



INSTALLATION AND MAINTENANCE INSTRUCTIONS - ORIGINAL VERSION

AVK GATE VALVES AND SERVICE CONNECTION VALVES FOR GAS

SERIES 02, 03, 06, 15, 36, 38 and 46

1. INTRODUCTION

AVK gate valves are designed for fully open or fully closed service installed in pipelines as isolating valves, and should not be used as control or regulating valves. Working conditions must be limited by temperature and pressure as stated, normally between -10 and +60 °C, maximum 20 m/s flow velocity and up to 16 bar differential pressure. For PED applications, see specific pressure classifications.

The AVK gate valve is designed with a cast body and bonnet assembled with countersunk bolts of stainless steel. It is operated with a stem of stainless steel and a wedge of ductile iron fully vulcanized with NBR rubber. Materials and coating vary according to the application of the valve. Full material specifications are found in the datasheets. All valves are hydrostatically tested according to EN 13774 for gas applications.

Operation of the gate valve is performed doing an either clockwise to close (CTC) or clockwise to open (CTO) rotating motion of the stem. When operating the valve stem the wedge moves up- or downwards on the threaded part of the stem.

Certain variants of the gate valves come with purge point outlets. These outlets are equipped with quarter turn ball valves fitted with hand lever. The hand lever is pulled upwards to a vertical position to open the valve. The purge point outlets are fitted with blind flanges, which are pressure tested together with the rest of the valve.

Specific operation conditions may apply for valves equipped with an ISO flange for mounting gearbox or actuator, please refer to the actuator manufacturer's instructions.

2. PRODUCT LIFE CYCLE

The life of the valve is dependent upon its installation and application.

The valve should be protected from the adverse effects of mechanical shock, loading and excess weight. This includes forces either applied to it or via the installation process or pipework that the valve is attached to.

Also, consideration should be given to various loadings, which can occur at the same time.

The valve on no account should be tampered with or modified in any way.

If for any reason work is to be carried out on the valve it is wholly the responsibility of the user to ensure the valve is depressurised and rendered safe prior to any fasteners / fixings being loosened. For replacement instructions of the stem seal nut, please refer to section 16.

To ensure correct installation of the valve it is essential that the personnel carrying out the installation have correct training and skills.

As the gate valve is designed for installation directly in the ground, it is designed to be corrosion and maintenance-free throughout the expected life time of the valve. Thus spare parts are not needed and repair of the valve in case of malfunction is not intended. To maintain full functionality of the valve throughout the expected life time frequent operation of the valve is recommended. The frequency of operation may vary from once a year to several times per month.

AVK gate valves are designed to be self cleaning due to the full and straight bore. To get the full benefit of this AVK recommends to install the valve in upright position or in a 45 degree angle. Upside down installation is not recommended.

3. CE MARKING AND THE PRESSURE EQUIPMENT DIRECTIVE 2014/68/EU

AVK gate valves for gas are CE marked according to 2014/68/EU.

Valves with a maximum allowable pressure not exceeding 0.5 bar are outside the scope of the directive. Valves are categorised in relation to the intended fluid contents, the maximum working pressure and the nominal size. Fluids are classified as Group 1, dangerous substances, Group 2, all other fluids including steam.

Categories are SEP (sound engineering practise) and for ascending levels of hazard, I, II, III or IV. Valves designated as SEP do not bear the CE mark and do not require a Declaration of Conformity.

Valves classified as category I, II, III or IV carry the CE mark and require a Declaration of Conformity (Note: all valves up to and including 25mm (1") having a maximum allowable pressure greater than 0.5 bar are designated SEP regardless of fluid group).

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4. REQUIREMENTS FROM LOCAL AUTHORITIES

Requirements from local authorities shall be met.

In case of conflicts between local requirements and PED, AVK shall be contacted to resolve any issues.

5. PRODUCT MARKING



Casting - valve side 1

- Body series number
- AVK logo
- Product dimension (DN)
- Pressure class (PN)*
- Casting material
- Supplier number



Casting - valve side 2

- Casting material
- Casting date

Label - valve side 2

- AVK logo and CE logo
- EAN number
- Item number
- Dimension / coating / stem material / closing direction / application
- Standard / pressure class / temperature
- Casting material
- Temperature
- Approvals
- Year of production
- Internal production order number and unique serial number



Stem and label on bonnet

- Unique serial number

* Pressure class is marked on valve body and label. Please be aware that the pressure classification on the label is always applicable.

