SLOVAK GAS TSO

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TECHNICAL – DELIVERY CONDITIONS

The Actuators for Ball Valve for high pressure gas pipelines DN 300 - DN 1400

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1. PURPOSE

The purpose of the working document is to define basic technical-delivery conditions for suppliers of actuators for ball valves and another armatures for eustream a.s.

For actuators delivery, we prefer that actuators of the types from the manufacturers whose actuators we have already been using on our piping systems are supplied.

The list of the manufacturers of the actuators used is available at the procurement section of eustream, a.s.

If actuators from the manufacturers other than those whose actuators we have already been using are used, it is necessary to ensure the following before the actuators are delivered:

Eustream employees´ training in the actuator operation and maintenance, confirmed in writing by eustream, a.s.

- general instructions for actuator maintenance and operation (in Slovak) - they have to also contain safe securing of a actuator in the closed position, as well as a notice of who will perform service actions when necessary

2. AREA OF APPLICATION

These technical-delivery conditions apply to all suppliers of actuators to eustream a.s. and applies to actuators for ball valves and another armatures.

The technical-delivery conditions for delivery of actuators for ball valves determined for gas pipelines and transportation of natural gas follow the standards STN EN 1594 with the following deviations and complements.

3. TERMS AND ABBREVIATIONS

Abbreviation	Description of abbreviation
DN	Nominal diameter
HPO	Hydro-pneumatic actuators
EHO	Electro-hydraulic actuators
EO	Electric actuators
ESD	System for safe shutdown of the technological unit
FC	Position – close
FL	Position – blocked
FO	Position – open
BV	Ball valve
PN	Design pressure
NG	Natural gas

4. DESCRIPTION

4.1 DEFINING OF BASIC OPERATING CONDITIONS FOR ACTUATORS FOR BALL VALVES

4.1.1 Operating temperatures

- temperature of transported gas: maximum + 59° C, under special requirements higher
- temperature of ambient environment: from -29 °C to +59 °C

4.1.2 Transported medium

Transported medium is natural gas with content of mechanical minor constituents max. 100g/m^3, with max. size of particles up to 5 mm in voluminous sample of NG.

Minor constituents:

a) content of carbon disulphide ≤ 5 mg/m^3

b) content of total sulphur ≤ 100 mg/m^3

c) total mercaptan ≤ 15 mg/m^3

d) content of nitrogen dioxide ≤ 2 %

4.1.3 Pressures

Maximum operating pressure and design pressure (PN) are determined in the order.

4.1.4 Environment

The actuator will work in environment - Zone 1 according to STN EN 60079-10 (actuator to explosion environment – explosive gases).

The actuator must be fully reliable and safe also during vibrations of pipeline system the part of which it ill be. Effective value of speed of vibrations measured in frequency range 6 - 50 Hz is maximum 4 mm/s.

4.2 TECHNICAL CONSTRUCTION

The actuators manufacturer must have quality management system according to EN ISO 9001.

Prior beginning the proces of calling for tender the actuator has to be certified in the European Union

Technical construction of actuator is determined in the order.

3 types of actuator construction are used:

- hydro-pneumatic actuators (HPO);
- electro-hydraulic actuators (EHO);
- electric actuators (EO).

4.2.1 Hydro-pneumatic Actuators

4.2.1.1 Basic data

Repositioning time within range (s):

- DN 300 – min. 10s. - max. 20 s;
- DN 500 – min. 20s. - max. 60 s;
- DN 700, DN 900, DN 1000 – min. 20 s. - max. 90 s;

- DN 1200, DN 1400 – min. 30s. - max.120 s;

