

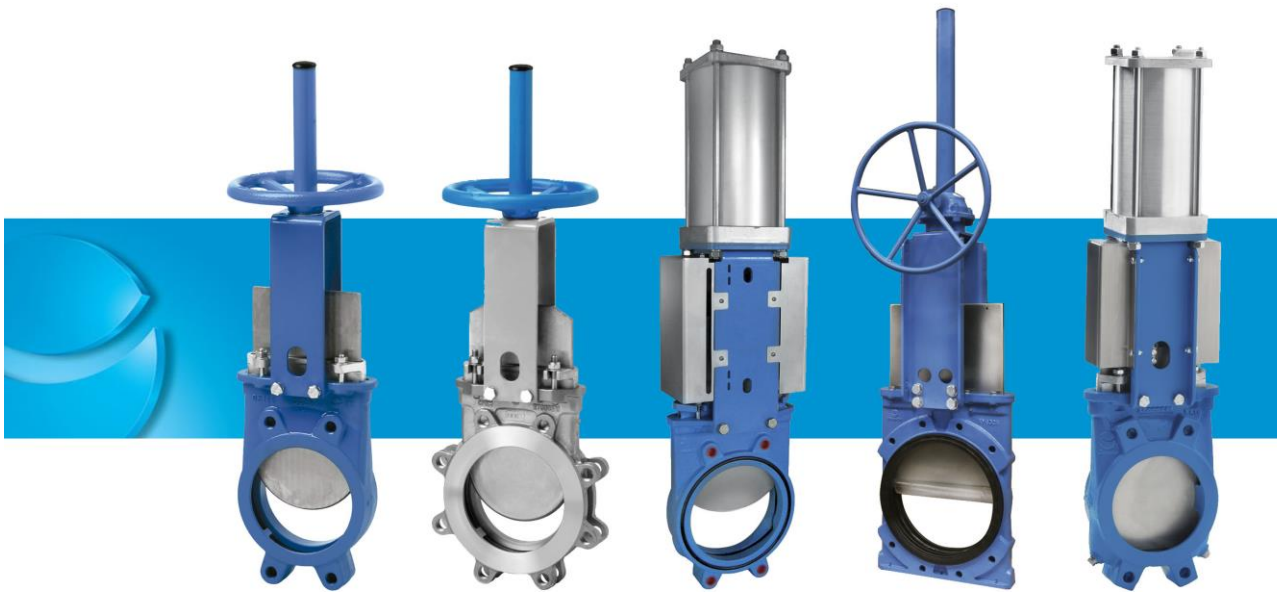
MODEL

Knife Gate Valves



DIRECTIVES & CERTIFICATES COMPLIANCE - KNIFE GATE VALVES

INSTALLATION, OPERATION & MAINTENANCE MANUAL



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0. INTRODUCTION


EUROPEAN DIRECTIVES

- 2006/42/EC (MACHINERY)
- 2014/68/EU (PED)
- 2014/34/EU (ATEX) 


1. INSTALLATION

- 2014/34/EU (ATEX) 

2. ACTUATORS

- 2006/42/EC (MACHINERY)
- 2014/34/EU (ATEX) 

3. MAINTENANCE

- 2014/34/EU (ATEX) 

4. RESIDUAL RISKS AND ADDITIONAL CONSIDERATIONS

5. DOCUMENTATION

0. INTRODUCTION

The ORBINOX Knife Gate Valves comply with the following European directives:

- 2006/42/EC: Machinery Directive

When applicable it can also comply with the following additional directives:

- 2014/68/EU: Pressure Equipment Directive
- 2014/34/EU: Potentially Explosive Atmospheres (ATEX)

It is the user's liability to verify the maximum working conditions (PS, TS), medium (gas or liquid), dangerousness group (1 or 2) and if the fluid is unstable to properly classify the valve according to the 2014/68/EU PED directive.

ORBINOX offers, supplies and certifies valves according to the information received from the customer. The customer is liable to make sure this information is accurate and according to specific working conditions requirements where the valve will be installed.



