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Operating instructions

In accordance to Annex I point 3.4 of European Directive 2014/68/EU (PED) and EN 764-6

The valves as pressure vessel can cause several damages and injuries if not correctly installed used and maintained. For this reason please read attentively and follow always these instructions.

GENERAL

A) Operating limits and design basis including anticipated operating and assumed design conditions

1) The valves can be used only in the pressure and temperature and fluids limits specified in the CE tag plate considering also the maximum allowable pressures stated in EN 12516 for temperatures over 20°C.
2) The valves for a correct functioning must be stress-free connected to the pipeline, also considering the stresses caused only by the weigh of the valve.
3) The valves are designed to be installed in horizontal pipeline. Only if provided by apposite devices they can be installed also in vertical or sloping pipelines.
4) If not differently specified, standard valves are not designed to be used for free discharge service.
5) The maximum allowable fluid speed for liquids with density equal or lower than the water is specified in EN 1074-1 table 2. For pressure over 25 bar the maximum fluid speed is 5 m/s.
6) The maximum allowable fluid speed for gases is 25 m/s.
7) The fluid must not contain solids in suspension that can cause damages to the valve components.

B) Design standard

The valves have been fully designed according to standards EN 12516 and EN 1984 (gate valves) or EN 16767 (swing check valves) or EN 593 (butterfly valves).

C) Joint coefficient

The joint coefficient used in the design of fabricated parts or component means welding joints is 0,70

D) Estimated lifetime

1) In case of service temperature over 20°C the estimated life time of the main pressure bearing parts is 100.000 hours.
2) After a stocking period over 18 months it's necessary to replace gaskets and packing.
3) Packing and gaskets in standard service conditions have a estimated life of 2 years. Over this limit it's recommended to replace them as precautionary measure.
4) Bolts, stem, pin, shaft, sleeve, and wedge, disc, valves have a estimated life of 5 years, unless damages due to external causes.
5) The estimated life of standard seats and packing is 500 cycles. Over this limits the packing must be always replaced and the seats renewed by a lapping finish or replaced (butterfly valve disc seats only).
6) All these estimated life times are valid for standard working conditions (water at 20°C) only; in high temperature service or with corrosive or abrasive fluids the life of these parts generally will result reduced. The amount if this life time reduction is unpredictable.

E) Features of the design relevant to the life of the component

1) The gate valves are not suitable for regulating service: then they can be in fully closed or in fully open position only. A use in partial open position can damages the valve seats and the wedge and reduce the life of the valve.
2) The force applied to the handwheels must not exceed the maximum limit specified in EN 12570 for the corresponding handwheel diameter: an higher force can produce damages to the valve reducing his life.
3) To maintain as much as possible the estimated life of the valve it's mandatory a good programmed maintenance plan as described below.

F) Residual hazards not prevented by design or protective measures, that might arise from foreseeable misuse

1) The use of the valve outside of the specified pressure / temperature limits can cause leaks, blow outs, explosions, fire, burns, intoxication and pollution.
2) If the valve is subjected to additional stresses caused by external forces other than the internal pressure they are possible ruptures of the main pressure bearing part with the possibility of leaks, blow outs, explosions, fire, burns, intoxication and pollution.
3) In case of explosive atmospheres only valves with *Ex* mark can be used in the limits of ATEX classification for the specific working conditions. The use non suitable valves in explosive (or potentially explosive) atmospheres can be a source of ignition.
4) The counter-thigh (back seat) has the scope to stop immediately a leakage through the stuffing box in emergency conditions: don't replace the packing with the valve under pressure in counter-tight position because it can cause leaks, blow outs, explosions, fire, burns, intoxication and pollution.
5) Never remove the yoke or the yoke sleeve or the actuator with the gate valve under pressure: this causes the quick rising of the stem with severe risk of injuries.
6) Before to vent a valve by means of the drain plug it's necessary to depressurise the pipeline: releasing the drain plug with the valve under pressure can be dangerous and can cause blow outs, explosions, fire, burns, intoxication and pollution.
7) Never release the bolted connections with the valve under pressure. Before to disassemble a valve check that it should be completely depressurised and vented to avid the risk of leaks, blow outs, explosions, fire, burns, intoxication and pollution.

