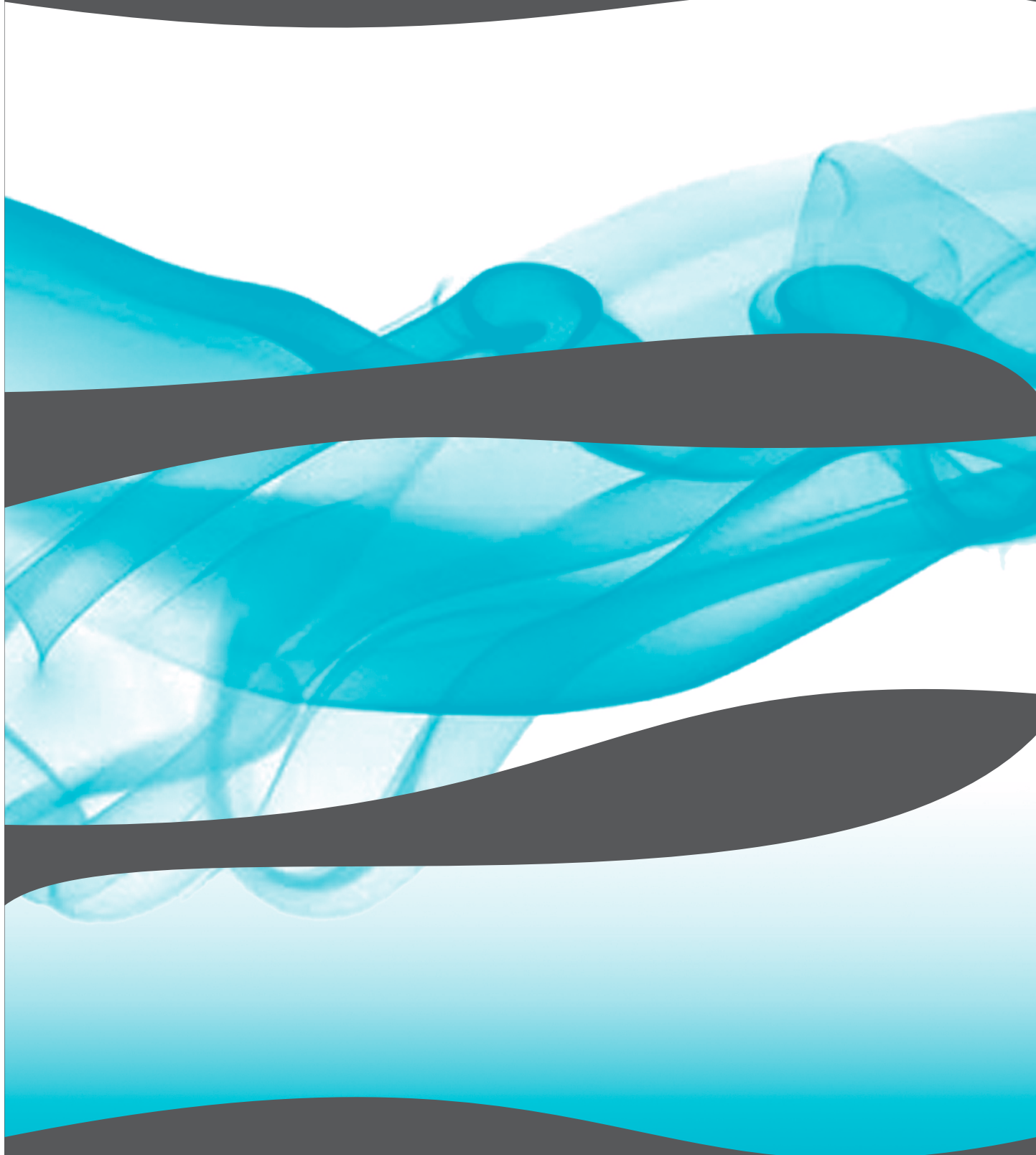




KNIFE GATE  
VALVES. RBR



## Contents

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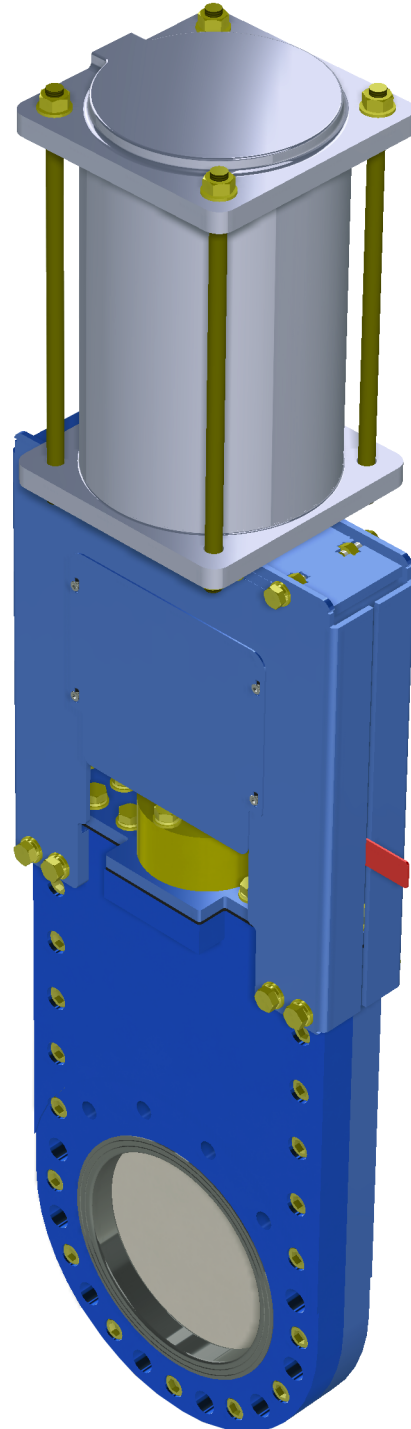
### 2. Technical features

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## 1. General features

The RBR-HAP model is a full flanged valve. It is generally used for fluids, although it is also suitable for use in piping carrying liquids that contain suspended solids.

Some of the main areas of application are:

Paper/cellulose industry (pulp, mechanical pulp, etc.).  
Environment (waste water, mud, ash, ventilation circuits, etc.).  
Chemical industry (viscous pulps, powder, granules, etc.).  
Food industry (washing facilities, silos, etc.).  
Metal/glass/cement/mining industries (silos, abrasive products, etc.).

### 1.1. Installation and service instructions

#### 1.1.1. Handling

Do not pick up the valve by the protection or operation drive or actuator. They have not been designed to deal with weight and can easily be damaged.

Do not pick up the valve by the opening. This can damage the seat's surface and the seals or gaskets.

Use lifting eye bolts screwed into the threaded bore holes on the body of the valve. You are also advised to use slings to lift the valve during installation. These slings must be placed on the upper part of the body of the valve.

#### 1.1.2. Flow direction and position

The standard valve is unidirectional, they may also be manufactured to be bidirectional. In any case, the direction of the fluid is shown on the body.

The unidirectional valve must be installed so that the highest pressure is exerted on the seat. It is important to remember that the flow direction is not necessarily the same as the pressure direction.

The valve must preferably be set up in a vertical position in a horizontal pipe, providing this is possible in the given facilities. Avoid installing the valve with the operation drive at the bottom. However, the valve can be assembled in any position around the pipe (please check with our technical department first).

#### 1.1.3. Assembly

During the assembly process, it is important to avoid resting the weight on the pipe and any mechanical stress directly onto the valve.

##### Preparation

Before fixing the valve to the pipe, check to make sure that it has not suffered any damage during transport or storage. Also make sure that the interior of the body is clean, particularly in the seat area.

Check that flanges and flange seals are the most suitable in each case, paying special attention to keeping the correct distance between flanges, and ensuring they are aligned and parallel with the pipe.

Incorrect positioning can cause deformations on the body of the valve, making it difficult to work properly or even preventing their functionality.

##### Fixing to the pipe

Make sure the parts attached to the valve (flanges, seals, pipe...) are all clean and check the fluid flow direction.

We recommend you fix threaded rods and nuts, instead of screws, on the threaded blind holes fixing the body to the flange, to prevent their thread from deteriorating when tightened (in the event that the screws are too long). The connection will be made with the most suitable screws in diagonal and without over-tightening.