Special requirements for ATEX valves:

The ORBINOX valves may also comply with the directive regarding equipment and protective systems for their use in explosive atmospheres. In these cases, the logotype (see below) shall appear on the identification label of the valve. This label shows the exact classification of the zone where the valve can be used. The user will be liable for its use in any other zone.

This directive only applies in the following atmospheric conditions:

- $0,8 \text{ bar} \leq P \leq 1,1 \text{ bar}$
- $- 20^{\circ}\text{C} \leq T \leq 60^{\circ}\text{C}$

Permitted flows: liquids, gases and dusts; hybrid mixtures are not permitted.

Note: A hybrid mixture is a combined mixture of a flammable gas or vapour with a combustible dust or combustible flyings

No substances shall be used that are susceptible to ignition or explosion caused by sparks or friction (e.g., according to class 4.1 ADR); neither shall conductive substances or hybrid mixtures be transported. Principally, the equipment is not suitable for processing or dosing self-decomposing substances.

Any increase in temperature due to frictional warmth is negligible, since the relative speed of the moving parts is extremely low.

The risk analysis associated to this directive does not take into account the fluid that goes through the valve, even when such fluid produces an explosive atmosphere. The user must take into account the risks that the fluid generates, such as:

- Heating of the valve surface
- Generation of electrostatic charges caused by displacement of the fluid
- Shock waves caused by the installation (water hammer), internal crashes generated by the pellets or the risks due to foreign bodies susceptible of being present in the installation

When handling liquids, the following specifications of IEC/TS 60079-32-1:2013 chapter 7.3.2.4 must be observed by the user for the above-mentioned versions with powder coatings of all layer thicknesses, the sealing or packing materials PTFE/silicone/VMQ and PTFE + syn. fibers and the so-called sliders made of nylon, polyethylene or PTFE:

- A transfer of liquids from upstream system areas with charge-generating processes may take place at the earliest after compliance with 30 s or a 3- times relaxation time for charge relaxation. (Information on the relaxation time can be found in Table 7 IEC/TS 60079-32-1:2013)
- The flow velocity must not exceed the following values for
 - Single-phase liquids of high conductivity must not exceed 7 m/s (see 7.3.2.3.5)
 - Single-phase liquids of low and medium conductivity must not exceed 2 m/s (see 7.3.2.4)
 - Single-phase liquids of low conductivity and minimum ignition energy less than 0.20 mJ or two-phase liquids (proportion of more than 0.5 % by volume of another phase) of low or medium conductivity do not exceed 1 m/s of the continuous phase but also do not fall significantly below 1 m/s

The occurrence of insulated capacities on the applied powder coatings with layer thicknesses of $80 \mu\text{m} < d \leq 200 \mu\text{m}$, $200 \mu\text{m} < d \leq 320 \mu\text{m}$ and $320 \mu\text{m} < d \leq 450 \mu\text{m}$ for types EX, XC, TL, EB (HERA) and CX or the sealing materials EPDM, NBR, Viton/FKM, PTFE or silicone/VMQ must be assessed by the user for the application in question. Spark discharges from insulated capacitances must be safely excluded by the user.

The occurrence of strong charge-generating processes in the respective versions with the powder coatings with the layer thicknesses $80 \mu\text{m} < d \leq 200 \mu\text{m}$, $200 \mu\text{m} < d \leq 320 \mu\text{m}$ and $320 \mu\text{m} < d \leq 450 \mu\text{m}$, the sealing materials PTFE or silicone/VMQ or the so-called sliders made of the materials nylon, polyethylene or PTFE must be evaluated by the user for the present application. Highly charge-generating processes must be reliably excluded by the user.

The maximum surface temperature of the valve depends on the temperature of the substances passed through (TFluid).

The dusts handled must have the following safety characteristics:

- Minimum ignition energy as function of temperature and pressure $> 1 \text{ mJ}$ determined according to EN ISO/IEC 80079-20-2
- Minimum ignition temperature of dust cloud $\geq 1.5 \times \text{TFluid}$ determined according to EN ISO/IEC 80079-20-2
- Minimum ignition temperature of dust layer (5 mm dust layer) $\geq \text{TFluid} + 75 \text{ K } ^\circ\text{C}$ determined according to EN ISO/IEC 80079-20-2
- The maximum permissible temperature range of the seals and packings used for the respective valve depends on the temperature of the substances being transported.