G) Other technical documents

1) If the valves are provided with electric, pneumatic or hydraulic actuators please refer to the manuals of these devices for a correct and safe installation. To set up the limit switches follow strictly the instruction contained in the RT's handbook (see the following paragraph).
2) If you need more detailed instructions or illustrations for maintenance and installation works please refer to our installation handbook available on this internet site: www.rtvalves.com. In case of doubt please contact us before to proceed.

H) Information about replaceable parts

1) Gasket and packing must be replaced only with suitable spares made with same material and same design of the original ones.
2) We recommend to replace damaged or worn parts only with original spare parts supplied by RT. The use of not original spare parts can be a source of risk or can reduce the life of the valve.

TRASPORTATION AND INSTALLATION

A) Storage and transport aspects

1) During the stocking period don't expose the valves to rain, sun or wind.
2) Don't remove the plastic caps until the installation; don't operate the valve before the installation.
3) Don't remove the original packing until the moment of the installation and move the valve with means compatible with the packaging type.

B) Possible variation in transport or installation of the valves

1) Move and lift the valves only by appropriate means: don't lift the valves by means of the handwheel or the lever (if present).
2) The gate valves must be generally installed only with the stem vertical and with the bonnet (or the cover) upright.
3) The butterfly valves must be installed preferably with the stem horizontal to the ground to reduce sedimentation in the bearings.

4) The gate valves can be installed in vertical or sloping pipelines or in all cases with the stem parallel o sloping to the ground only if provided with split wedge.
4) The swing check valves can be installed in vertical or sloping pipelines with the flow from down to up; in case of inverse flow direction it's possible to install only swing check valve with counterweight.
5) The swing check valves can be installed in horizontal or sloping pipelines only with the cover on the top.
6) The butterfly valves must be installed only with the disc completely closed to avoid damages to the disc seat.
7) Installing swing check valves respect the arrow direction for the fluid direction marked on the body
8) Installing butterfly valves respect the arrow direction for the preferential pressure drop marked on the CE tag plate (that can be different than the normal flow direction).

C) Necessary distance to other objects
1) During transport and storage keep away the valves form heat sources.
2) All valves (also the stainless steel ones) must be keep away form rusted parts to avoid rust contamination that can cause the starting of the rust formation process on the valves surfaces.

PUTTING IN SERVICE

A) Removal of existing transportation protection
1) Before to install the valves remove the plastic caps that protect the valve ends and the protections to other valve parts such stem and actuators.
2) Before the installation clean the internal parts of the valve only with compressed air: don't use solvents, kerosene, water or other fluids.

B) Details on operating fluids
1) Please check always the CE tag plate for possible limitation in the use regarding the service fluid.
2) The valves in carbon steels must not be used for corroding fluids service.
3) If the valve is in stainless steel please check the compatibility of the service fluids with the valve material to avoid high corrosion rates.

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C) Additional safety requirements associated with commissioning or start up
1) Before to install a valve check that the distance between the pipeline connections should be correct (as reference consider the standard VDMA 24277)
2) Before to install a valve check visually the correct functioning of the obturator opening and closing the valve.
3) During the welding of butt weld ends please care that no welding residual enter in the pipeline; during this operation the negative pole of the welding machine must be connected to the pipeline never to the valve.
4) Before to pressurise the valve check the tightness of all bolted connections tightening them crosswise. After pressurization check the tightness of the packing.
5) The valves for oxygen service must be kept clean and once installed must be always flushed with suitable cleaning and degreasing fluid.