#### 1.1.4. Warnings

##### Pneumatic

The valve is supplied with a standard double acting cylinder, with the option of supplying single acting cylinders on request. In both cases, the supply pressure may vary between 3.5 and 10 bar, with the cylinder size having been designed for a supply pressure of 6 bar.

You are advised to use dried, filtered and lubricated pilot air at 6 nominal bar (maximum 10 bar) to get the best out of both the valve and the cylinder, as regards operation and duration.

##### Electric

Motorisation by servomotor with a declutchable safety handwheel. The motor's opening and closing run limits, as well as the torque limiters, will be regulated on our premises and must not be manipulated thereafter.

The torque limiters' electrical connection is absolutely necessary to be able to offer all our guarantees.

Before any connection, verify the motor's supply voltage.

The instructions sheet and the connection diagram are inside the servomotor's connection box.

**NOTE:** In all cases, the pneumatic or electric connection must be carried out after all assembly operations have been completed, and after ensuring that there is no risk involved.

**WARNING.** Is user responsibility to verify the compatibility of the fluid in the service conditions with the valve construction materials.

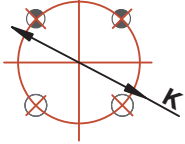


### 1.1.5. DIN PN10 flange dimensions

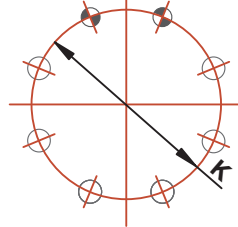
Other usually flanges DIN PN16, DIN PN25, DIN PN40, DIN PN63, DIN PN100, ANSI 150LBS, ANSI 300LBS.

Other flanges on request.

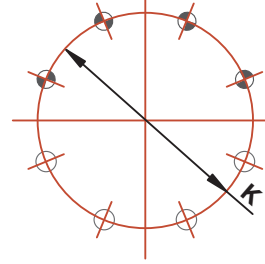
DN 50



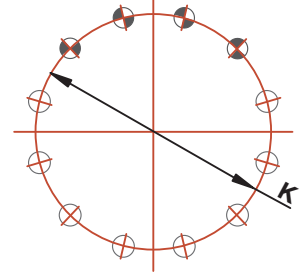
DN 65-150



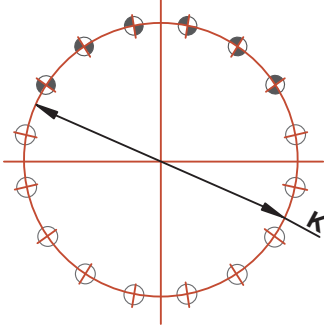
DN 200



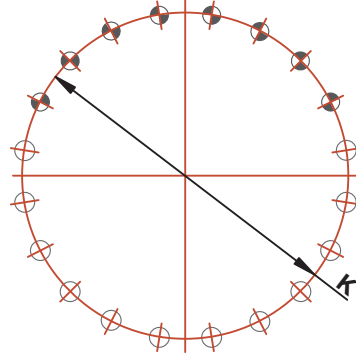
DN 250-300



DN 350-400



DN 450-500-600

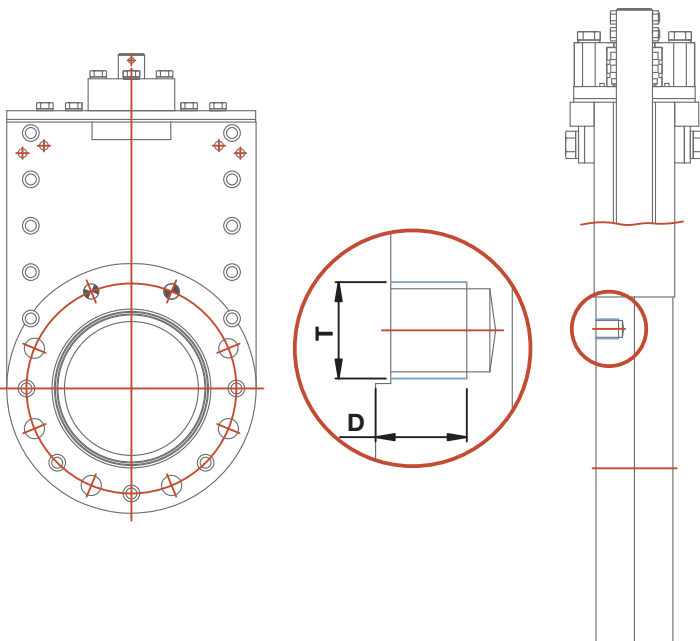




**Z** No. of bore holes, flange PN10



 Threaded blind bore holes

 Through bolts

**K** Diameter



DN	K	Z			T	D
50	125	4	2	2	M-16	8
65	145	8	2	6	M-16	11
80	160	8	2	6	M-16	11
100	180	8	2	6	M-16	11
125	210	8	2	6	M-16	11
150	240	8	2	6	M-20	12
200	295	8	4	4	M-20	12
250	350	12	4	8	M-20	15
300	400	12	4	8	M-20	16
350	460	16	6	10	M-20	21
400	515	16	6	10	M-24	24
450	565	20	8	12	M-24	28
500	620	20	8	12	M-24	28
600	725	20	8	12	M-27	28

**DN** Nominal Diameter / **K** Diameter / **Z** No. of bore holes /  
 Threaded blind bore holes /  Through bolts / **T** Thread /  
**D** Depth

The manufacturer reserves the right to make changes without prior notification.

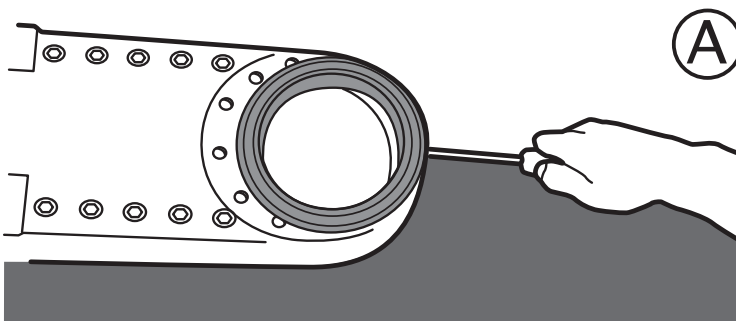
## 1.2. Maintenance

### 1.2.1. Changing the seat

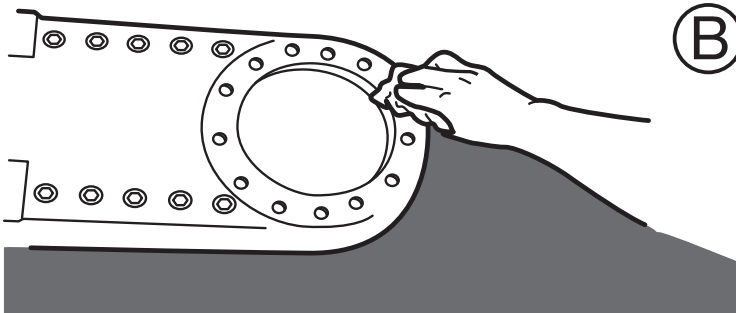
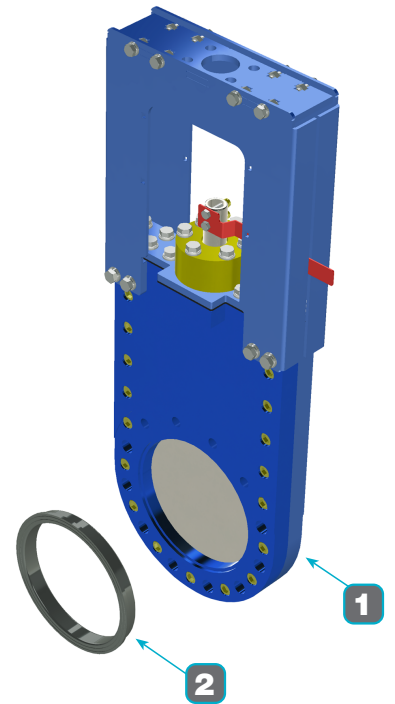
**1** Body

