



## AVK KNIFE GATE VALVES

### SERIES 702

#### 1. INTRODUCTION

The AVK knife gate valve is a unique, patented, bi-directional on-off valve that ensures a bubble-tight shut off.

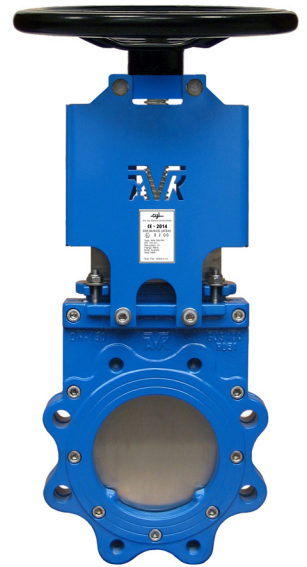
The valve is available with body of ductile iron and seat of nitrile, viton, PTFE, EPDM, natural rubber and polyurethane depending on the service medium and temperature. All AVK knife gate valves receive a treatment of Body of ductile iron with 100-150 µm UV resistant polyester coating. Yokes of carbon steel with coating 100-150 µm of plascoat PPA 571 Aqua.

The valve may be supplied handwheel operated, with quick closing lever, with ISO top flange or fitted with electric or pneumatic actuators. The valve design permits a simple and rapid change of actuator.

AVK knife gate valves feature the following advantages:

Its light weight and short face to face dimension allows easy installation and results in low piping stress and support loads. It is a full bore valve permitting easy passage of liquid of whatever viscosity. The AVK knife gate valve does not have body cavities below the gate where the pumped medium can collect. For particulate or abrasive media gate scrapers and deflector cones can be provided.

AVK soft-seated knife gate valves are limited, by their soft seats, body and gate materials to certain maximum working temperatures. **It is important to advise your supplier of the working temperature, pressure, medium and operation frequency to ensure that the correct valve is fitted.**



#### 2. APPLICATION AND TEMPERATURE RANGE OF AVK SEALING MATERIALS

**EPDM:** Advantages: excellent resistance to heat, ozone and sunlight, very good flexibility at low temperature, good resistance to alkalis, acids and oxygenated solvents. Limitations: poor resistance to oil, gasoline and hydrocarbon based solvents. Maximum continuous operating temperature -30 °C / +90 °C.

**NBR-NITRIL:** Advantages: very good resistance to oil, gasoline, alkalis and acids, good resistance to hydrocarbon based solvents. Limitations: inferior resistance to ozone and oxygenates solvents, it should not be used for high polar solvents (acetones and ketones). Maximum continuous operating temperature -30 °C / +80 °C

**EPDM-POTABLE:** WRAS approved seat for potable water (FDA conformity). Maximum continuous operating temperature -30 °C / +90 °C

**VITON:** Advantages: very good resistance to ozone and sunlight, compatible with a broad spectrum of chemicals, salts solutions and may be used on bleached paper lines. Good resistance to alkalis and acids. Limitations: not suitable for steam or hot water service. Maximum continuous operating temperature -40 °C / +180 °C.

**POLYURETHANE:** Advantages: very good resistant to abrasion and tear, outstanding resistance to oxygen, ozone and sunlight and general weather. Maximum continuous operating temperature -10 °C / +80 °C.

**PTFE (TFE or Teflon):** Advantage: best chemical resistance of all plastics. It has excellent thermal and electrical insulation properties. PTFE's mechanical properties are low compared to other engineering plastics, but its properties remain at useful levels over a great range (-10 °C / +200°C, depending on application).

**WARNING: Knife gate valves are not suitable for hot water at above temperature of 80° C, neither for steam.**

## AVK KNIFE GATE VALVES

### SERIES 702

#### 3. OPERATING PRESSURE

TP: Test pressure in Kg/cm<sup>2</sup>

MAX WP: Working pressure in kg/cm<sup>2</sup>

Test fluid: H2O

#### Test pressure (TP) and work pressure (WP) in kgs/cm<sup>2</sup>

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
TP	15	15	15	15	15	15	15	15	15	9	9	6	6	6
WP	10	10	10	10	10	10	10	10	10	6	6	4	4	4