6. HEALTH AND SAFETY PRECAUTIONS

Whenever AVK valves are installed or operated the inherent dangers of pressurized gas must be addressed. Never attempt to dismantle the valves when the system is under pressure. Gate valves are heavy, especially in large dimensions, so always use appropriate lifting devices to avoid injuries. It is essential that staff undertaking these operations is adequately trained to avoid accidents. This installation and maintenance instruction will not replace adequate training and correct craftsmanship and AVK will not be held responsible for any accidents arising from incorrect installation.

Likewise before, during and after installation the applicable standards, codes and regulations for installation and for the prevention of accidents must be observed. Note that especially for installations in hazardous environments ATEX regulations may apply.

7. LIMITS OF USE

Valves are permitted for use with Group 1 hazardous gases. As standard they are suitable for the isolation of Natural Gas, Towns Gas and other non-aggressive gases and non-aromatic oils. Valve included in the KIWA Gastec type approval certificate, has been evaluated suitable for Hydrogen gas according to KIWA AR 214

Prior to use on any other fluid the compatibility of the valve materials must be verified.

Valves are not designed for 'end of line' service. In the event of the valve being mounted at the end of the pipeline, we strongly advise the use of a blanking plate or plug.

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Valves are not suitable for fatigue loading, creep conditions, wind and earthquake loading, fire testing, fire hazard environment, corrosive or erosive service, transporting fluids with abrasive solids.

It is the responsibility of the end user to ensure the integrity of the valve is not adversely affected by the surrounding environment. If there is any doubt the user must implement checks to monitor the product integrity.

The valves referred to in this document have been categorised in accordance with the Pressure Equipment Directive.

Maximum Allowable Pressure PS (bar)	Nominal Size DN	Category
10	32-100	I
	150-350	II
	400-600	III
16	32-50	I
	80-150	II
	200-600	III

Categories I, II, and III require CE mark.

8. OPERATING PRESSURES AND TEMPERATURES

End configuration: Flanged, weld-ends and screw (service connection valves)
 Size Range: 32 mm to 600 mm
 Maximum working pressure: Standard buried applications: 16 bar. PED applications: See below table.
 Temperature range: -10°C to +60°C

End configuration: PE-ends, PE-ends/flanged and PE-ends/steel combination
 Size Range: 32 mm to 400 mm
 Maximum working pressure: All applications: 10 bar.
 Temperature range: -10°C to +20°C Note: The Maximum working temperature is set according to the ISO9080 lifetime requirements for PE pipes, and is therefore not the max. temperature for the valve

DN	Max allowed pressure [bar] for PED applications			
	Series 02	Series 06 and 15	Series 46	Series 46/70
40-150	16	16	16	16
200	15	15	15	15
250	12	12	12	12
300	10	10	10	10
400	7.5	7.5	14	13.5
500	8	7	7.5	-
600	-	7	7.5	-

9. PRESSURE/TEMPERATURE RATING

Valves must only be installed in a piping system whose pressure and temperature do not exceed the above ratings.

If system testing will subject the valve to pressures more than the working pressure rating, this should be within the production test pressure for the valve.

The maximum allowable pressure as specified is for non-shock conditions. Water hammer and impact for example, should be avoided.

If the limits of use specified in these instructions are exceeded or if the valve is used on applications for which it was not designed, a potential hazard could result.

10. STORAGE AND HANDLING

The valve should be handled and stored in such a way as to always protect the valve from becoming damaged both internally and externally, either mechanically or by chemical/substance.

If fitted, valve end protectors should not be removed unless necessary to do so for inspection or installation.

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If outdoor storage is unavoidable, valves should be supported off the ground and protected by a weatherproof cover.

Rubber components in valves, or provided as spares, should not be exposed to heat or direct sunlight where this can be avoided, as this accelerates the ageing of the rubber.

The AVK series 36 gate valve with PE ends is packed so the pipe is protected from UV radiation and other risks of damaging the pipe. If the packaging is undamaged and kept away from direct sunlight (UV radiation) at a temperature below +40°C, then the storage time is 5 years from the production date of the pipe. If the valve is not protected correctly, the pipe storage time is 2 years according to EN1555-2/EN12007-2.