**2** Seat

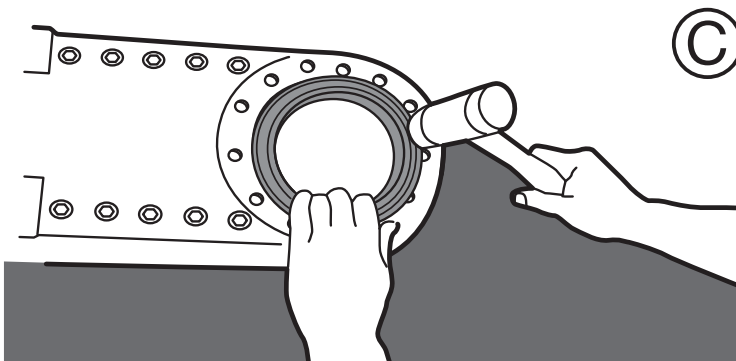
To change the seat, please follow the steps below:



**A** Dismantle the seat with a screwdriver.



**B** Clean the base of the body where the new seat will be placed.



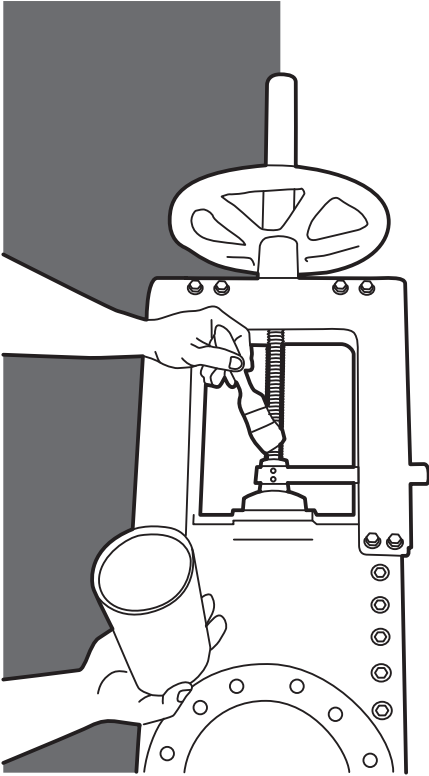
**C** Assemble the new seat, pressing down with a plastic hammer.

The manufacturer reserves the right to make changes without prior notification.

## 1.2. Maintenance

### 1.2.2. Lubrication

In manual drive valves, you should grease the stem at least once a year.





## 1.3. EC Directives

### 1. Machines Directive: DIR 2006/42/CE

### 2. Pressure Equipment Directive (PED): DIR 2014/68/EU

The RBR-HAP knife gate valves for Group 2 fluids (not dangerous) classified according to article 13 of the Pressure Equipment DIRECTIVE PED2014/68/EU and in accordance with the table below meet the requirements of EUROPEAN DIRECTIVE PED2014/68/EU Pressure Equipment according to Module A, analyzed as pipelines for the transport of fluids whose vapor pressure at the maximum permissible temperature is higher than 0.5 bar at normal atmospheric pressure.

MOD. A	CATEGORY I	GROUP 2
<b>DN</b>	<b>FLANGES</b>	
<b>250</b>	PN25/40/63/100	ANSI150/300
<b>300</b>	PN25/40/63/100	ANSI150/300
<b>350</b>	PN16/25/40/63/100	ANSI150/300
<b>400</b>	PN16/25/40/63/100	ANSI150/300
<b>450</b>	PN16/25/40/63/100	ANSI150/300
<b>500</b>	PN16/25/40/63/100	ANSI125/150/300
<b>600</b>	PN16/25/40/63/100	ANSI125/150/300

**DN** Nominal Diameter in mm.

Other ND / FLANGES combinations for this classification of fluids are exempt from CE marking because they belong to article 4.3 of the EUROPEAN DIRECTIVE PED2014/68/EU.

Other classifications of knife gate valves for module and category according to ND, NP, and fluid on request.

### 3. Directive concerning Equipment and Protective Systems intended for Use in Potentially Explosive Atmospheres (ATEX): DIR 2014/34/EU

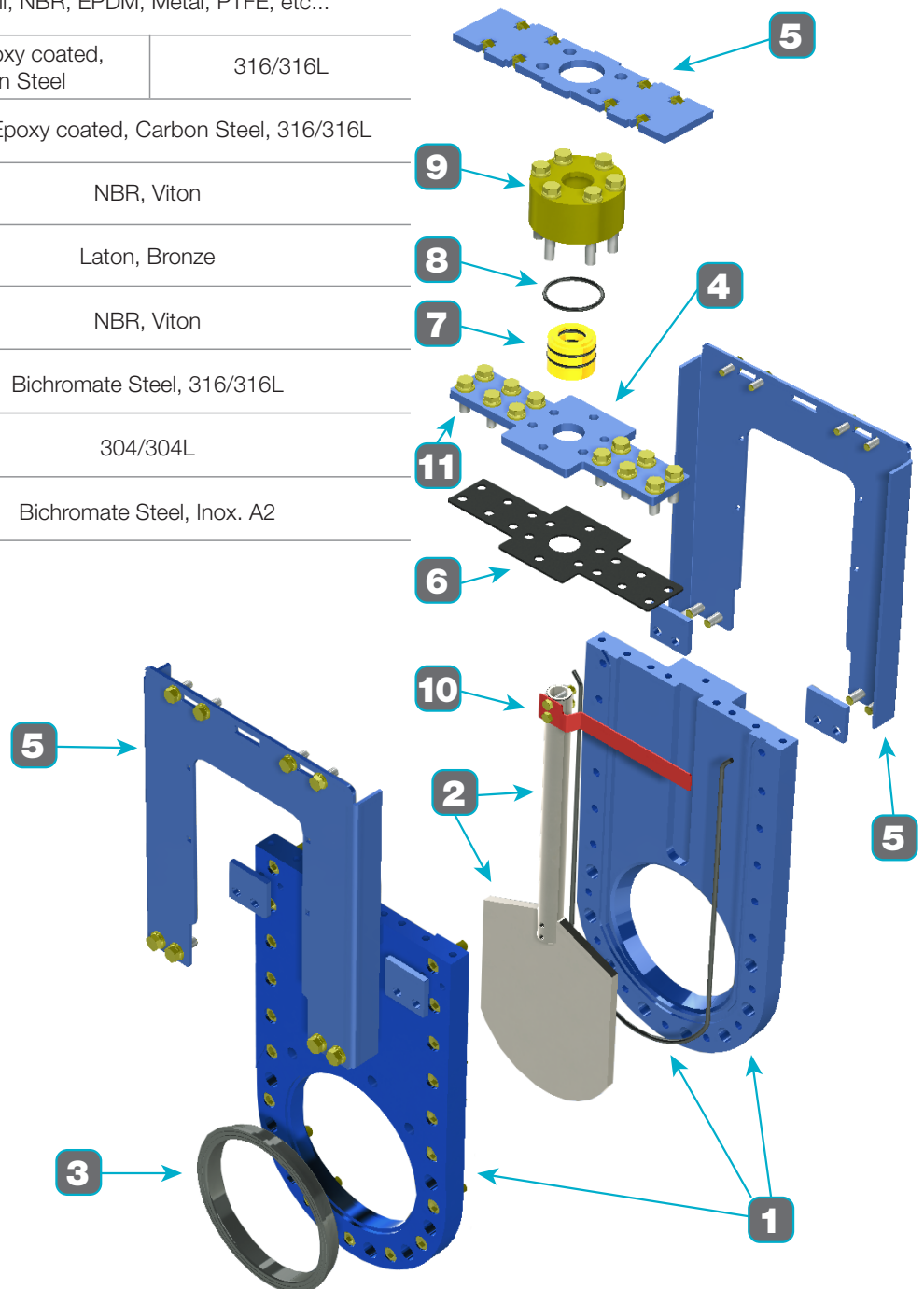
The RBR-HAP knife gate valves with pneumatic and hydraulic drives meet the requirements of the ATEX Directive 2014/34/EU on the equipment and protective systems intended for use in potentially explosive atmospheres, in accordance with GROUP II, CATEGORY 3, ZONES 2 and 22.