#### 4. INSTALLATION

1. Prepare two FULL FACE gaskets.

##### Elastomeric flange gaskets for bidirectional valves

Nominal Size DN	Pressure Class PN	Dimensions mm D1 x D2 x S
50	10-16	Ø50 x Ø107 x 4
65	10-16	Ø65 x Ø127 x 4
80	10-16	Ø80 x Ø142 x 4
100	10-16	Ø100 x Ø162 x 5
125	10-16	Ø125 x Ø192 x 5
150	10-16	Ø150 x Ø218 x 5
200	10	Ø200 x Ø273 x 6
250	10	Ø250 x Ø330 x 6
300	10	Ø300 x Ø378 x 7
350	10	Ø350 x Ø438 x 7
400	10	Ø400 x Ø490 x 7
450	10	Ø450 x Ø540 x 7
500	10	Ø500 x Ø595 x 7
600	10	Ø600 x Ø695 x 7

D1 = Inside diameter  
D2 = Outside diameter  
S = Seal thickness

2. The AVK valve is bi-directional; it can be inserted between the two flanges without regards to the flow direction. However, if a deflector cone for abrasive media is supplied, it must be fitted at the upstream end of the valve in order to function correctly. If the valve is supplied with a diaphragm disk for regulation, the diaphragm disk has to be installed opposite to the upstream.
3. Valves fitted with pneumatic actuators have BSP threaded air input and output ports. Tight shut off of the valve will be ensured by having at least an 87 PSI (6 BAR) air supply at the actuator. The used air should be filtered, dry and lubricated. The valve is designed to be installed with the cylinder in a vertical position resulting in proper support for the cylinder forces.

**All the pneumatic actuators single or double acting larger than Ø250**, must be supported externally due to the heavy weight. If for any reason, the valve has to be installed in any other position than vertical, the pneumatic actuator has to be well supported in order to avoid misalignments of the pneumatic actuator and consequently a poor performance of the valve.

**WARNING: Depending on service pressure, an actuator air supply pressure lower than 6 bars may cause the valve to open or close slowly and to shut off incompletely.**

4. Valves fitted with oil hydraulic actuators have BSP threaded oil input and oil ports. Tight shut off of the valve will be ensured by having minimum 1.160 Psi. (80 BAR) and maximum 1.740 Psi. (120 BAR) oil supply at the actuator.

## AVK KNIFE GATE VALVES

### SERIES 702

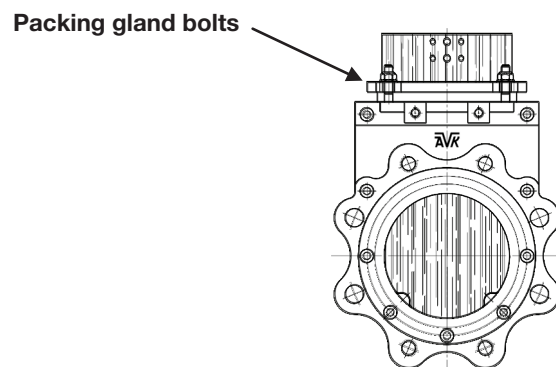
5. The AVK knife gate valve maintains its bubble-tight seal by pressure of the gate against the U-shaped soft seat between the two body parts and against the upper packing gland. Therefore, on valves designed for heavy service as AVK knife gate valves, the spindle must be lubricated by a waterproof, neutral grease to reduce the operating force required. **We advise as silicone multi usage grease from Loctite – (8104) or Molikote 111 Compound.**

If a maximum manual operating torque is specified by the end user, AVK must be informed as it could be necessary to offer a gearbox.

Valves that are to be electrically actuated in the field must have the spindle lubricated as stated above. Failure to do so will make operating the valve inordinately difficult. To avoid any problem, AVK recommends that heavy service valves would have the actuators fitted at our factory. The level of spindle lubrication must be checked every three months and maintained at an adequate level.

