

AVK UK CONNECT BACK TO BASICS - CHAPTER 1 GATE VALVES

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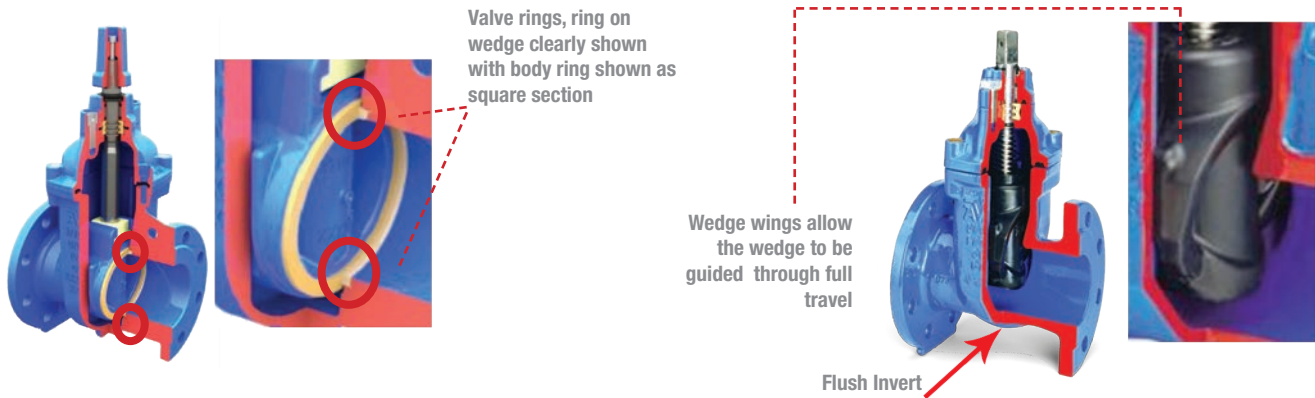
DUTY; Gate valves to be used ONLY for isolation purposes, fully open to fully closed operation. They are not designed for modulating and flow control applications. They are suitable for use on clean water (WRAS approved), dirty water as well as sewage applications although any applications where solid content is above 10% , we would recommend the use of a Knife gate valve. (Refer AVK S702 range)

WHOLE LIFE CAPABILITY; For endurance testing and as an example manually operated valves are type tested for 250 cycles and electrically operated valves for 2500 cycles, this applies to DN50-DN500 valves only. Gate valves are generally used infrequently and can remain in either the fully closed or fully open position for considerable periods. For maintenance purposes, it is recommended that the valve is operated at least once every 6 months. Please refer to operating and maintenance manuals.

DESIGNS; The majority of gate valves used for the water industry have a non rising , inside screw design. This means that the valve stem is kept within the valve body but is free to rotate with the wedge rising and lowering inside the valve. This is commonly referred to as a multi turn design.

NAMES; Most common term used for this product is Gate valve, but can also be called; Line valve, Stop valve, Wedge gate valve and Sluice valve although not to be mistaken with Sluice gate which commonly refers to a penstock device.

TYPES; AVK UK most commonly supply flanged gate valves in 2 categories; Metal (MF S37 and S54) or Resilient (RS S21 and S55) seated gates valves. These terms refers to the seating/seal material. AVK UK also can supply PE tailed and valves with mechanical ends.



Metal faced gate valve, consisting of four faces, non ferrous metal rings (normally Al Bronze) within valve; two fitted to valve body and two fitted to valve wedge. The valve effectively seals on two faces only and uses pipeline pressure as well as the interference of the wedge and two faces to effect the valve sealing performance. (Refer to comments regarding leakage performance and low pressure usage)

Resilient seated gate valve, consisting of a typically ductile iron wedge encapsulated/bonded with rubber (typically EPDM). The seal is effected by the rubber wedge interference/compression with the valve body. The valve wedge nut is also fully encapsulated. Note the flush invert of the valve design as well as the 'wings' on the wedge. (Refer comments regarding orientation)

SIZE RANGE; AVK UK Gate valve offer as follows;
Resilient seated valves– DN50 to DN800
Metal seated valves– DN50 to DN2400

AIR BLEED PLUG; The S54 range DN350 and above are fitted as standard with an air bleed plug to the bonnet of the valve. This is to facilitate air removal and prevent air entrapment during valve testing.

WORKING PRESSURES AND TESTING; AVK UK Gate valve offering as follows;
16 bar and 25 bar rating as standard. (PN40 rated valves available as Butterfly and Knife gate valves)
Both seats are tested with every valve to 1.1 x working pressure. The Body is tested to 1.5 x working pressure;
Test pressures and durations are carried out as per EN12266-1.
For example a S21 resilient seated valve PN16 rated valve will be tested as follows
Seat tested to 1.1 x 16 bar = 17.6 bar
Body tested to 1.5 x 16 bar = 24 bar

VELOCITIES; Typical velocities in water pipelines can be found in EN1074-1 which states that valves should be designed for certain maximum flow velocities (i.e. PN16 = 4m/s). A metal-faced valve is recommended when used for scour duties. A valve used on this duty is sometimes regarded as sacrificial. The recommended average flow velocity for scour duty is 10m/sec: Valves used for this duty must have screwed and pinned seats. AVK UK can offer selected larger gate valves as parallel faced design which can be used for higher velocities. Please contact AVK UK for high velocity applications.