## 2. Technical features

### 2.1. Construction and Terminology

#### 2.1.1.1. Description and Materials HAP/M

DESCRIPTION	CARBON STEEL	316/316L
<b>1</b> Body (Body seal)	Zinc + Epoxy coated S355J2 (NBR, Viton)	316/316L (NBR, Viton)
<b>2</b> Gate - Shaft	304/304L	316/316L
<b>3</b> Seat	Butil, NBR, EPDM, Metal, PTFE, etc...	
<b>4</b> Body cover	Zinc + Epoxy coated, Carbon Steel	316/316L
<b>5</b> Support case	Zinc + Epoxy coated, Carbon Steel, 316/316L	
<b>6</b> Body cover seal	NBR, Viton	
<b>7</b> Bushing	Laton, Bronze	
<b>8</b> O-ring	NBR, Viton	
<b>9</b> Bushing	Bichromate Steel, 316/316L	
<b>10</b> Indicator plate	304/304L	
<b>11</b> Screw	Bichromate Steel, Inox. A2	



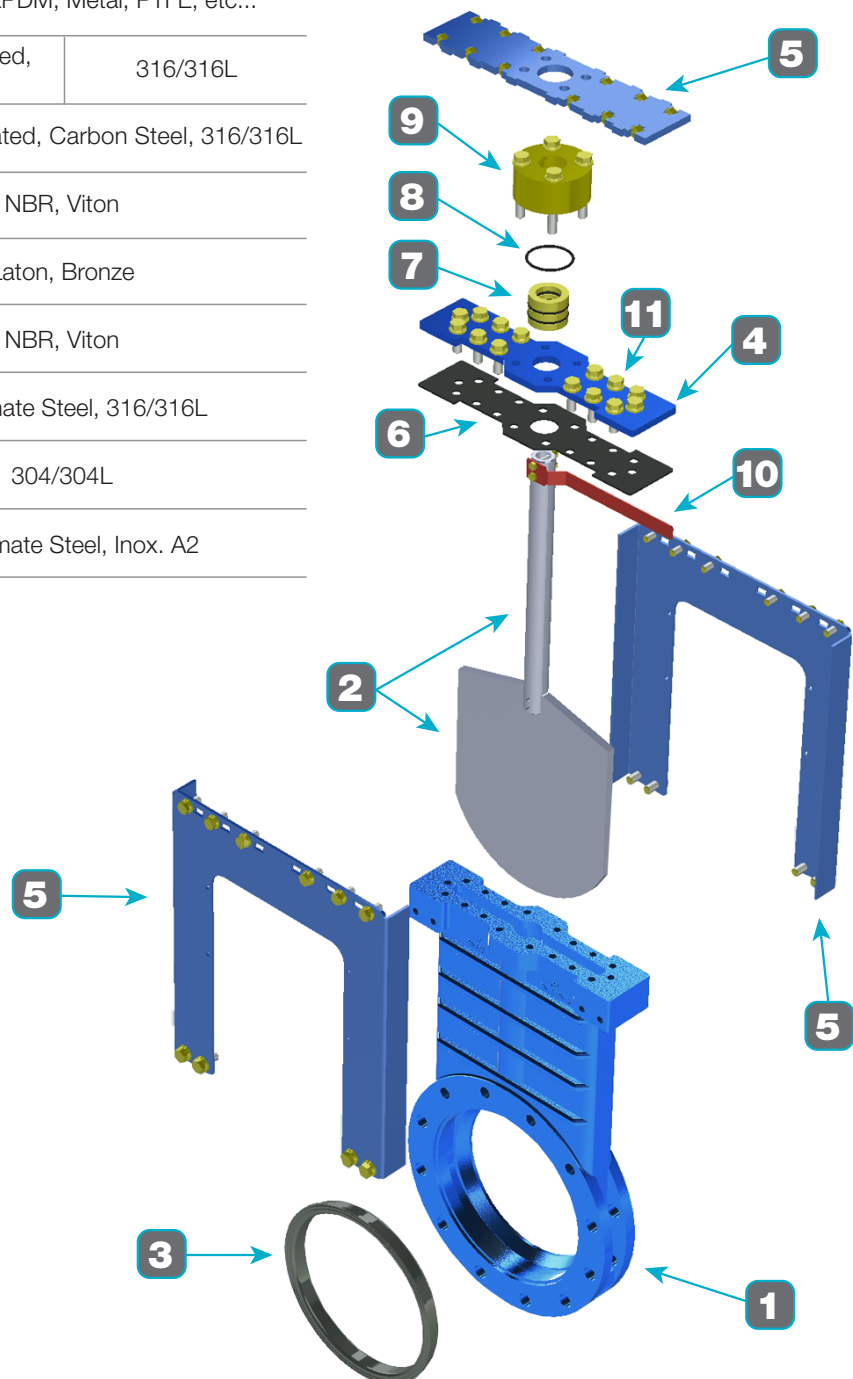
The manufacturer reserves the right to make changes without prior notification.

## 2. Technical features

### 2.1. Construction and Terminology

#### 2.1.1.2. Description and Materials HAP/F

DESCRIPTION	CARBON STEEL	CF8M
<b>1</b> Body (Body seal)	Epoxy coated A216/WCB	CF8M
<b>2</b> Gate - Shaft	304/304L	316/316L
<b>3</b> Seat	Butil, NBR, EPDM, Metal, PTFE, etc...	
<b>4</b> Body cover	Zinc + Epoxy coated, Carbon Steel	316/316L
<b>5</b> Support case	Zinc + Epoxy coated, Carbon Steel, 316/316L	
<b>6</b> Body cover seal	NBR, Viton	
<b>7</b> Bushing	Laton, Bronze	
<b>8</b> O-ring	NBR, Viton	
<b>9</b> Bushing	Bichromate Steel, 316/316L	
<b>10</b> Indicator plate	304/304L	
<b>11</b> Screw	Bichromate Steel, Inox. A2	



The manufacturer reserves the right to make changes without prior notification.



### 1 Body (Body seal)

The body of the knife gate valve HAP series M consists of two half bodies joined together by screws. The material can be carbon steel with an electrozinc treatment that is epoxy-coated Ral 5017, or 316/316L stainless steel.

In HAP series M, the sealing of the body is carried out by means of an o-ring between the two half bodies.

### 2 Gate-Shaft

Standard manufacturing materials are stainless steel 304/304L in valves with carbon steel body, and 316/316L stainless steel in valves with stainless steel body 316/316L or CF8M. For other materials or combinations, please check.

The HAP series F valve body is one-piece cast carbon steel A216WCB with epoxy protection Ral 5017, or CF8M. It can be supplied in other materials on request.

The gate is polished on both sides to provide a smooth, even contact surface with the sealing gasket. There are different degrees of polishing available, as well as a range of anti-abrasion treatments and modifications to adapt to the specific requirements of special facilities.

### 3 Seat

This part ensures the valve is 100% sealed. The standard seal is made using a metal ring that is vulcanised with different types of elastomers, depending on its application.

#### COMPARISON TABLE OF RUBBER TEMPERATURES:

Elastomers	Min. temp.	Max. temp.
Butyl	-15	130
NBR	-20	100
EPDM	-25	100
Viton	-5	220
Silicone	-40	250

Temperatures in °C.

#### BUTYL

This is the standard seat. It can be used in a wide range of applications.

#### NBR

Suitable for fluids containing grease or oil at temperatures no higher than 100°C.

#### EPDM

Generally used for water and water-diluted products at temperatures no higher than 100°C. It can also be used with abrasive products.

#### VITON

Suitable for corrosive applications and for high temperatures up to 190°C continually and for peaks up to 220°C.

#### SILICONE

Mainly used in the food industry and for pharmaceutical products with temperatures no higher than 250°C.

#### PTFE

It is not constructed with the inner metal ring. Suitable for corrosive applications and also for the food industry.

#### OTHER

The seat can be supplied in different types of elastomers on request.

### 4 Body cover

Standard manufacturing materials are zinc+epoxy-coated carbon steel in valves with carbon steel body, and 316/316L stainless

steel in valves with stainless steel body 316/316L or CF8M.

### 5 Support case

Designed in a U shape for greater resistance and manufactured in an electrozinc treatment that is epoxy-coated Ral 5017.

The support case can also be supplied entirely manufactured in stainless steel on request.