1. INSTALLATION



- Make sure the valve is ATEX marked according to the requested zone and it includes all anti-static devices.
- During installation and maintenance operations, use hand tools (non -electric) which do not generate any potential ignition source such as sparks
- Personnel shall have a Working Authorization for explosive classified areas
- Check continuity between the body of the valve and the pipe (test in accordance with EN 12266-2 Standard, annex B, points B.2.2.2. and B.2.3.1).
- This check must be done every time the valve has been removed from the line, serviced, and put back to the line.
- The knife gate valve, included hand operated valves, must be always earthed, i.e., the electrical resistance to earth must be $< 10^6 \Omega$. The integration of the slide knife in the electrically conducting circuit should be checked regularly as required by the operation instruction.
- All valve accessories such as electric instrumentation, deflection cones, etc must be earthed, i.e., the electrical resistance to earth must be $< 10^6 \Omega$. The integration of these accessories in the electrically conducting circuit should be checked regularly as required by the operation instruction
- EN-14432 pneumatic valves: it is the user's liability to ensure that sufficient air pressure reaches the cylinder so that the valve remains closed during transport. This protects the valve against any unexpected opening during transport

2. ACTUATORS



The operation of automated valves is limited only with fitted gate covers to fulfil 2006/42/EC (machinery Directive).



- If the valves are going to be used in areas where explosive atmospheres are present, they shall only be used in conjunction with equipment that is suitable for the specific purpose and is supplied in compliance with Directive 2014/34/EU. Regarding the assembly of the valves with equipment (e.g. drive units) that has not been subject of this EU-Type Examination, a separate risk assessment with regard to additional ignition hazards shall be carried out.
- Concerning the selection and erection of the electrical apparatus (e.g., drive) the requirements of EN 60079-14 shall be observed.
- Make sure these actuators are ATEX marked according to the requested zone or EPL (Equipment Protection Level)
- The maximum permissible drive speed of $< 1 \text{ m s}^{-1}$ (up to DN 1200) or $< 0.5 \text{ m s}^{-1}$ (from DN 1200) shall be guaranteed by the user.

3. MAINTENANCE



- Make sure the valve is ATEX marked according the requested zone or EPL (Equipment Protection Level) and it includes all anti-static devices
- Those in charge of handling and maintenance of the valve must be qualified and trained regarding ATEX
- During installation and maintenance operations, use hand tools (non-electric) which do not generate any potential ignition source such as sparks
- Personnel shall have a Working Authorization for explosive classified areas

- Periodicity of check and evaluation of valve electrical conductivity must be determined by end user according to valve working conditions. In any case, once the valve is put into operation, the packing area must be revised after the valve has been stroked 100 times or after 3 months of operation, whatever happens first. After this preliminary check, new checking periods must be determined by end user based on the results of this first check
- The valves must be cleaned at regular intervals in accordance with the operating instructions so that dust layers > 5 mm do not occur. Cleaning may only be carried out with a vacuum cleaner that is approved for vacuuming combustible dusts
- Clean the valve periodically to prevent dust accumulation. Do not sweep or dump the dust. Always use a vacuum cleaner system
- Dead end service is not allowed
- Do not apply any new coating to the valve. Should it require new coating, please contact our closest representative
- Allowed seals: EPDM, FKM-FPM, NBR, PTFE (*), VMQ (*) and METAL (no seal).
 (*) PTFE and VMQ seals have some size and knife gate valve model restrictions.
 - PTFE or silicone sealing materials, a minimum layer thickness of at least 8 mm (types BC, EX, EXT, ET, XC, EK and HK of all sizes) must be ensured. This must be ensured by regular checks of the layer thicknesses by the user.
 - BX knife gate valves; PTFE and VMQ seals are not allowed for 1G and 1 D service.
- Allowed packing: ST, stainless steel, copper and graphite
- To keep the ATEX approval, always use original spares from ORBINOX. Original order number is mandatory to receive the correct spares.
- Washer DIN 6798A (This washer guarantees continuity among carbon steel parts, coated in epoxy, yoke and body and stainless-steel guards for coating thicknesses up to 200 microns)
- After any maintenance it is mandatory to check that the valve is correctly earthed, included hand operated valves. Continuity between the valve body, the pipe, the gate, supports and guards must be tested (in accordance with EN 12266-2 Test F21 Annex B, B.2.2.2 and B.2.3.1). Packing shall be checked and pressurized for Zero leakage
- The ignition temperature falls with increasing pressure. As there is increased pressure inside the valve, the user of the valve must ensure that only media whose ignition temperature at the maximum internal pressure does not fall below the values of 85°C (T6), 100°C (T5), 135°C (T4), 200°C (T3), 300°C (T2) or 450°C (T1) or that the respective temperature class is complied with are transported.