VALVE STEMS; AVK UK gate valves fully comply with EN1074 Pt 1 and Pt 2 as well as BS5163 2004. The BS5163 2004 element ensures, amongst other details that the valve stem is suitable for operation by a tee key and has had bending moment tests to establish a core strength. In addition the valve stem has a 12mm lead which ensures the number of turns to operate is uniform across the industry and NOT manufacturer specific.



If in doubt ask - 01604 601188

For more information on this product range contact:
Stuart Montgomery - AVK Market Sector Manager.
Mobile: +44 (0) 07876 798 775
Email :stmo@avkuk.co.uk

All documentation for gate valves are available on the AVK UK website : www.avkuk.co.uk

Issue 1 Nov 2013

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TEMPERATURE; Gate valves are suitable for use with water and neutral liquids within a temperature range of -15 to +70°C. For any temperatures below freezing, valve should be suitably insulated.

OPERATION; Various operators available on request. Please note S54 DN700 and above must be operated using a direct mounted gearbox and/or actuator as these valves are not designed for thrust applications. Valves at this size will not be supplied bareshaft. Please refer to valve datasheets/ differentiators/ guidance notes which are available on the AVK UK website.

DIRECTION OF OPERATION; Valves can be offered as close clockwise or open clockwise. Red and white designators as shown opposite are for valves up to and including DN600. (white insert close clockwise/ red insert open clockwise)
This should never be assumed as this directly depends on water authority specifications.



BYPASS; Bypass valves are usually available on valve sizes DN350 and above for both MF and RS valves, refer to valve data sheet. The actual diameter of the bypass valve may vary and is dependant on the main valve size but typically DN80. Orientation of the bypass valve can change to suit orientation of main valve on MF valves. Bypass valves are generally offered for 3 basic reasons;

- 1) To allow the pipeline differential pressure to be balanced, lowering the torque requirement of the valve and permit one man operation.
- 2) With the main valve closed and the bypass open , this allows for the potential continual throughput of medium, avoiding possible stagnation.
- 3) Delayed filling of pipelines.

VALVE LEAKAGE AND LOW PRESSURE OPERATION;

EN1074/EN12266-1 states the following regarding seat tightness, AVK UK fully comply, if not exceed these standards.

At high differential pressure

All RS Gates valves are tested to leakage rate A with all MF Gate valve seated to leakage rate B.

The test is to be done at 1.1 x the maximum rated pressure of the valve.

The production test duration is relative to the valve size; UTI DN50– 20 seconds, DN65–DN150– 60 seconds, DN200+ 120 seconds

Leakage rate A is zero visual detectable leakage.

Leakage rate B is 0.01 X DN. So for example on a DN700 it is 7 cubic mm per second and on a DN600 it is 6 cubic mm per second.

At low differential pressure

According to EN1074 the valve must also meet the above, at a low differential of 0.5 bar (5.1m) however please note this test is only carried out as a type test and not a production test.

ORIENTATION;

Metal seated; Standard orientation for metal seated gate valves is for vertical valve stem in horizontal pipeline. The valve can be made to suit other orientations but would require shoes and channels and review of operating gearbox type and specification. The valve can be fitted 10 degrees off vertical without need for shoes and channels. The shoes and channel apply to S54 range DN350 above only, since S37 DN300 and below have a low mass wedge design and therefore shoes and channels are not generally required.

Resilient seated; Valve can be positioned in any orientation due to guided wedge design

METAL SEATED GATE VALVE SEAT RETENTION DESIGNS;

- S37 DN50- 300 Interference and press fit as standard
- S54 DN 350-600 Interference and press fit as standard
- S54 DN 700-1200 Threaded fit, screwed in as standard (pinned available as option)
- S54 DN 1400-2400 Interference fit and pinned as standard

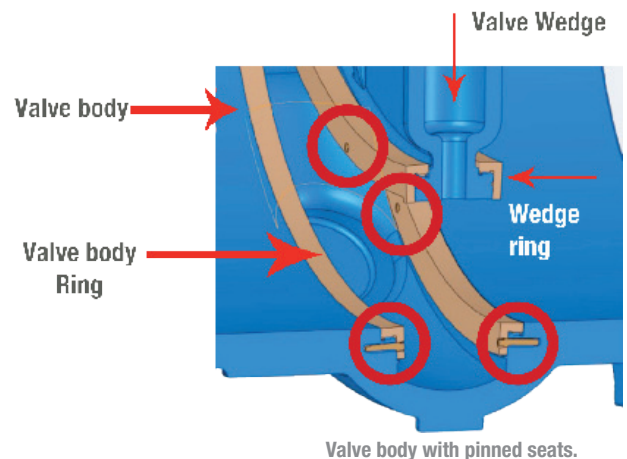
Reservoir specification option available on DN350– 600 where valve seats and faces are riveted.

Example of valve with pinned seats, typical pin locations shown as circled above.

RELEVANT STANDARDS;

BS EN 1074 PART 1 and 2, BS5163 2004, EN 1092-2, EN12266-1, EN 558 table 2, basic series 3.

REPLACABLE SEALS; AVK UK S21, S37, S54 up to and including DN600, and S55 range have O ring stem seal which is replaceable under pressure (please refer to operating and maintenance manuals). DN700 and above S54 range have a gland and stuffing box stem seal. The O ring stem seals and the gland and stuffing box is the method used to effect a sealing interface between the rotating valve shaft and the valve body. This has a two function sealing performance; preventing grit and ground water into the valve as well as media from escaping from the valve.



Gland and stuffing box stem seal



O ring stem seals