### 6 Body cover seal

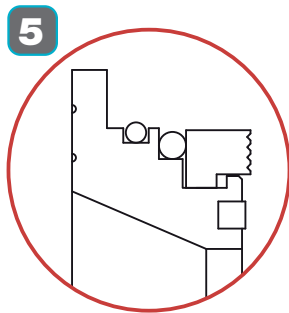
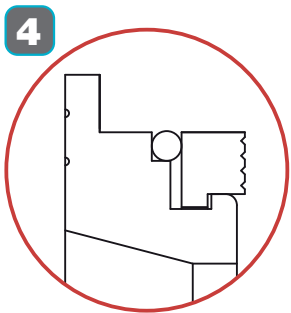
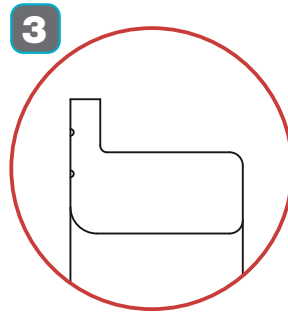
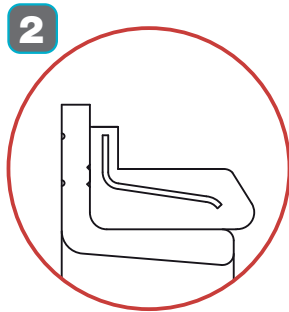
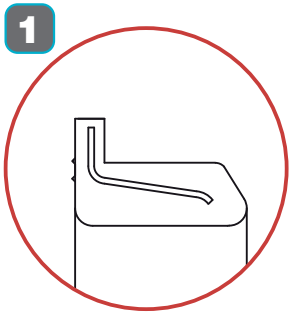
Housed in the body cover, this seal provides the sealing in the upper part of the body in both the M-series and the F-series.


The manufacturer reserves the right to make changes without prior notification.



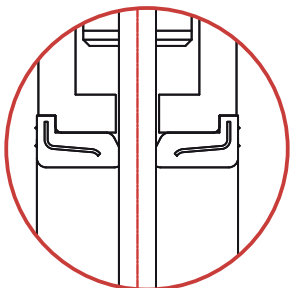
## 2.1.2. Types of closure

- 1** Seat
- 2** Seat + Scraper Deflector / Ref. 2310
- 3** M/M Metal-Metal Deflector / Ref. 2313
- 4** PTFE Deflector / Ref. 2317
- 5** S.L.R. Deflector / Ref. 2316

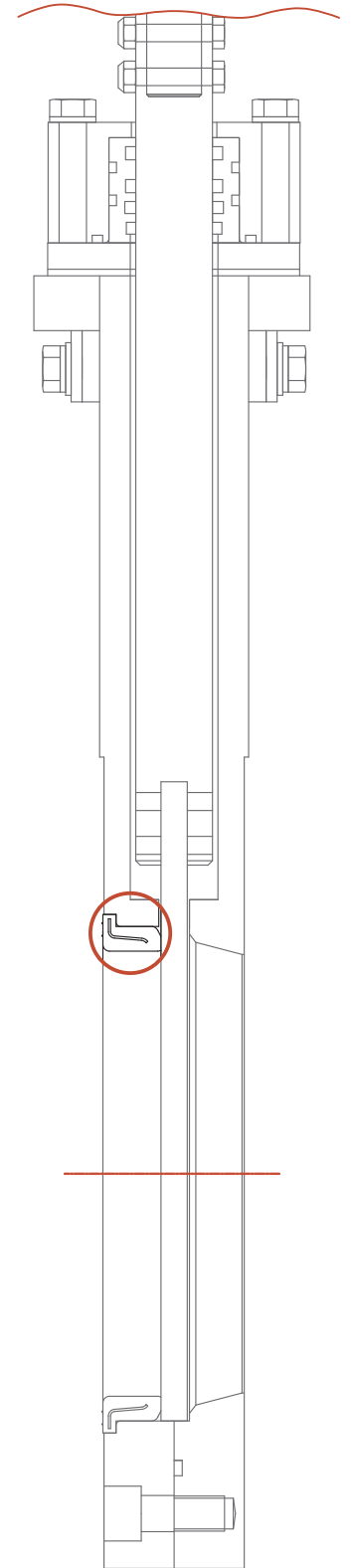


**Important** 

Valve can be bidirectional with any type of seat.



Sample of bidirectional tightness with two seats.



## 2.1.3. Options and accessories

### Flushing holes

### Locking devices

They lock the valve to prevent it from being unduly operated.

### Manual emergency drives (handwheel, lever)

They enable the pneumatic valves to be manually handled in the event of failure or loss of pressure in the air system.

### Columns and extensions

They make it easier to operate the valve in situations with complicated access.

### Mechanical travel stops

Allow mechanical regulation of pneumatic cylinder.

### Travel stop supports

They enable different types of detectors and positioners to be put into place.

### Mechanical limits switches, inductive sensors and positioners

To indicate the precise or continual position of the valve.

### Pneumatic distributors or electro-distributors

To distribute air to the pneumatic drives.

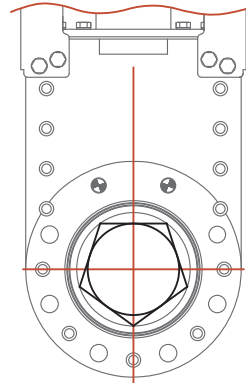
### Mirror-polished gate

Particularly recommended for the food industry and, in general, for applications where the solids need to slide off and not get stuck to the gate.

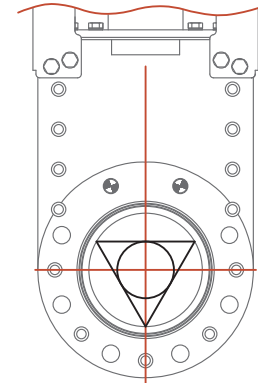
### Hard chrome gate

Provides increased hardness and greater resistance to abrasion

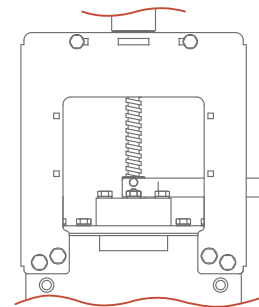
### Flow controllers



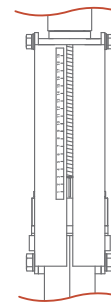
Pentagonal diaphragm



Triangular diaphragm



Graduated position indicator



## 2.1.4. Pressure drops

DN	Kv	Cv
50	167	160
65	290	275
80	380	365
100	650	620
125	1,165	1,115
150	1,520	1,450
200	2,835	2,710
250	4,485	4,285
300	5,675	5,420
350	7,130	6,810
400	9,220	8,805
450	11,465	10,950
500	14,940	14,270
600	21,875	20,895

DN Nominal Diameter in mm.

$$Kv = Q \sqrt{\frac{d}{\Delta P}}$$

**Kv** Flow coefficient. Flow of water in m<sup>3</sup>/h. passing through the valve and generating a pressure drop of 1 bar.

