 RWE Gas Storage. s.r.o. **TS-A-15GS004/7533**

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 190 00 Praha 9

**TECHNICAL SPECIFICATION**

**Ball Valve**

**Sectional shut-off valve DN 400 PN 160**

**(POV)**

Prague 6. 2. 2015

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|   | **Basic information** |  | **Applicant’s statement to the individual items according to article 1.1 of the Call** |
| **Item** | **Name** | **Specification** |   |
| **1** | ***CODE***  | **TS-A-15GS004/7533** |   |
| **2** | ***SITE*** | UGS Dolní Dunajovice |   |
| **3** | ***VALVE TYPE*** | Ball valve (hereinafter referred to as BV) with combined sealing and pneumatic actuator. |   |
| **4** | ***NOMINAL DIAMETER (DN)*** | 400 |   |
| **5** | ***NOMINAL PRESSURE (PN)*** | 160 |   |
| **6** | ***QUANTITY*** | **2 pc** |   |
| **7** | ***DESIGN TAG*** | **HV-603, HV-605** |   |
| **8** | ***MEDIUM*** | Natural gas pursuant to ČSN EN ISO 13 443 |   |
| **9** | ***MEDIUM TEMPERATURE*** | In operation +5°C ÷ +20°COut of operation -30°C ÷ +50°C (pipeline under operating pressure, no medium flow) |   |
| **10** | ***AMBIENTE TEMPERATURE*** | -30°C ÷ +50°C |   |
| **11** | ***ENVIROMENT*** | Zone 2 IIA T1 dle ČSN EN 600 79-10-1 |   |
| **12** | ***OPERATING PRESSURE*** | 4,5 ÷ 12,6 MPa |   |
| **13** | ***TEST PRESURE*** | 200.2 bar(g) (pressure test of the pipeline before commissioning) |   |
| **14** | ***SIL*** | SIL is not required |   |
| **15** | ***VALVE PURPOSE*** | Sectional (border) shut-off valve with a safe position FC (FC = Fail Closed ) used for the closure of individual sections during emergency conditions . |   |
| **16** | ***LOCATION*** | Outdoor, aboveground, on horizontal pipeline (valve horizontally, pneumatic actuator above the valve, the longitudinal axis of the operating cylinders of the actuator will be parallel with the longitudinal axis of the pipeline on which the ball valve will be installed). |   |
| **17** | ***TYPE OF OPERATION*** | Discontinuous operation that is standard for the operation of a seasonal underground gas storage. The foreseen frequency of valve position change does not exceed 100 cycles per year. |   |
| **18** | ***BALL VALVE SERVICE LIFE INCLUDING THE ACTUATOR*** | At least 30 years under the operating conditions specified in this technical specification. |   |
|   | **Technical requirements for the ball valve** |   |
| **19** | ***TYPE OF BALL VALVE*** | Aboveground, flanged, low version without the extension, with single acting pneumatic actuator, epoxy coating |   |
| **20** | ***CONSTRUCTION LENGTH***  | Designated by the supplier - according to ISO 14 313:2007 |   |
| **21** | ***SAFETY FACTOR*** | 2.15 (for all parts of the ball valve under pressure) |   |
| **22** | ***LEAKAGE CLASS*** | Class V pursuant to IEC 60534-4 (valve body shall be absolutely leak-proof outwards). |   |
| **23** | ***BALL SEALING SYSTEM*** | Combined sealing (primary metal to metal sealing, secondary soft (exclusively therban). |   |
| **24** | ***EMERGENCY BACKUP BALL SEALING*** | The ball valve shall be fitted with a system for the emergency tertiary backup sealing for the case of ball valve tightness failure. The backup sealing equipment (sealant paste, applicator) shall be included in the delivery. |   |
| **25** | ***BALL VALVE STEM*** | Shall be of the anti-blow-out type to prevent the blowing out of the stem during the dismounting of the actuator. |   |
| **26** | ***EMERGENCY BACKUP SEALING OF THE STEM*** | The ball valve shall be fitted with a system for the emergency backup sealing of the ball valve for the case of a sealing failure. The backup sealing equipment (sealant paste, applicator) shall be included in the delivery. |   |
| **27** | ***STEM SEALING*** | The ball valve shall enable the safe replacement of the upper sealing of the stem while in service.Control pin in „Fire–safe„ and „Anti–blow–out„ |   |
| **28** | ***CONNECTION TO THE PIPELINE*** | Flanged. Flanges manufactured according to ANSI B16.5, class 900 / RF (counter flanges, connecting material and sealing are included in the delivery). Connecting pipe dimension Ø406,4 x 17,5 mm. |   |
| **29** | ***BALL VALVE BODY*** | Split-body or top-entry. The ball valve body shall enable the replacement of the ball and sealing. |   |
| **30** | ***BALL VALVE STRUCTURE*** | The ball valve shall be a full bore valve, bidirectional, the reduction of the bore shall not exceed the values defined in API 6D or EN13942. The ball valve shall be DBB (double block and bleed). The ball valve shall have guaranteed tightness of the interspace both in the closed and open position.The ball valve shall be of the Double Piston Effect type (bidirectional, at least one saddle shall be leak-proof when the other one fails).The ball valve shall be of the Fire Safe type in line with API 6FA.The ball valve shall be antistatic. The ball valve structure shall be free of any cavities where deposits or hydrates could form limiting the proper functioning of the ball valve.The ball valve have to be Trunnion mounted ball. |   |