To avoid storing old valves at your warehouse, we kindly encourage you to make use of the FIFO method (first in, first out)

11. LAYOUT AND SITING

It should be considered at the design stage where valves will be located to give access for operation, adjustment, maintenance and repair.

Valves must be provided with adequate support. Adjoining pipework must be supported to avoid the imposition of pipeline strains on the valve body, which would impair its performance.

The valve shall be installed in piping systems designed with compensators according to standard practice and norms designed to absorb axial pipe movements due to temperature expansion or contraction.

A heavy valve may need independent support or anchorage.

If the valve is installed in rock or sharp-edged stone, there shall be a bed of earth, sand or other suitable material to a minimum depth of 150 mm beneath the valve. Fine-grade (< 5 mm) material free from sharp-edged stones shall be filled and compacted carefully around the side of the valve and to a minimum consolidated height of 150 mm above the valve.

12. INSTALLATION

Prior to installation, a check of the valve labelling and marking must be made to ensure that the correct valve is being installed.

Record the valve serial number and its location to help with traceability.

The valve shall be handled with great care not damaging the coating to avoid the risk of external corrosion.

Extra care shall be taken to make sure outside coating is intact or the use of other means of additional protection shall be used when the valve is installed in polluted or aggressive soil conditions or coastal environments. Alternatively, the frequency of inspections shall be increased to detect any corrosion.

Before installing and commissioning the valve shall be examined for damaged coating. If the coating is damaged repair is required. AVK can supply a coating repair kit.

The valve should be fully opened and closed to ensure it is operating satisfactorily.

Valves are precision manufactured items and as such, should not be subjected to misuse such as careless handling or allowing dirt to enter the valve through the end ports.

Excessive forces during installation and operation must be avoided.

All special packaging materials must be removed.

When valves are provided with lifting lugs or eye nuts, these should be used to lift the valve. These lugs are designed to take the weight of the valve only and not any attached pipe work etc. Valves should not be lifted using the handwheel, stem, gear-box, actuator or by the purge pipes (only applicable for the AVK valves with purge points). During lifting all applicable Health & Safety requirements should be observed.

Immediately prior to valve installation, the pipework to which the valve is fastened should be checked for cleanliness and freedom from debris.

Valve end protectors should only be permanently removed immediately before installation. The valve interior should be inspected through the end ports to determine whether it is clean and free from foreign matter.

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The mating flanges (both valve and pipework flanges) should be checked for correct gasket contact face, surface finish and condition. If a condition is found which might cause leakage, no attempt to assemble should be made until the condition has been corrected.

The gasket should be suitable for operation conditions or maximum pressure/temperature ratings and should be checked to ensure freedom from defects or damage.

Care should be taken to provide correct alignment of the flanges being assembled. It is important when installing any valve that pipeline stresses are kept to a minimum and no undue external forces are placed on the valve connections. During assembly, the bolts must be tightened sequentially to make the initial contact of flange and gasket flat and parallel followed by gradual and uniform tightening to the specified torque for the gasket being used in an opposite bolting sequence to avoid bending one flange relative to the other, particularly on flanges with raised faces. See figure 1 for bolt tightening pattern.

Parallel alignment of flanges is especially important in the case of the assembly of a valve into an existing system.

The bolting used for the flange connection must be checked for correct size, length, material and that all connection flange bolt holes are utilised. See table 1 for bolt sizes.

If a permanent extension spindle and road cover is used only a permanent telescopic extension spindle that is not completely collapsed (shall be extracted e.g. min. 50 mm) shall be used to avoid transfer any loads to the buried valve.

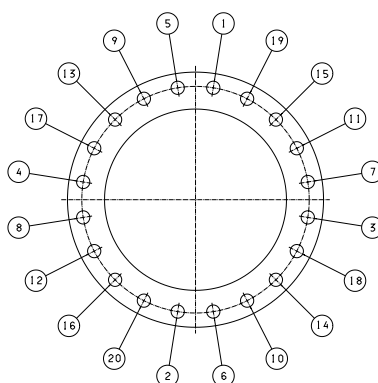
Gate valves with spigot pipe ends are to be installed either by means of appropriate welding or the use of a suitable coupling. For welding procedures please refer to pipe manufacturers' specifications. For choice of coupling please consult an AVK representative.

Special care shall be taken when installing gate valves with purge points. The purge point pipes shall be protected from any sideways loads, both during handling and after installation.