D) Specific protective measures
1) In case of high or low temperatures service fluids the valves should be provided with suitable insulations.
2) If the pipeline can be subjected to temperature variations it's necessary to verify that the pipeline design shall be appropriate to compensate such expansions or install suitable expansion joints to avoid to submit the valve to the stresses caused by thermal variations.
3) Depending on the installation position it can be necessary to preview apposite supports to sustain the weight of the valve to avoid additional stresses to the connections and to valve body caused by the valve weight.
4) In case of corrosive or toxic fluids we recommend to install apposite blow–out protections on all flanged connections to avoid damages and injuries in case of accidental blow out.
5) In case of high or low temperature service or in case of fluids with high expansion coefficient (e.g. steam) it's necessary to avoid absolutely to submit the valve to overpressures caused by the expansion of the fluids: in these case sometimes (depending on service conditions) it's necessary to install a pressure relief device; for more information please contact us.
6) During maintenance works and the during the operation of valves for high or low temperature service it's mandatory to wear protective gloves to avoid burns.
7) During the maintenance works and the operation of valves for toxic or corrosive service fluids it's mandatory to wear the appropriate protective devices (e.g. gloves, masks, clothes) to avoid accidental contacts with the fluids.
8) In case of explosive atmospheres use only wrenches and other tools suitable for these conditions (*Ex – proof*) to avoid sparks that can cause ignition.

USE / OPERATION

A) Description of correct operating parameters
1) The maximum allowable pressure at 20°C as the maximum and minimum allowable temperatures are indicated on the CE tag plate.
2) The maximum allowable pressures at temperatures over 20°C are indicated on the EN 12516 for the corresponding material group and considering as pressure class the maximum allowable pressure at 20°C indicated on the CE tag plate.
3) Other limitations concerning temperatures, pressures and service fluids are specified in the CE tag plate
4) In all cases the service fluid must be compatible with the body material in order to avoid excessive corrosion or erosion.
5) The thrust applied to the valve handwheel (or the torque applied to the stem) must not exceed the maximum value specified in the EN 12570: higher thrust (or torque) can damage irremediably the valve.
6) During the closing operation it's not absolutely allowed to use wrenches or other force-increasing devices to operate the valve.
7) If the valves are provided with electric, pneumatic or hydraulic actuator please refer to the manuals of these devices for a correct and safe installation.

B) Requirement on training or qualification of operators
1) Only trained personnel with specific skills in the field of valves and pressure vessels can perform installation and maintenance works.
2) The welding operations necessary to install the valves must be performed only by qualified personnel according to EN regulations.

C) Risks in case of inappropriate use
1) The use of valves outside of the specified pressure - temperature limits or with not appropriate fluids can cause explosion, burns, fire, injuries and pollution.
2) The use of standard valves for free discharge service can cause several damages and the impossibility to operate them.
3) The use of inside screw gate valves with degreasing fluids (e.g. solvents, steam, fuel, kerosene etc.) can cause seizure of internal parts blocking the functionality of the valve.
4) The valves can't be absolutely operated if the service fluid is solidified: such operation can cause several damages and leaks.
5) Greasing the valves for oxygen service or using not well degreased or not well flushed and cleaned valves for oxygen service can cause fire or explosions.
6) The use of not suitable lubricating greases can cause a failure or a contamination of the service fluid.
7) The use of non-Ex marked valves or actuators in explosive atmosphere can cause fire or explosions.

MAINTENANCE AND INSPECTION

1) After the installation and every month grease the stem and the yoke sleeve using MoS2 grease. Don't grease absolutely the valves for oxygen service. In case of valves used for food industry or drinking water use only greases suitable for this application with ministerial approval.
2) Before to pressurise the valve check the tightness of all bolted connections; this check have to be repeated also immediately after the first pressurization because it's possible a releasing of the bolts (cause the elasticity of the steel) with a consequent small leakage: these leakages must be stopped immediately tightening the bolts.
3) For a correct and safe functioning it's necessary to check periodically the conditions of the valves and to submit them to a periodical maintenance program that preview al least:
   a. bolted connection tightness check; a released bolt can cause leakages and for this reason can represent a risk;
   b. erosion and corrosion control of the valve body wall thickness: if the body wall show a reduction of the thickness under the vales stated in tab. 10 of EN 12516-1 (considering also the statements of Paragraph 8 in the same standard) the valve must be replaced immediately to avoid the risk of rupture;
   c. gasket and packing substitution: a worn gasket (or packing) can cause leakages with consequent risk of damages or injuries.
4) After a gasket (or packing) blow out it's always necessary to replace the gasket (or the packing) with a new one. Replace gasket and packing only with the valve depressurised, vented and aerated only.
5) In case of rust on the external surfaces remove the rust sandblasting and apply a protective painting. Renew the painting in case of degradation.