$$\Delta P = \left( \frac{Q}{Kv} \right)^2 d$$

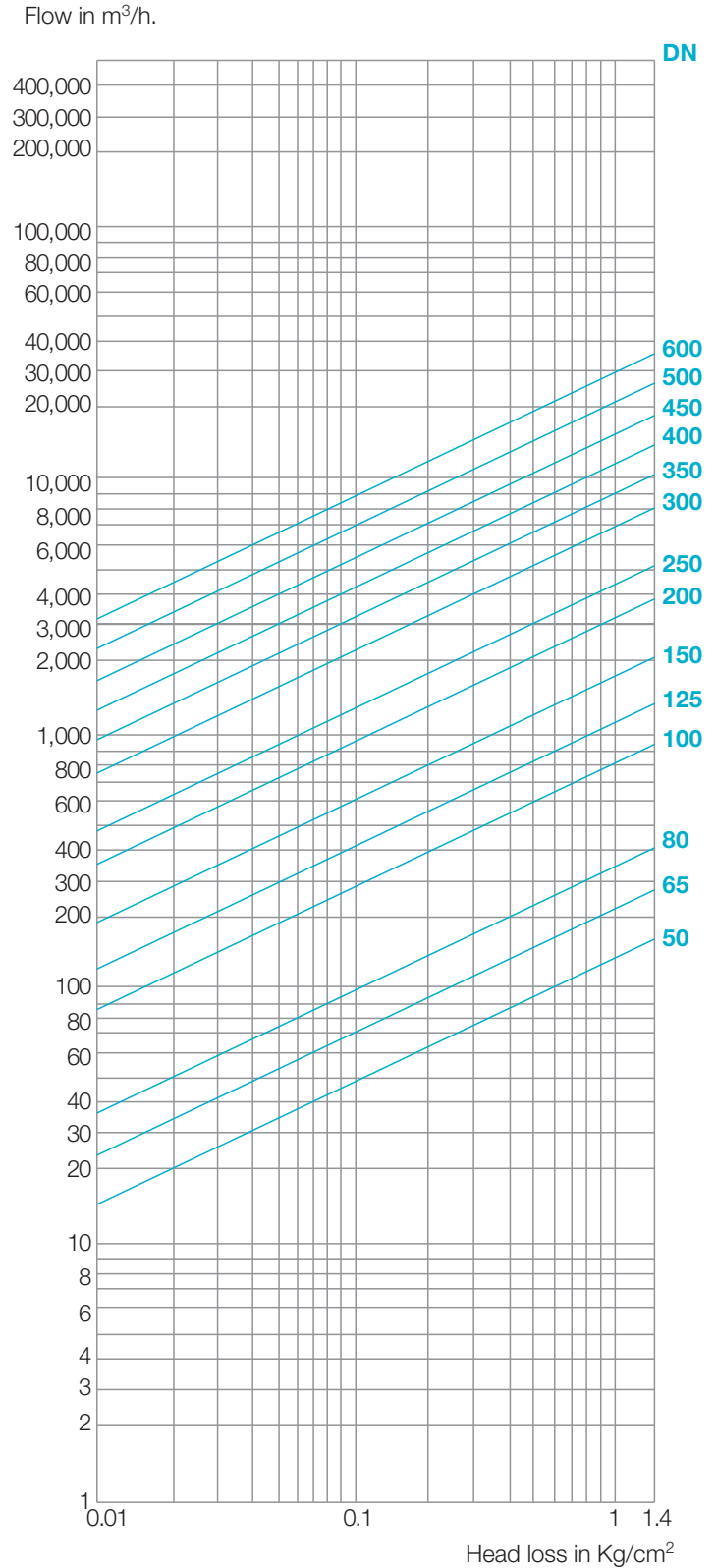
**Q** Flow in m<sup>3</sup>/h.  
**ΔP** Pressure drop in bar.  
**d** Relative density of the fluid (1 in the case of water at 4°C).

$$Cv = Q \sqrt{\frac{d}{\Delta P}}$$

**Cv** Gallons per minute that pass through the valve for the pressure drop to be 1 psi.

$$\Delta P = \left( \frac{Q}{Cv} \right)^2 d$$

**Q** Flow in gallons/min.  
**ΔP** Pressure drop in psi.  
**d** Relative density of the fluid (1 in the case of water at 60°F).



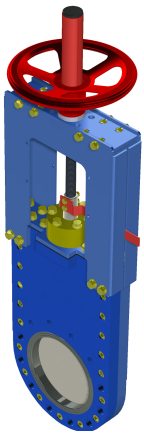
The manufacturer reserves the right to make changes without prior notification.

## 2.2. Drives

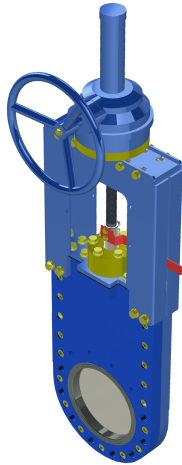
HERBE's RBR-HAP knife gate valves can be activated with different types of drives, both manual and automatic. A correct choice of the type of drive will enable a more efficient use of the valve.

Please check with our Technical Department to select the most appropriate drive for your needs.

### MANUAL

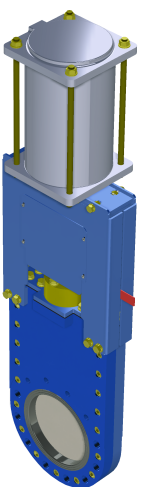


**HAP-VA**  
Handwheel with rising stem

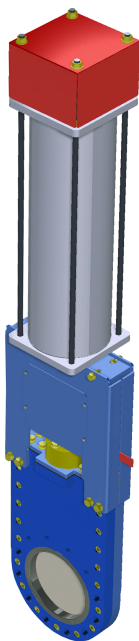


**HAP-R**  
Gear operator

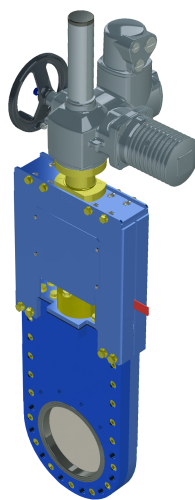
### AUTOMATIC



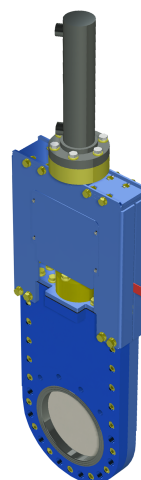
**HAP-NDE**  
Pneumatic cylinder



**HAP-NSE**  
Single effect pneumatic cylinder



**HAP-E**  
Electric actuator



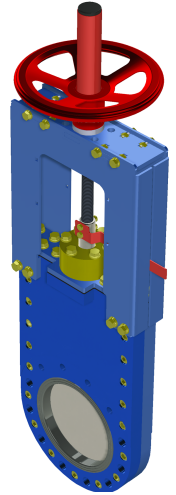
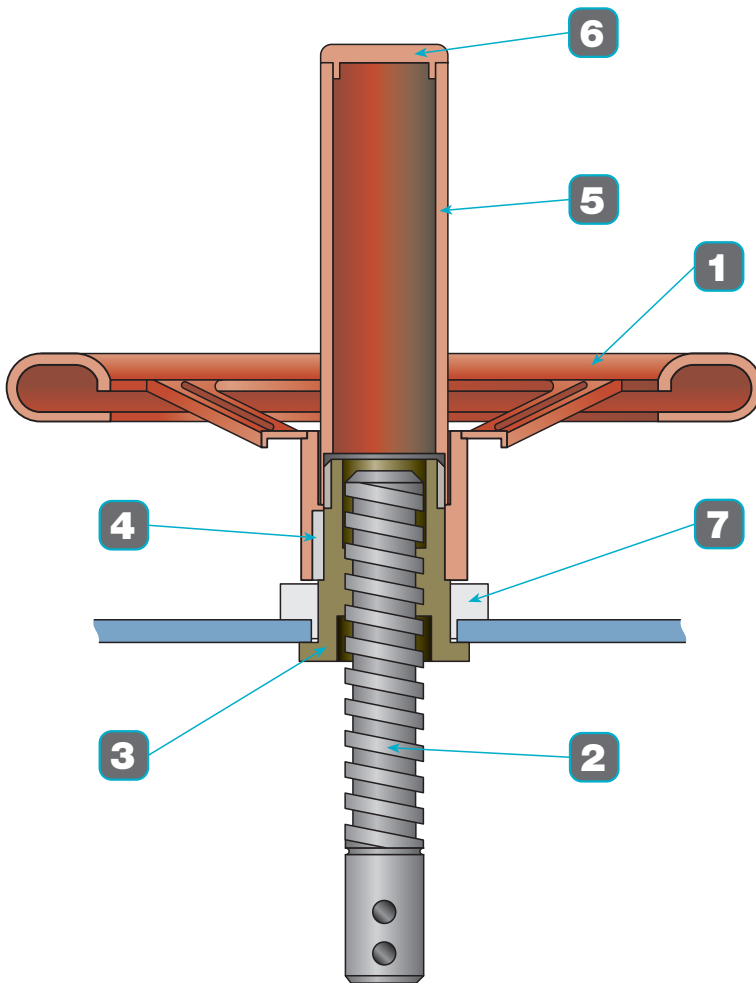
**HAP-HI**  
Hydraulic cylinder

The manufacturer reserves the right to make changes without prior notification.

## 2.2.1. VA

### VA. Handwheel with rising stem.

Manufactured from DN 50 up to DN 600, for any other sizes, please check with our Technical Department.