Table 1

DN mm	BOLT SIZES		Quantity	
	Working pressure (bar) PN 10	PN 16	PN 10	PN 16
40	M16	M16	4	4
50	M16	M16	4	4
65	M16	M16	4	4
80	M16	M16	8	8
100	M16	M16	8	8
150	M20	M20	8	8
200	M20	M20	8	12
250	M20	M24	12	12
300	M20	M24	12	12
350	M24	M24	16	16
400	M24	M27	16	16
450	M24	M27	20	20
500	M24	M30	20	20
600	M27	M30	20	20

Figure 1



13. OPERATION

Gate valves are typically operated with an extension spindle in below ground installations. In manholes or in above ground installations handwheels or electric actuators may be used. Ensure proper sizing of the handwheel and/or operating keys, extension spindles and actuators. Please refer to AVK datasheets for further information. When installing gate valves mounted with electric actuators, please observe closing torques and number of turns from the datasheet. When the valve is installed in a chamber with an extension spindle going to above ground level, ensure that no vertical force from the extension spindle presses down directly on the valve stem top. The extension spindle must be supported by wall mounts or similar to prevent vertical forces and thereby supporting the weight of the extension spindle.

When closing the gate valve ensure that the appropriate torque and number of turns are applied to the valve. See table 2.

14. PRESSURE TESTING

After installation, perform a pressure test before the trench is closed. Secure the pipe and gate valve against movement. If the pipeline and valve are tested with water prior to gas/air tests, ensure that the pipeline and valve are drained to prevent frost damage. AVK valves are designed to resist a test pressure of 1.5 x PN.

Due to the varying storage environment conditions from the time of manufacturing to the time of installation, the seating rubbers might need to be compressed into the seat 1-2 times before proper sealing is achieved.

This is done by first applying the specified torque at closing - reopening with a few spindle rotations - and then reclosing the valve at the specified torque.

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Note: When applying one sided pressure on a closed valve, a slight whistling noise and a slow pressure drop on the upstream side might be noticed, which can seem like a leakage. This is, however, not a leakage, but just the cavity above the wedge (valve tower), which is slowly being pressurized. Once the cavity and the upstream pressures are equalized, the noise and pressure drop will stop.

15. MAINTENANCE

The valve is designed to give long trouble free service without the need of routine maintenance.

After the specified number of operation cycles have been reached the wear inside the valve shall be examined. If the wear is extensive, worn components shall be replaced or a new valve shall be installed.

If internal or external leakage is suspected, it is recommended that AVK International be contacted to suggest suitable remedial action.

Table 2

Valve dimension DN mm	MAX. TORQUES				
	Closing torque Nm	Closing torque below 0°C Nm	Free running torque Nm	Rupture torque	Turns to open
Service connection valves					
25	35	-	-	200	7
32	35	-	-	200	9
40	35	-	-	200	11
50	35	-	-	200	14
Gate valves					
40	40	40	9	400	11
50	40	50	9	400	11
65	60	65	9	400	14
80	60	80	9	400	17
100	80	100	9	400	21
125	80	125	9	500	26
150	80	150	18	600	26
200	120	200	18	800	33
250	180	250	18	1000	37
300	200	300	18	1200	44
350	300	350	24	1400	59
400	300	400	24	1600	59/50***
450	300*/450**	450	25	1600	59*/39**
500	300*/450**	500	25	1600	59*/43**
600	500**	600	25	1600	53*/52**

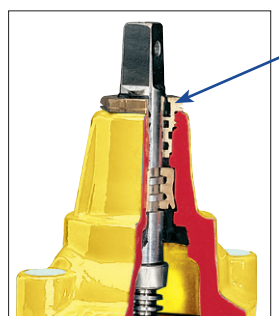
* series 02 ** series 06 and 46 *** series 36

16. REPLACEMENT OF STEM SEAL NUT

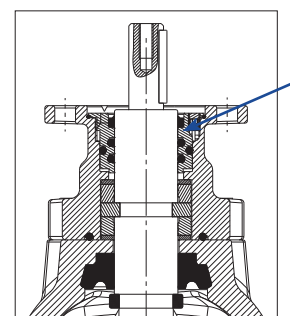
The stem sealing can be replaced regardless of the position of the valve. If it is necessary to replace the stem sealing under pressure, the following procedure must be followed. NB: No USE OF OPEN FIRE!