| **31** | ***CHARPY TEST*** | To be conducted in line with ISO 14313:2007 |   |
| **32** | ***BALL VALVE SLUDGE DISCHARGE SYSTEM*** | The ball valve shall be fitted with a sludge discharge system that will terminate with ball valve and capping with a pressure cap. The sludge discharge ball valves of the ball valve shall exhibit a long service life. |   |
| **33** | ***BALL VALVE AIR VENTING*** | The ball valve shall be fitted with air venting of the closed middle part of the body – the air venting will terminate with ball valve and capping with a pressure cap. The ball valves of the air venting of the ball valve shall exhibit a long service life. |   |
| **34** | ***MARKING OF THE BALL VALVE POSITIONS*** | The terminal positions of the ball valve shall be clearly and unambiguously marked on the valve as well as the actuator. |   |
| **35** | ***CONNECTION OF THE BALL VALVE ACTUATOR*** | In line with CSN EN ISO 5211 |   |
| **36** | ***BALL VALVE INSTALLATION*** | The ball valve body shall be fitted with a support for safe, easy, firm and reliable attachment of the valve to the base. The ball valve + actuator set shall be fitted with attachment points for easy and secure handling by a crane. The attachment points shall be located so as to rule out any the damage to the ball valve + actuator set and any of its parts and damage to the corrosion protection (including the paint coat) if the manufacturer’s handling instructions are observed.  |   |
| **37** | ***MARKING*** | Pursuant to EN 13942, table 12, physical values will be specified in SI units, the nameplate will also contain the client’s CODE (item 1 of this technical specification). |   |
|   | **TECHNICAL REQUIREMENTS FOR THE ACTUATOR** |   |
| **38** | ***TYPE*** | Pneumatic, single-acting |   |
| **39** | ***ACTUATOR OUTPUT*** | The actuator shall be dimensioned for the reliable opening of the ball valve at the differential pressure of 2.0 MPa. |   |
| **40** | ***CONTROL AIR*** | Treated control air with the pressure of at least 4.5 bar(g), max. 10.0 bar(g) is available. Reliable function of the actuator is required at the control air pressure of 4.5 bar(g). |   |
| **41** | ***CONTROL AIR REGULATION*** | The actuator delivery shall also include the control air regulating station including sludge discharge and filtering of mechanical impurities (so-called filter regulator). |   |
| **42** | ***CONTROL AIR CONNECTION*** | The actuator shall be prepared for control air connection 1/4" NPTF thread. |   |
| **43** | ***SAFE POSITION*** | In the case of any energy outage (control voltage, loss of control air pressure) the actuator shall bring the ball valve safely to the safe position “CLOSED” (fail close), closed by a spring. |   |
| **44** | ***TIME FOR THE OPENING /CLOSING OF THE BALL VALVE*** | During the standard operation the actuator shall ensure the reliable opening/closing of the ball valve within 90 seconds. |   |
| **45** | ***TIME FOR THE EMERGENCY SHUTDOWN OF THE BALL VALVE*** | The actuator shall ensure the reliable closing of the ball valve within 10 seconds in the case of a condition assessed as an accident or in the case of a loss of energy (loss of control voltage, loss of control air pressure). |   |
| **46** | ***HI-PILOT*** | Yes, set pressure 6,3 MPa(g). |   |
| **47** | ***ACTUATOR POSITION MONITORING*** | The actuator will be fitted with terminal position sensors (open/closed) of the EExi – Namur type (we prefer terminal sensors with a terminal board for cable connection integrated in the position sensor). |   |
| **48** | ***ACTUATOR POSITION INDICATOR*** | The actuator will be fitted with continuous mechanical indicator of the position, the terminal positions “OPENED” and “CLOSED” will be clearly marked on the actuator. |   |
| **49** | ***FIRE SAFE*** | The actuator does **NOT** have to be Fire Safe |   |
| **50** | ***VALVE CONTROL AND DIAGNOSTICS*** | The ball valve + actuator set shall be fitted with a system for the automatic monitoring of the functionality of the valve (seizing, stiffening, control) – check using the partial uplift method (the passable cross-section of the ball valve shall not be reduced). The ball valve shall be fitted with a positioner DVC SIS with the 4-20mA EExi signal, HART communication protocol, driver for AMS system EMERSON. In case of using solenoid valves we require these valves in design EExe, voltage level 24 VDC – coil with low power intake < 5W.The valve will be controlled by analog signal 4-20mA (4mA = valve closed and 20mA = valve open). |   |