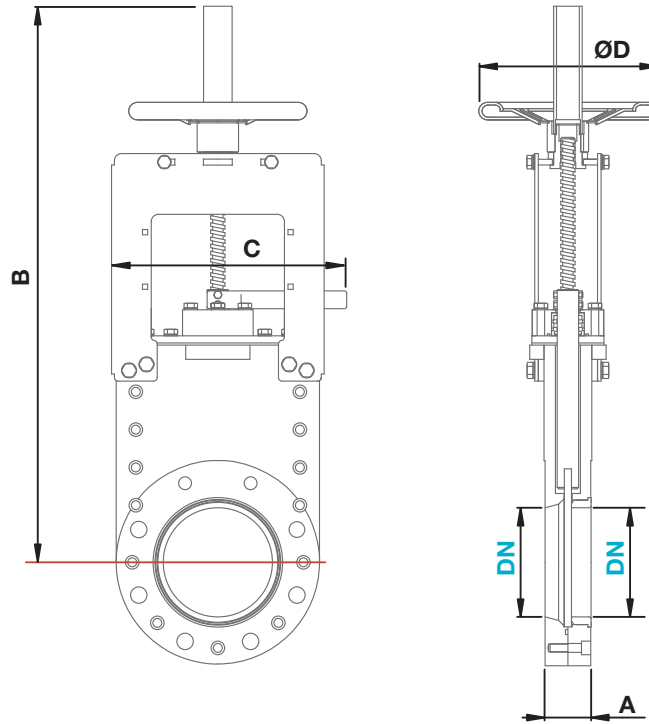


DESCRIPTION	MATERIAL	U. (units)
<b>1</b> Handwheel	Steel	1
<b>2</b> Stem	AISI-303	1
<b>3</b> Nut	Brass	1
<b>4</b> Cotter	Steel	1
<b>5</b> Protection	Steel	1
<b>6</b> Plug	Plastic	1
<b>7</b> Bearing	Nylon	1

\* Other materials available on request.

## 2.2.1. VA

Measurements.



DN	A	B	C	ØD
50	40	413	186.5	200
65	40	446	187.5	200
80	50	511.5	242	200
100	51	599	237.5	200
125	53	680.5	307	250
150	64	779.5	330	250
200	64	1,044.5	418	300
250	80	1,208	485.5	350
300	82	1,388.5	506	350
350	108	1,547	571	500
400	109	1,750.5	620	500
450	119	1,984.5	698	500
500	123	2,091	727	500
600	151	2,611	859	500

**Assembly between Flanges PN10**

DN Nominal diameter / ØD Handwheel diameter

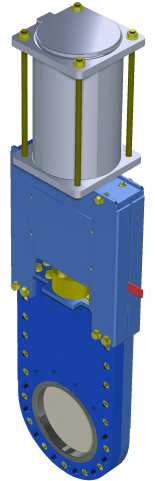
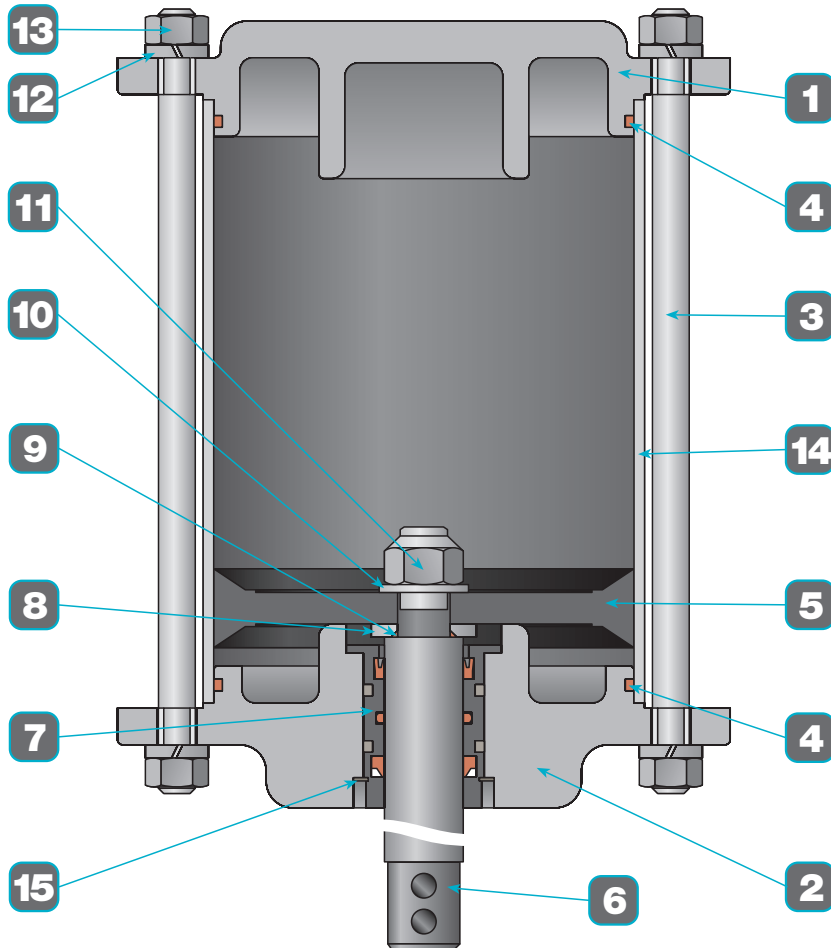
Measurements in mm.

The manufacturer reserves the right to make changes without prior notification.

## 2.2.2. NDE

### NDE. Double acting pneumatic cylinder.

Manufactured from DN 50 up to DN 600, for any other sizes, please check with our Technical Department.



	DESCRIPTION	MATERIAL	U.
1	Top cover	Aluminium	1
2	Bottom cover	Aluminium	1
3	Tie-rods	Bichromate steel	4
4	O-ring	NBR	2
5	Piston	NBR	1
6	Shaft	Chromate steel	1
7	Bushing	Delrin	1
	Collar	NBR	1
	Inner ring	NBR	1
	Outer ring	NBR	2
	Scraper	Polyurethane	1

	DESCRIPTION	MATERIAL	U.
8	Bearing	Bichromate steel	1
9	O-ring	NBR	1
10	Bearing DIN 125	Bichromate steel	1
11	Self-locking nut DIN 985	Bichromate steel	1
12	Grower bearing DIN 127	Bichromate steel	8
13	Nut DIN 934	Bichromate steel	8
14	Jacket	Aluminium	1
15	Safety ring DIN 471	Bichromate steel	1

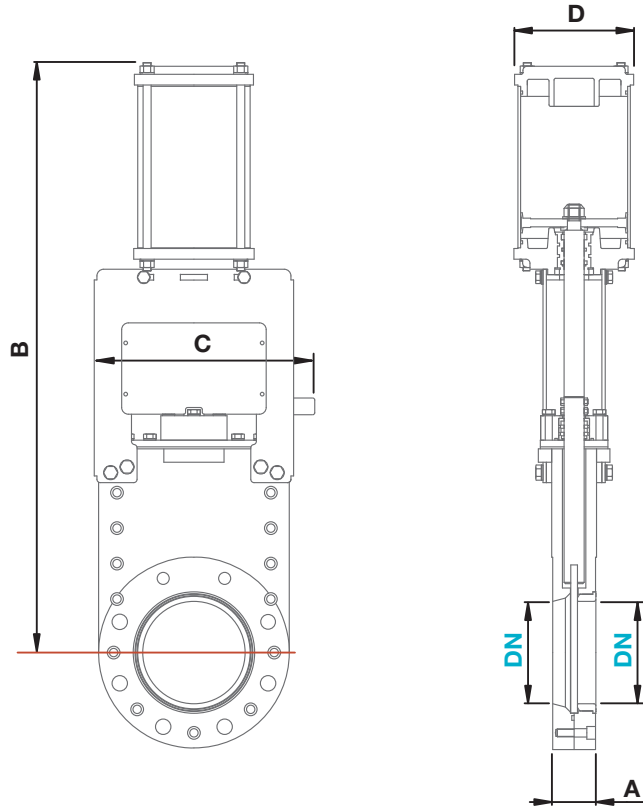
\* Other materials available on request.

The manufacturer reserves the right to make changes without prior notification.



## 2.2.2. NDE

Measurements.