1. Lower the pipeline pressure as much as the situation allows
2. Close the valve using the specified torque. The replacement can also be done with the valve in open position, but then it is required to completely isolate the valve from pressure
3. Unscrew the stem seal nut in counterclock direction and lift it off over the stem
4. Replace the stem seal nut unit including O-rings with a new one ordered from AVK International
5. Apply locking liquid medium strength to the stem nut threads
6. Apply a silicone based grease to the o-rings
7. Mount the new stem seal nut by sliding it carefully over the stem, and tighten it firmly clock wise with a torque of approx. 80 Nm
8. Open the valve and observe for leakages
9. Re-apply normal pipeline pressure while observing for leak ages

Up to DN 400:



From DN 450:



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17. CE-DECLARATION

CE-DECLARATION OF CONFORMITY PURSUANT TO THE EUROPEAN PRESSURE EQUIPMENT DIRECTIVE (PED) 2014/68/EU

<i>The manufacturer:</i>	AVK International A/S Smedeskovvej 40 DK-8464 Galten Denmark Phone no.: +45 87542100	
<i>Hereby declares that its:</i>	Resilient seated gate valves: <ul style="list-style-type: none">• Series 02, Series 06 and Series 15, D040 to DN600• Series 36 and Series 38, DN40 to DN400• Series 46, DN50 to DN600 Pressure rating (PN) and maximum operating pressure (MOP) according to actual labelling and corresponding datasheet.	
<i>Have achieved approval through requirements of the following directive:</i>	CE-0085BO0317 from DVGW CERT GmbH Josef-Wirmer-Strasse 1-3 D-53123 Bonn Phone no.: +49 (228) 91 88 807 Notified body no.: 0085	
<i>And conform to the essential requirements of the following directive:</i>	Pressure Equipment Directive (PED), 2014/68/EU, modules B (Production Type) and C2.	
<i>And that they are in accordance with:</i>	Harmonised standards <ul style="list-style-type: none">✓ EN 19✓ EN 1171✓ EN 1563✓ EN1515-4✓ EN 12266-1✓ EN 12516-2 (S46)✓ EN 12516-3✓ EN 12516-4✓ EN 16668✓ EN 10213 (only S46)✓ EN 10216-2 (only S46)✓ EN 13480-2 (only S46)✓ EN 13480-4 (only S46)✓ EN 13480-5 (only S46)	Supporting standards <ul style="list-style-type: none">✓ EN 13774✓ EN 682✓ EN 558-1 (only S02, S06, S15)✓ EN 1092-2 (only S02, S06, S15)✓ EN 12627 (only S46)✓ DVGW-VP 600 / DVGW-G 5600 (only S36, S38)
	Other features and characteristics according to the corresponding datasheet.	

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CE-DECLARATION OF CONFORMITY PURSUANT TO THE EUROPEAN PRESSURE EQUIPMENT DIRECTIVE (PED) 2014/68/EU

The manufacturer:

AVK International A/S
Smedeskovvej 40
DK-8464 Galten
Denmark
Phone no.: +45 87542100

Hereby declares that its:

Resilient seated gate valves (service connection valves):

- Series 03, DN25 to DN50
- Series 36, DN25 to DN50

Pressure rating (PN) and maximum operating pressure (MOP) according to actual labelling and corresponding datasheet.

Have achieved type test approval through certificate no.:

NG-4313BQ0203 from
DVGW CERT GmbH
Josef-Wirmer-Strasse 1-3
D-53123 Bonn
Phone no.: +49 (228) 91 88 807
Notified body no.: 0085

And conform to the essential requirements of the following directive:

Pressure Equipment Directive (PED), 2014/68/EU, modules A (Internal Production Control).
Series 03 DN25 and Series 36 DN25 are manufactured according to sound engineering practice (SEP) according to PED article 4.3.

And that they are in accordance with:

Harmonised standards

- ✓ EN 19
- ✓ EN 1171 (only S36)
- ✓ EN 1563
- ✓ EN 1515-4
- ✓ EN 12266-1
- ✓ EN 12516-3
- ✓ EN 12516-4
- ✓ EN 16668

Supporting standards

- ✓ EN 682
- ✓ EN 1555-2 (only S36)
- ✓ EN 10226-1 (only S03)
- ✓ EN 13774
- ✓ EN 16722 (only S03)
- ✓ DVGW-VP 600 / DVGW-G 5600 (only S36)

Other features and characteristics according to the corresponding datasheet.