6. When the valve is first put into service, the packing gland screws at the upper part of the body should be checked. The packing gland bolts are set to an average tightness at works. However, different service pressures require different degrees of tightness. If the service medium is seen to be leaking from the upper part through the packing gland, tighten the packing gland bolts according to the table below:

DN mm	Torque range (Nm) min.
50	2
65	2
80	2
100	2
125	2
150	3
200	3
250	3
300	3.5
350	3.5
400	3.5
450	4
500	4
600	4



7. Once the valve is installed at the line, grease must be applied to the spindle to ensure an easy operation.
8. Valves operated through electric actuator (especially modulating actuators) must be inspected and lubricated every 2 weeks. Further, the grease nipple at the actuator and the threaded spindle should be checked and lubricated periodically. The operation and maintenance instructions of the electric actuator manufacturer should be followed by the customer. **If this advice is not taken seriously, AVK cannot guarantee the correct performance of the valves.**

**AVK valves electrically operated through electric actuator should be installed in vertical position.** If for any reason, the valve has to be installed in any other position than the advised by AVK, the electric actuator has to be well supported in order to avoid misalignment of the electric actuator and consequently a poor performance of the valve.

**To operate motor actuated valves, follow actuator manufacturer's instructions.**

The knife gate valve should be closed at the max. torque listed on page 4. The limit switch should be set just before the closing torque, as close to the torque as possible (by closing the knife gate valve on the handwheel, please observe when the torque switch is starting to move and set the limit switch in this position).

The opening torque on the actuator should be set at 10% above the recommended closing torque of the KNV. When the KNV is in fully open position, turn the handwheel on the actuator 1 round towards closing and set the limit switch.

For recommended torques for knife gate valves please see table on the next page.

# AVK KNIFE GATE VALVES

## SERIES 702

### AUMA ACTUATOR SPECIFICATIONS - ON-OFF

Valve diameter nominal DN mm	Working pressure bar	Torque		Spindle thread	Top flange size ISO 5210	No of turns	Auma on-off S2-15min 3Phases 400V-50Hz	Advised speed rpm	Power consump. kW	Time to close/open sek.	Auma	
		min	max								coupling type	weight SA kg
		Nm	Nm									
50	10	8	16	18 x 4	F-10	14	SA 07.2	45	0,10	19	B3 / A	20
65	10	10	17	18 x 4	F-10	17	SA 07.2	45	0,10	23	B3 / A	20
80	10	12	19	20 x 4	F-10	21	SA 07.2	45	0,10	28	B3 / A	20
100	10	15	22	20 x 4	F-10	26	SA 07.2	45	0,10	35	B3 / A	20
125	10	17	24	20 x 4	F-10	33	SA 07.2	45	0,10	44	B3 / A	20
150	10	25	50	24 x 5	F-10	31	SA 07.6	45	0,20	41	B3 / A	21
200	10	27	53	24 x 5	F-10	41	SA 07.6	45	0,20	55	B3 / A	21
250	10	50	69	24 x 5	F-10	51	SA 10.2	45	0,40	68	B3 / A	25
300	10	63	84	28 x 5	F-10	61	SA 10.2	45	0,40	81	B3 / A	25
350	6	78	102	28 x 5	F-10	71	SA 10.2	45	0,40	95	B3 / A	25
400	6	90	110	28 x 5	F-10	81	SA 10.2	45	0,40	108	B3 / A	25
450	4	215	259	40 x 7	F-14	65	SA 14.6	45	1,60	87	B3 / A	53
500	4	223	320	40 x 7	F-14	72	SA 14.6	45	1,60	96	B3 / A	53
600	4	249	388	40 x 7	F-14	86	SA 14.6	45	1,60	115	B3 / A	53
700	3	330	436	50 x 8	F-14	89	SA 14.6	45	1,60	119	B3 / A	53
800	2	420	570	50 x 8	F-16	102	SA 16.2	22	1,50	278	A	67
900	1,5	512	783	50 x 8	F-16	114	SA 16.2	22	1,50	311	A	67
1000	1	620	987	60 x 9	F-16	113	SA 16.2	22	1,50	308	A	67
1200	1	950	1460	60 x 9	F-25	136	SA 25.1	22	4,00	371	A	150