4.2.1.2 Design

- According to API SPEC 6D;
- Actuator fixed on the body of Ball Valve
- According to the customer's specification with remote control;
- With remote alert of the BV position, especially of the end position of the valve and line break ;
- With the mechanical alert of the BV position on the axis of the control pin;
- with the possibility to reset the ball by help of the manual pump
- According to the requirement „high pilot, low pilot (value will be specified by the buyer)
- According to the requirement "line break" (value will be specified by the buyer)
- According to the requirement the reserve pressure tank (s) – reserve for three emergency re-settings of the ball
- Without a need of maintenance (at maximum oil quality check, 1 x annually)
- Simple technical solution for setting the end positions by the position of the ball
- Separate hydraulic circuit from the pneumatic circuit – separate hydro-cylinder and air cylinder with the exclusion of the possibility to mix both media
- well-arranged connection scheme;
- Use of biologically removable oil
- Device allowing the control of the torque of BV;
- actuator designed as modular system;
- Actuator manufacture has to submit a confirmation that offered and supplied actuators meet the requirement for use control medium of natural gas with content of hydrogen min. up to 20 %.
- the usual value of the operating pressure necessary for functioning of the actuator is approx. 30 to 35 bar
- construction solution must be approved by BV manufacturer and must have certificate about actuator certification in EU.

4.2.1.3 Connection size

The connection size shall be chosen according to the ball valve type. In case of hydro-pneumatic control, the off take of gas will be from the body of BV, tubing is part of the delivery

4.2.1.4 Control voltage

DC – direct current – impulse (control impulse separately for opening and closing, after reaching the end position, the impulse to be interrupted due to the repositioning of ball valve maximum 150 s.
According to requirement: 220 V DC, or 24 V DC, constant voltage 24 V DC for the ESD system, in case of voltage loss, the ball valve to be repositioned to the defined safety position FC (fail close), FO (fail open), FL (fail lock).

4.2.1.5 Local control

In all constructions have possibility of local control by mechanical impulse.

4.2.1.6 Drive medium - natural gas

- Operating pressure max. 7,35 MPa;
- Operating temperature from 10° C to 70° C;
- The content of mechanical impurities max. 100g/m^3 with the maximum size of particles up to 5 mm in the volume sample of natural gas.

4.2.1.7 Anti-corrosion protection

Actuators will have protected surface against corrosion by protective paint with guaranteed service life at least 15 years.

Selection of the of the kind of the paint must be agreed by the buyer on the basis of the offer from the producer. Colour shade of the of the covering paint of the ball valve will be specified by the buyer.

4.2.1.8 Documentation

A part of delivery must be an accompanying documentation containing:

- Certificate on quality and completeness of the product;
- Material certificates of components used, mainly of the pressure materials;
- Certificate on suitability of the equipment to be used in the defined environment, for operation with the defined medium
- Hydraulic connection scheme
- Dimensioned sketch
- Electric scheme
- indication of: weight of the actuator, minimum and maximum torque, connection size, period of the actuator operation at the prescribed torque, the volume of oil tank, stroke of the hydraulic cylinder,
- minimum and maximum oil pressure in the system
- list of used parts
- recommended spare parts for 4 years of operation
- the manual for operation and maintenance of the actuator (in Slovak language).

4.2.1.9 Separate covenants

- presence of the technicians of the BV and actuator supplier when commissioning
- presence of the customer´s technicians when acceptance testing of the BV and actuators

4.2.2 Electro-hydraulic Actuators

4.2.2.1 Basic data

Repositioning time within range (s):

- DN 300 – min. 10s. - max. 20 s;
- DN 500 – min. 20s. - max. 60 s;
- DN 700, DN 900, DN 1000 – min. 20 s. - max. 90 s;
- DN 1200, DN 1400 – min. 30s. - max.120 s;

4.2.2.2 Design

- According to API SPEC 6D;
- Actuator fixed direct on the body of BV;
- According to the customer's specification with remote control;
- possibility to select control local/remote;
- possibility to control BV in loss of feeding – three emergency re-settings of ball and possibility to re-set ball by manual pump;
- With remote alert of the BV position, especially of the end position of the valve
- with visual mechanical alert of the BV position on the axis of the control pin;
- Without a need of maintenance (at maximum oil quality check, 1 x annually)
- Simple technical solution for setting the end positions by the position of the ball
- motor-driven voltage 3 x 400 V alternating;
- well-arranged connection scheme of hydraulic and electric system;
- moment, electrical and thermal protections of motor built-in directly in actuator;
- Use of biologically removable oil
- actuator designed as modular system;
- Actuator manufacture has to submit a confirmation that offered and supplied actuators meet the requirement for use control medium of natural gas with content of hydrogen min. up to 20 %;
- device allowing control of BV torque;
- construction solution must be approved by BV manufacturer and must have certificate about actuator certification in EU.