DN	A	B	C	D
50	40	512	186.5	118
65	40	551.5	187.5	118
80	50	621	242	144
100	51	700	237.5	144
125	53	780.5	307	180
150	64	882	330	180
200	64	1,154.5	48	180
250	80	1,324.5	485.5	220
300	82	1,514	506	280
350	108	1,677.5	571	280
400	109	1,883	620	280
450	119	2,127	698	280
500	123	2,227.5	727	280
600	151	2,811.5	859	435

**Assembly between Flanges PN10**

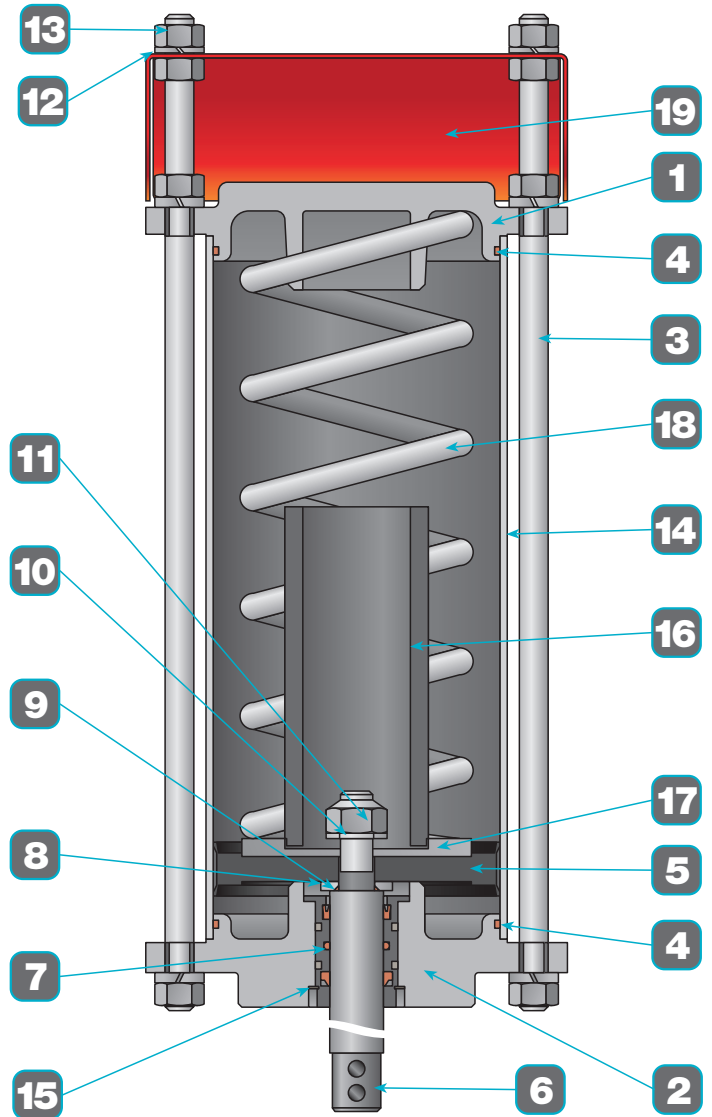
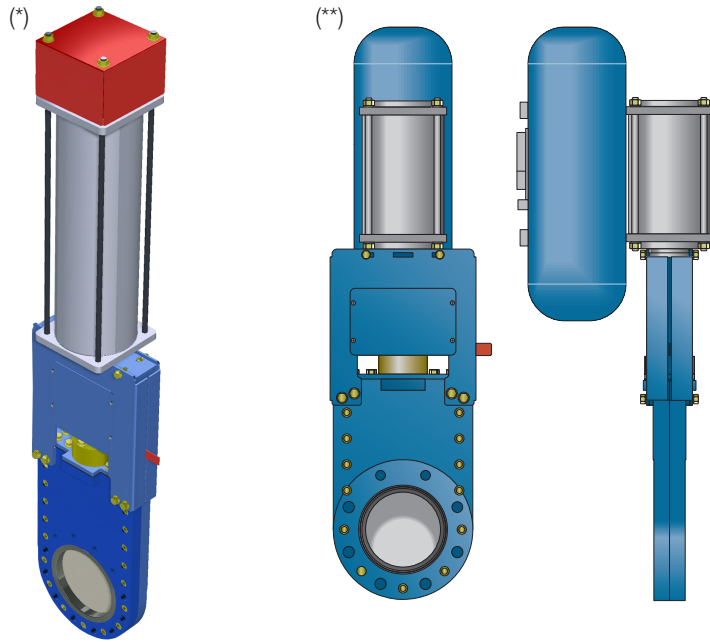
**DN** Nominal diameter / **Measurements** in mm.

The manufacturer reserves the right to make changes without prior notification.

### 2.2.3. NSE

#### NSE. Single acting pneumatic cylinder.

Manufactured from DN 50 up to DN 300 using a spring system (\*) and from DN 350 upwards using a drum system or accumulator tank (\*\*).



	DESCRIPTION	MATERIAL	U.
<b>1</b>	Top cover	Aluminium	1
<b>2</b>	Bottom cover	Aluminium	1
<b>3</b>	Tie-rods	Bichromate steel	4
<b>4</b>	O-ring	NBR	2
<b>5</b>	Piston	NBR	1
<b>6</b>	Shaft	Chromate steel	1
<b>7</b>	Bushing	Delrin	1
	Collar	NBR	1
	Inner ring	NBR	1
	Outer ring	NBR	2
	Scraper	Polyurethane	1
<b>8</b>	Bearing	Bichromate steel	1

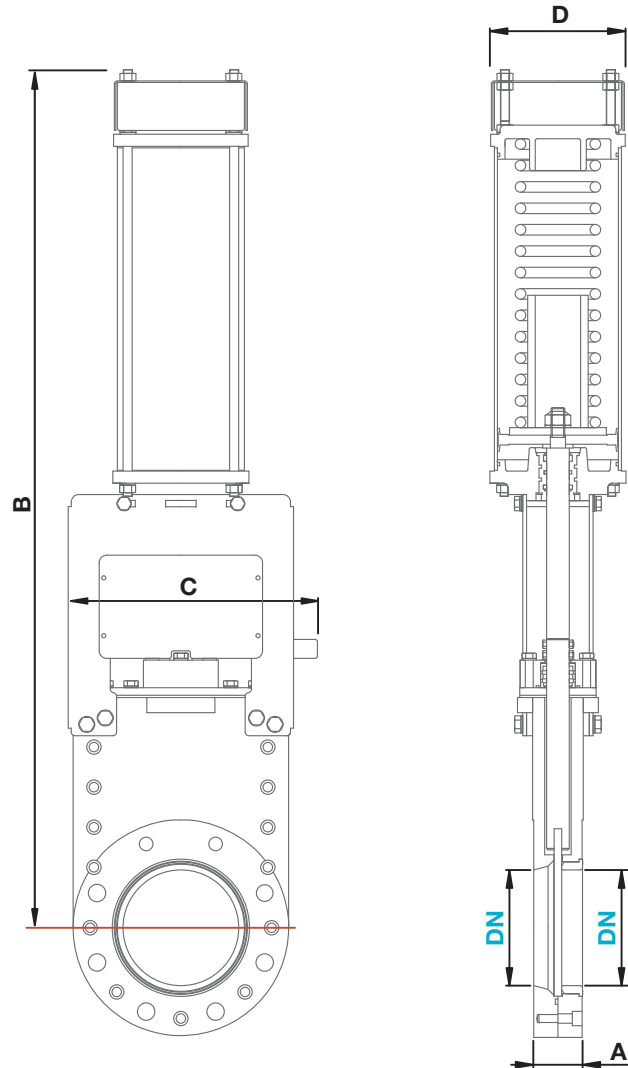
	DESCRIPTION	MATERIAL	U.
<b>9</b>	O-ring	NBR	1
<b>10</b>	Bearing DIN125	Bichromate steel	1
<b>11</b>	Nut DIN985	Bichromate steel	1
<b>12</b>	Bearing DIN125	Bichromate steel	12
<b>13</b>	Nut DIN934	Bichromate steel	16
<b>14</b>	Jacket	Aluminium	1
<b>15</b>	Safety ring DIN471	Bichromate steel	1
<b>16</b>	Stop-tube	Steel	1
<b>17</b>	Tube-washer	Steel	1
<b>18</b>	Spring	Steel	1
<b>19</b>	Protective shield	Steel	1

\* Other materials available on request.

The manufacturer reserves the right to make changes without prior notification.

### 2.2.3. NSE

Measurements.



DN	A	B	C	D
50	40	664	186,5	118
65	40	700.5	187.5	118
80	50	794.5	242	144
100	51	926	237.5	144
125	53	1,015.5	307	180
150	64	1,135	330	180
200	64	1,481.5	418	180
250	80	1,623.5	485.5	220
300	82	1,841	506	280

**Assembly between Flanges PN10**

**DN** Nominal diameter / **Measurements** in mm.

The manufacturer reserves the right to make changes without prior notification.



# Herbe

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