### AUMA ACTUATOR SPECIFICATIONS - REGULATION

Valve diameter nominal DN mm	Working pressure bar	Torque		Spindle thread	Top flange size ISO 5210	No of turns	Auma type SAR-modul. S4-25% 3 phases-400V-50Hz	Advised speed rpm	Power consumption kW	Time to close/open sek.	Auma	
		min	max								coupling type	weight SAR kg
		Nm	Nm									
50	10	8	16	18 x 4	F-10	14	SAR 07.6	45	0,2	19	A	31
65	10	10	17	18 x 4	F-10	17	SAR 07.6	45	0,2	23	A	31
80	10	12	19	20 x 4	F-10	21	SAR 07.6	45	0,2	28	A	31
100	10	15	22	20 x 4	F-10	26	SAR 07.6	45	0,2	35	A	31
125	10	17	24	20 x 4	F-10	33	SAR 07.6	45	0,2	44	A	31
150	10	25	50	24 x 5	F-10	31	SAR 10.2	45	0,4	41	A	35
200	10	27	53	24 x 5	F-10	41	SAR 10.2	45	0,4	55	A	35
250	10	50	69	24 x 5	F-14	51	SAR 14.2	45	0,75	68	A	58
300	10	63	84	28 x 5	F-14	61	SAR 14.2	45	0,75	81	A	58
350	6	78	102	28 x 5	F-14	71	SAR 14.2	45	0,75	95	A	58
400	6	90	110	28 x 5	F-14	81	SAR 14.2	45	0,75	108	A	58
450	4	215	259	40 x 7	F-16	65	SAR 16.2	45	3	87	A	77
500	4	223	320	40 x 7	F-16	72	SAR 16.2	45	3	96	A	77
600	4	249	388	40 x 7	F-16	86	SAR 16.2	45	3	115	A	77
700	3	330	436	50 x 8	F-25	89	SAR 25.1	11	3	485	A	160
800	2	420	570	50 x 8	F-25	102	SAR 25.1	11	3	556	A	160
900	1,5	512	783	50 x 8	F-25	114	SAR 25.1	11	3	622	A	160
1000	1	620	987	60 x 9	F-25	113	SAR 25.1	11	3	616	A	160

## AVK KNIFE GATE VALVES

### SERIES 702

#### 5. OPERATION

- To open, turn the handwheel in anti-clockwise direction.
- To close, turn handwheel in clockwise direction. Valve must be tightened firmly to ensure a bubble tight seal.

DN	Number of turns
50	14
65	17,5
80	21
100	26
125	32,5
150	31
200	41
250	51
300	61
350	71
400	81
450	65
500	72
600	86

- To open the hydraulic cylinder actuated valve, apply oil pressure to the lower side BSP inlet of the actuator.
- To close the hydraulic cylinder actuated valve, apply oil pressure to the upper side BSP inlet of the actuator.
- To open the pneumatic cylinder actuated valve, apply air pressure to the lower side BSP inlet of the actuator piston. The air must always be cleaned, filtered, dried and lubricated.
- To close the pneumatic cylinder actuated valve, make sure that you have at least 87 PSI (6 BAR) at the upper side BSP inlet cylinder head to ensure force enough for a bubble tight seal. The air must always be cleaned, filtered and lubricated.

Air consumption at      Min. 6 bar  
    Max. 10 bar

DN	Ø cylinder	Capacity in litres
50	80	0,35
65	80	0,43
80	100	0,72
100	100	0,97
125	125	1,87
150	160	3,48
200	190	6,44
250	190	7,85
300	190	9,25
350	250	18,61
400	250	21,25
450	300	34,07
500	300	37,68
600	300	44,75

## AVK KNIFE GATE VALVES

### SERIES 702

#### Technical data for electric actuated valves

Diameter nominal DN mm	Valve flange drilling PN bar	Working pressure WP stand. bar	Torque		Spindle thread	Flange top size ISO 5210	No of turns	Auma type on-off
			min Nm	max Nm				
50	10	10,0	8	16	18 x 4	F-10	14	SA 07.2
65	10	10,0	10	17	18 x 4	F-10	17	SA 07.2
80	10	10,0	12	19	20 x 4	F-10	21	SA 07.2
100	10	10,0	15	22	20 x 4	F-10	26	SA 07.2
125	10	10,0	17	24	20 x 4	F-10	33	SA 07.2
150	10	10,0	25	50	24 x 5	F-10	31	SA 07.6
200	10	8,0	27	53	24 x 5	F-10	41	SA 07.6
250	10	8,0	50	69	24 x 5	F-10	51	SA 10.2
300	10	6,0	63	84	28 x 5	F-10	61	SA 10.2
350	10	6,0	78	102	28 x 5	F-10	71	SA 10.2
400	10	5,0	90	110	28 x 5	F-10	81	SA 10.2
450	10	5,0	215	259	40 x 7	F-14	65	SA 14.6
500	10	4,0	223	320	40 x 7	F-14	72	SA 14.6
600	10	4,0	249	388	40 x 7	F-14	86	SA 14.6

EU regulations require all valves to be opened and closed at least twice a year to establish that they are in proper operating condition.