4.2.2.3 Connection size

Connecting sizes according to BV.

4.2.2.4 Control voltage

DC – direct current – impulse (control impulse separately for opening and closing, after reaching the end position, the impulse to be interrupted due to the repositioning of ball valve maximum 150 s.

According to requirement: 220 V DC, or 24 V DC, constant voltage 24 V DC for the ESD system, in case of voltage loss, the ball valve to be repositioned to the defined safety position FC (fail close), FO (fail open), FL (fail lock).

4.2.2.5 Local control

In all constructions have possibility of local control by mechanical impulse.

4.2.2.6 Anti-corrosion protection

The color of the paint according to the requirements of the customer.

4.2.2.7 Documentation

A part of delivery must be an accompanying documentation containing:

- Certificate on quality and completeness of the product;
- Material certificates of components used, mainly of the pressure materials;

- Certificate on suitability of the equipment to be used in the defined environment, for operation with the defined medium
- Hydraulic and electric connection scheme
- Dimensioned sketch
- Electric scheme
- indication of: weight of the actuator, minimum and maximum torque, connection size, period of the actuator operation at the prescribed torque, the volume of oil tank, stroke of the hydraulic cylinder,
- minimum and maximum oil pressure in the system
- list of used parts
- recommended spare parts for 4 years of operation
- the manual for operation and maintenance of the actuator (in Slovak language).

4.2.2.8 Separate covenants

- presence of the technicians of the BV and actuator supplier when commissioning
- presence of the customer's technicians when acceptance testing of the BV and actuators

4.2.3 Electric Actuators

4.2.3.1 Basic data

Repositioning time within range (s):

- DN 300 - max. 20 s;
- DN 500 – max. 60 s;
- DN 700, DN 900, DN 1000 – max. 90 s;
- DN 1200, DN 1400 – max.120 s.

4.2.3.2 Design

- According to API SPEC 6D;
- Actuator fixed direct on the body of BV;
- According to the customer's specification with remote control;
- selection of control mode locally/remote;
- With remote alert of the BV position, especially of the end position of the valve
- with visual mechanical alert of the BV position on the axis of the control pin;
- Simple technical solution for setting the end positions by the position of the ball
- motor-driven voltage 3 x 400V alternating;
- in case of loss of feeding, possibility to re-set the ball manually by mechanical gear;
- well-arranged connection scheme;
- moment sensors and end sensors of position;
- possibility of display of instant ball position locally, possibly to have availability of remote transmission of position (according to requirements);
- moment, electrical and thermal protections of motor built-in directly in actuator.
- construction solution must be approved by BV manufacturer and must have certificate about actuator certification in the European Union.

4.2.3.3 Connection size

Connecting sizes select according to BV.

4.2.3.4 Local control

In all constructions have possibility of local control by mechanical impulse – pusher and manually.

4.2.3.5 Anti-corrosion protection

The color of the paint according to the requirements of the customer.

4.2.3.6 Documentation

A part of delivery must be an accompanying documentation containing:

- Certificate on quality and completeness of the product;
- Material certificates of components used, mainly of the pressure materials;
- Certificate on suitability of the equipment to be used in the defined environment, for operation with the defined medium;
- Electric connection scheme
- Dimensioned sketch
- Electric scheme
- indication of: weight of the actuator, minimum and maximum torque, connection size, period of the actuator operation at the prescribed torque;
- list of used parts
- recommended spare parts for 4 years of operation
- the manual for operation and maintenance of the actuator (in Slovak language).