| **51** | ***FITTING THE DRIVE TO BALL VALVE BODY*** | The ball valve will be equipped with drive at the factory, adjustment of the ball valve will also be done at the factory – is required delivery of complete assemblies. Ball valve reviving within UGS facility will be done after its installation in pipe technology Suppliers. Commissioning of the valve into service, the supplier and then train the operator's staff for operation and maintenance (commissioning and operator training is included in the contract). |   |
| **52** | ***PAINT COAT SYSTEM*** | Paint coat system and the color finish of the ball valve and the actuator according to the ball valve and actuator manufacturer’s standard, the guaranteed service life of the paint coat shall be at least 15 years. |   |
| **53** | ***PACKAGING AND CONSERVATION*** | The packaging and conservation of the subject of the delivery within the scope of this technical specification shall be provided by the contractor so as to protect the delivery from mechanical damage during transportation and handling at the construction site conducted in line with the manufacturer’s instructions and the protection against weather influences during storage in outdoor environment would be effective for the period of at least 3 months. Each delivery package shall be marked by an identification code which specifies the individual parts of the delivery in the bill of delivery. |   |
| **54** | ***STANDARDS AND REGULATIONS*** | TPG 201 01, TPG 935 01, TPG 702 04 |   |
| **55** | ***QUALITY AND CERTIFICATION*** | EN 10204-3.1Certificate of non-explosiveness shall be issued by an authorized test laboratory recognized in the Czech RepublicThe product will be marked by the CE signA declaration of conformity shall be issued for the complete ball valve including the actuator and accessories which form a part of the ball valve and the actuator in accordance with the Act no. 22 / 1997Sb. as amended. |   |
|   | **Scope of the delivery** |  |   |
| **56** |  | Complete ball valve with mounted actuator and all mounted accessories (all tubing, wiring, ...) according to the technical specifications, perfectly tuned for safe and reliable operation with the parameters specified in this technical specification. |   |
| **57** |  | All cable ducts ( EExe and EExi according to the application for the cable diameter 6.2 mm). |   |
| **58** |  | Accompanying technical documentation in Czech language. Instructions for installation, operation and maintenance in the Czech language. |   |
| **59** |  | N/A |   |
| **60** |  | All certificates, records of all tests to verify the properties deliveries specified in this technical specification or required by applicable generally valid Czech national and European standards and regulations (eg. A certificate of Fire Safe design, antistatic design, protocol Charpy test, ATEX , PED, protocols pressure and tightness test in the factory all parts of protocols for non-destructive testing (NDT) base material and welded joints, ...).Certificate of quality materials according to DIN EN 10204-3.1 assigned certificates.Certificate of quality and completeness of the supply.Declaration of Conformity in accordance with Law no. 22 / 1997Sb. as amended.Product Data Sheet - product specifications, incl. complete assembly drawing of ball valve and acruator, including the main dimensions, parts lists, assembly, showing details of the connection ends, the detail design of the sealing system (incl. Emergency prevent leakage), detail design of the sealing system of the control shaft, indicating materials and design outfit, putting the starting torque (force) expected for the most demanding operating conditions and allowable load of connection points (tensile, bending) |   |
|   |   | Separate drawing of the entire assembly KK + drive, which will now illustrate made NDT testsAll Certificates, reports will be delivered by the supplier in Czech or English or German.Declaration of warranty and post-warranty service valve and actuator in the Czech Republic |   |
| **61** |  | Paint for the contingent repair of the ball valve and actuator paint coal. |   |
| **62** |  | Set of parts for the installation of the ball valve and the actuator and commissioning. |   |
| **63** |  | Technical specifications of main components in order to ensure the ordering (supply) in case of failure (e.g. sludge discharge system ball valves, air control solenoid, etc ..) |   |
| **64** |  | N/A |   |
| **65** |  | Set of spare parts for 2 years of operation. |   |