#### 6. COATING

Body: UV resistant polyester coating  
 Yokes: Carbon steel with coating 100-150 µm of plascoat PPA 571 Aqua  
 Colour – RAL 5017 (BLUE)

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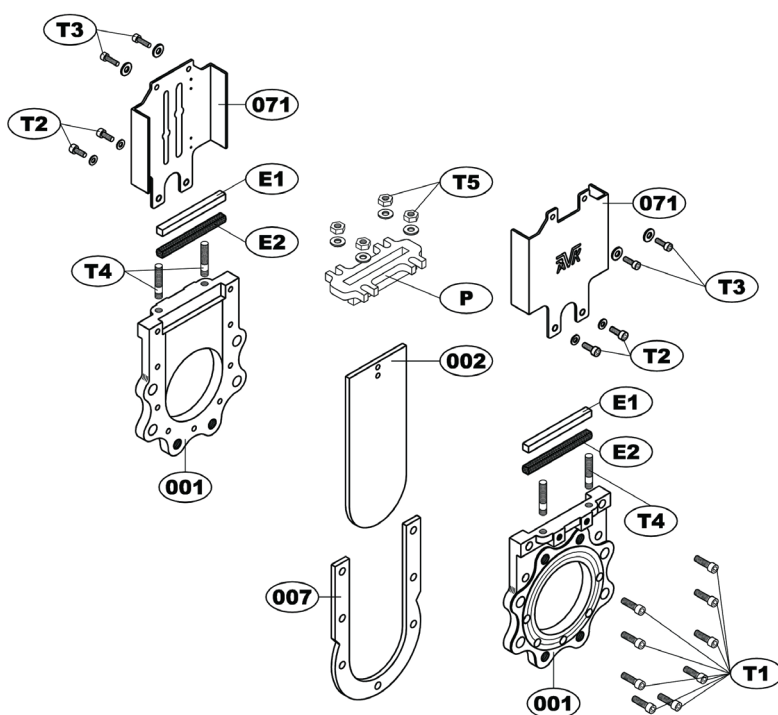
### SERIES 702

#### 7. MAINTENANCE

When the body material, elastomeric seat and packing gland material used in the application are according to the manufacturer's recommendations, the AVK valve is virtually maintenance-free. When routine inspection of the process piping is scheduled, it would be prudent to inspect the elastomeric seat and packing material. As all elastomers degrade and tear to some extent when exposed to the atmosphere, sunlight and application process, careful inspection will reveal the relative condition of the seats and packing gland seal material.

Should a decision be made to change the packing gland seal and / or seat, proceed as follows:

**WARNING: relieve pipeline pressure prior to loosening gland nuts or flange bolts. Failure to relieve pipeline pressure could result in personal injury and/or equipment damage.**



To change U-shaped sealing and packing gland material, proceed as follows:

- With a wrench remove the bolts fixing the yoke-plates to the body **071** and upper platform. Remove the bolts fixing the spindle to the gate. Set yoke-plates and upper platform aside.
- Remove the packing gland & packing nuts **P** & **T 5**, then the packing material **E 1** & **E 2**, proceed by removing the body bolting **T1**. And once removed, separate the valve bodies **001** and replace the AVK supplied spare seat and packing gland material, and assemble bodies & packing gland as it was previously.

**Packing gland bolts are tightened to the average torque values specified in chapter "Installation" (item 4).**

**IMPORTANT: Once leakage has stopped, do not continue tightening the packing gland screws. Over-tightening the gland screws will result in higher valve operating torques and premature packing failure.**

## AVK KNIFE GATE VALVES

### SERIES 702

DN	Torque (Nm)
50	40
65	40
80	40
100	40
125	40
150	75
200	75
250	75
300	75
350	75
400	75
450	75
500	120
600	120

#### 8. STORAGE OF RUBBER PRODUCTS

While the various types of rubber possess different degrees of resistance to the deteriorating influences which may be present during storage, the same general recommendations apply to all vulcanised rubber products. They should be stored in a cool, dry, dark place away from steam pipes, sunlight, etc.