4.2.3.7 Separate covenants

- presence of the technicians of the BV and actuator supplier when commissioning
- presence of the customer’s technicians when acceptance testing of the BV and actuators

4.3 TAKING THE ACTUATOR BY THE CUSTOMER OR A CUSTOMER'S REPRESENTATIVE AT THE PRODUCTION PLANT

The customer reserves the right to participate in the output inspection of the actuator.

As part of the acceptance procedure, the actuator is inspected according to the order, the completeness of the documentation is checked and the final testing is performed subsequently.

4.3.1 Rules for the customer's representatives participation

The following rules apply to the customer's representatives participation:

- the manufacturer shall notify the customer of the date of the final tests no later than 14 days in advance;
- if no customer's representative participates in the final tests despite the timely notification, the manufacturer is entitled to dispatch the actuator without the customer's acceptance;
- the presence of the customer's representative during the tests shall not affect the manufacturer's responsibilities and guarantees;

- the manufacturer shall prepare the actuator for testing in the condition in which it will be dispatched;
- if the actuator fails the tests, the manufacturer is obliged to inform the customer of the technical clarification of the defects. After the clarification and repair of the defects, it can prepare the actuator for re-acceptance;
- the one actuator may be subjected to final testing 2 times as a maximum. If the actuator fails the final test for the first time and then the repeated test too, the actuator will not be taken over by the customer and the manufacturer has to replace it with another actuator.

4.3.2 Valve adjustment time test

Measuring the time of adjustment from one end position to another.

The adjustment time is defined by the customer when specifying the actuator.

4.3.3 Actuator function tests

Verification of the functions depending on the types of the actuators, however at least the following:

- manual rotation of the actuator position, reverse movement, smoothness of movement when adjusting the valve;
- check of the value setting on the LBC system, standard pressure drop 5bar/minute.

4.3.4 Dimension check

The following dimensions are checked:

- length;
- height;
- actuator connection dimensions;

4.3.5 Visual check

Check:

- actuator marking check.

4.3.6 Documentation check

The following documentation shall be included in the scope of delivery of the actuator as a minimum:

- assembly drawing of the actuator (including the main dimensions and their tolerances) agreed by the customer;
- material sheets of all pressure parts of the actuator including the relevant chemical and mechanical values in accordance with Sect. 3.1 STN EN 10204 standard;
- product quality and completeness certificate;
- a report on passing the final test procedure signed by the customer's representatives;
- a certificate of suitability for use of the equipment in a defined environment Zone 2, unless otherwise specified;
- confirmation of the actuator certification in the EU;
- the general maintenance and operation instructions for the actuator (in Slovak) - it has to also contain the actuator safe securing instructions.

The term safe securing means the sequence of activities and actions that must be performed on the actuator in order to prevent the valve from opening spontaneously or from opening due

to unauthorized handling (malfunction of the control, depressurization of the control, disconnection from the power supply, impossibility of control even manually e.g. by a hand pump, etc.)

- X-ray reports.

4.4 ACTUATOR MARKING

The actuator hasto be fitted with a plate bearing the following information as a minimum:

a) manufacturer's trademark;

b) actuator type;

c) coil control voltage;

d) actuator serial number; manufacture year

e) actuator torque;

f) weight;

4.5 PACKAGING

The actuator has to bepacked in non-returnable factory packaging so, as to prevent damage or functionality reduction during transport. The price of the packaging is included in the price of the actuator.

The welding ends have to be wrapped and blinded to prevent dirt from entering the actuator. The edges of the connection ends have to be protected with tape to prevent potential damage.

5. RELATED EXTERNAL REGULATIONS

STN EN 1594 Gas supply systems. Gas pipeline for maximum operating pressure above 16 bar. Operation requirements.

6. DISTRIBUTION LIST

Special: TA,
TT
TU,
TKO.

7. LIST OF ANNEXES

No annexes