MAXIMUM FLUID TEMPERATURES

Atmosphere	
Gas/air, steam/air, and mist/air	Dust/air
80% of minimum fluid ignition temperature in °C	2/3 of minimum dust cloud ignition temperature minus 10°K, or minimum dust layer ignition temperature minus 85 °K (for layers up 5mm)

Note: these maximum fluid temperatures apply to all categories. The differences between categories are the consideration of foreseeable malfunction cases and rare malfunctions cases

MAXIMUM SEAL AND PACKING TEMPERATURES

Max Temperature (°C)	SEAL				
	EPDM	FKM-FPM	NBR	PTFE	VMQ
	120	200	120	250	250

Max Temperature (°C)	PACKING	
	ST	GRAPHITE
	250	600

Note: Most of the times seals maximum temperature capacity is the key limitation factor when evaluating valve maximum working temperatures. In ATEX zones these temperatures must be compared to those above related to limitation of fluids temperatures. Always consider the most restrictive as maximum valve working temperature.



Replacement of the valve:

1. The same valve with exactly the same certificates must be ordered to ORBINOX. When placing this order, it is customer liability to clearly indicate that the new ordered valve is a replacement of a certified valve
2. It is user's liability to ensure that all requirements in the "maintenance" chapter are fulfilled
3. Loosen the bolts that connect the actuator to the slide
4. Loosen the bolts that connect the yoke to the body
5. Reassemble the valve



Replacement of the actuator:

1. The same actuator with exactly the same certificates must be ordered to ORBINOX. When placing this order, it is customer liability to clearly indicate that the new actuator is a replacement of a certified valve
2. It is user's liability to ensure that all requirements in the "maintenance" chapter are fulfilled
3. Loosen the bolts that connect the actuator to the yoke
4. Reassemble the valve

4. RESIDUAL RISKS AND ADDITIONAL CONSIDERATIONS

For a proper and safe use of the valve during its life please be aware of the following considerations:

- The valve has been designed for the fluid indicated in the quotation and order. If the fluid is going to be changed please contact ORBINOX to check the adequacy of the valve.
- The valve is not designed to withstand cyclic actions, seismic actions, fire or pipe actions.
- The valve is supplied without external isolation. When hot fluids are being transported the valve surface can be heated to high temperature values. Valve should be isolated, or the risk must be indicated in the installation.
- If the valve is supplied bare-shaft please contact ORBINOX to be sure that the selected actuator is valid for the application and the integrity of the valve.
- Check the compatibility of the valve material with the application, the environmental conditions and the pipe materials to avoid corrosion (general corrosion, galvanic corrosion) and the erosion of the valve. A corrosion allowance of 1 mm in thickness has been taken into account in the design of the valve. Check at least yearly the state of the valve.

5. DOCUMENTATION

General Declaration of Conformity to the following Directives, if applicable, are available in the download section on ORBINOX web page www.orbinox.com:

- 2006/42/CE: Machinery Directive
- 2014/68/EU: Pressure Equipment Directive for Category I

With specific order number:

- 2014/68/EU: Pressure Equipment Directive for Category II and III
- 2014/34/EU: Potentially Explosive Atmosphere (ATEX)

Contact ORBINOX if these documents are required in other language than those available on the web page.