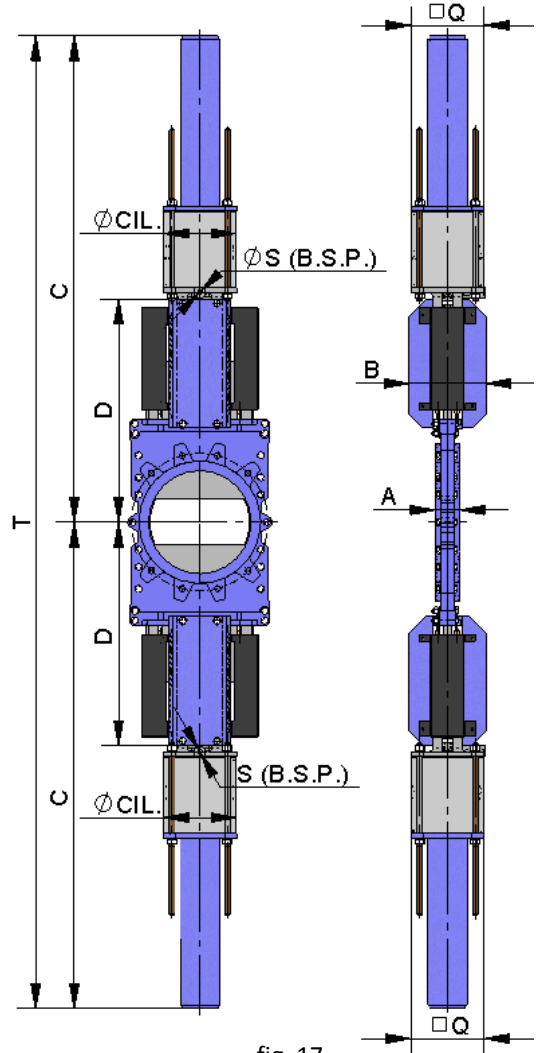


fig. 17

DN	$\Delta P$ (Kg/cm <sup>2</sup> )	DRAW (Nw)	A	B	C	D	T	Q	$\phi$ CYL.	$\phi$ STEM	S (B.S.P.)
50	10	402	40	92	660	235	1320	135	125	25	1/4"
65	10	686	40	92	688	256	1376	135	125	25	1/4"
80	10	1039	50	92	725	285	1450	135	125	25	1/4"
100	10	1617	50	92	785	328	1570	135	125	25	1/4"
125	10	2529	50	92	840	371	1680	135	125	25	1/4"
150	10	3636	60	102	850	395	1700	170	160	30	1/4"
200	10	6468	60	119	1225	495	2450	215	200	30	3/8"
250	10	10104	70	119	1660	585	3320	270	250	40	3/8"
300	6	8732	70	119	1742	645	3484	270	250	40	3/8"

table 4

C.M.O.

Amategui Aldea 142, 20400 Txarama-Tolosa (SPAIN)

TEC-TD.EN05

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## KNIFE GATE VALVES TD SERIES

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### OTHER POSSIBLE ACTUATORS

The most common actuators are detailed in the tables in the pages above, with their respective dimensions, actuator with two double acting pneumatic cylinders and actuator with two single acting pneumatic cylinders. They can also be supplied with other actuators, for example with a manual wheel, geared motor, electric or hydraulic motor, etc. They all have in common that each valve requires two actuators, since this type of valves has two gates.

If the valve is to be used with any of these actuators, ask CMO technical commercial department for information on sizes and characteristics.



# KNIFE GATE VALVES TD SERIES

## INFORMATION ON FLANGE DIMENSIONS

### EN 1092-2 PN10

DN	$\Delta P$ (Kg/cm <sup>2</sup> )	●	○	Metric	P	ØK	DN
50	10	4	-	M 16	8	125	50
65	10	4	-	M 16	8	145	65
80	10	4	4	M 16	9	160	80
100	10	4	4	M 16	9	180	100
125	10	4	4	M 16	9	210	125
150	10	4	4	M 20	10	240	150
200	10	4	4	M 20	10	295	200
250	10	8	4	M 20	12	350	250
300	10	8	4	M 20	12	400	300
350	10	12	4	M 20	21	460	350
400	10	12	4	M 24	21	515	400
450	10	16	4	M 24	22	565	450
500	10	16	4	M 24	22	620	500
600	10	16	4	M 27	22	725	600
700	8	20	4	M 27	22	840	700
800	8	20	4	M 30	22	950	800
900	8	24	4	M 30	20	1050	900
1000	4	24	4	M 33	20	1160	1000
1100	4	28	4	M 33	20	1270	1100
1200	4	28	4	M 36	22	1380	1200

table 5

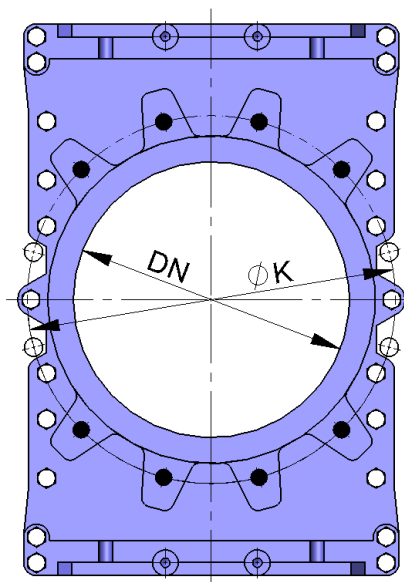


fig. 18

- BLIND TAPPED HOLE
- THROUGH HOLE

### ANSI B16, class 150

DN	$\Delta P$ (Kg/cm <sup>2</sup> )	●	○	R UNC	P	ØK
2"	3	4	-	5/8"	8	120,6
2 ½"	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 ½"	22	577,8
20"	1	16	4	1 ½"	22	635
24"	1	16	4	1 ½"	22	749,3
28"	1	24	4	1 ½"	22	863,6
32"	1	24	4	1 ½"	22	977,9
36"	1	28	4	1 ½"	20	1085,9
40"	1	32	4	1 ½"	20	1200,2

table 6

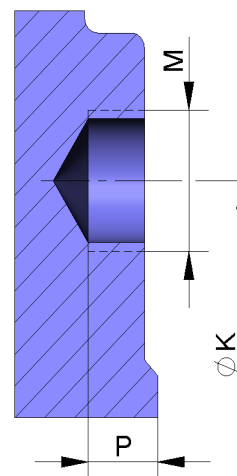


fig. 19