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1 Subject of specification

This specification used in conjunction with other technical specifications of the Grupa LOTOS S.A. establishes the minimum requirements for the design and manufacture of shut-off fittings.

2 Scope of validity

This specification applies to the preparation of tender documents, inquiries and contracts concerning new investments and modernisation projects planned by Grupa LOTOS S.A..

It shall also be a basis for preparing both detailed specifications and inquiries for individual or package supplies.

2.1 Deviations

Any deviation from this specification and the relevant specifications, standards and related documents including proposals, which the bidder claims to be economically and / or technically superior solutions must be submitted in writing for review and approval by Grupa LOTOS SA. Non-approved exceptions are not acceptable by Grupa Lotos S.A.
The supplier must report in writing any ambiguity in this or any other specifications of Grupa LOTOS SA or non-compliance with the referred documents / standards and obtain a written explanation from Grupa Lotos SA

3 Definitions and designations

- Shall – Indicate a mandatory requirement.
- GL S.A. – Grupa LOTOS S.A.
- Fittings – auxiliary devices installed on piping systems and permitting control of the flow of the working medium.
- Gate valve – a fitting with closing or regulating element what moves in a to-and-fro (back and forth) motion perpendicular to the direction of flow of the working medium.
- Valve – a fitting with closing or regulating element what moves in a to-and-fro (back and forth) motion or a plane-and-rotary motion parallel to the direction of flow of the working medium in the housing seat.
- Butterfly valve – a fitting with closing or regulating element in the form of a disk revolves round an axis perpendicular to the direction of flow of the working medium.
- ASME – standards of the American Society of Mechanical Engineers
- ASTM – standards of the American Society for Testing and Material
- API – standards of the American Petroleum Institute
- BS – British Standard

3.1 Hierarchy of documents

In case of conflicts existing between this specification and other documents, the following order of precedence shall govern:

- The current Polish legislation

- Terms of purchase order / contract and other requirements agreed in writing with GL S.A.
- Data Sheets approved by GL S.A.
- This specification
- Other Specifications
- Drawings and other documents
- Standards,

4 Shut-off fittings

Shut-off fittings are fittings dedicated to closing and opening the flow of the working medium.

The following devices are classified as shut-off fittings:

- valves
- globe valves
- ball valves
- plug valves
- butterfly valves
- check valves

4.1 Classification of fittings as regards flow cross-section

- full opening valves
- reduced opening valves
- conduit valves

4.2 Connection between shut-off fittings and piping

- Pipe Flanges and Flanged Fittings (according to ASME B16.5)
- Large Diameter Steel Flanges (according to ASME 16.47)
- welded (according to ASME B16.11)
- threaded (according to ASME B16.11)

4.3 Pressure classes of fittings

The below listed ratings are attributed to equivalent rated pressures PN:

- Class 150 ; PN 20 (20 bar)
- Class 300 ; PN 50 (50 bar)
- Class 400 ; PN 64 (64 bar)
- Class 600 ; PN 110 (110 bar)
- Class 900 ; PN 150 (150 bar)
- Class 1500 ; PN 260 (260 bar)

- Class 2500 ; PN 420 (420 bar)

4.4 General requirements for shut-off fittings

- Technical conditions to be fulfilled by shut-off fittings in industrial installations are defined in the technical inspection regulations, Polish Standards and international standards (ASME/API/BS).
- Shut-off fittings shall have mechanical strength and design allowing the transmission of maximum loads and stresses that can occur in the pipeline in the extreme temperatures of its operation.
- The housings of shut-off fittings shall be made of steel or cast steel.
- Shut-off fitting parts that are in contact with aggressive media shall be resistant to their action.
- Only welded and/or flanged connections shall be used for connecting shut-off fittings to steel pipes. For diameters up to and including DN 50 mm. threaded connection with tightness obtained on the thread may also be used.
- Each fitting shall have an identification number marked on it, and one-way (non-return) flow fittings shall have the direction of flow marked on them. desired direction of flow is termed "forward flow", flow in the opposite direction is "reverse flow".
- Shut-off fittings installed in a pipeline laid under the surface of a road shall be protected against damage from loads caused by mechanical pressure.
- Shut-off fittings shall be mounted in a way and places allowing their easy operation and easy dismantling.
- To improve valve operability, manual gear has to be supplied according to below list.

	Gate	Globe
Rating 150	≥14''	≥14''
Rating 300	≥12''	≥12''
Rating 600	≥10''	≥6''
Rating 900	≥8''	≥4''
Rating 1500	≥6''	≥4''
Rating 2500	≥4''	≥3''

4.5 Shut-off fittings with reference to generally applied standards

4.5.1 Design and manufacture

- Gate valves – API 602, BS 5352, API 600, API 6D
- Globe valves – BS 1873, BS 5352
- Ball valves – API 6D, API 608, BS 5351
- Plug valves – API 6D
- Butterfly valves – API 609
- Check valves – API 594, API 602.

4.5.2 Face to Face and End to End Dimensions of Valves – ASME B16.10

4.5.3 Pipe Flanges and Flanged Fittings – ASME B16.5

4.5.4 Socket-Welded and Threaded Connections – ASME B16.11

4.5.5 Dimensions of Buttwelding Ends – ASME B16.25

4.5.6 Pressure and temperature ranges – ASME B16.34A

4.5.7 Pressure tests (valve inspection and testing) – API 598

4.5.8 Fire testing of valves – API 607, API 6FA

4.6 Requirements for markings on housings and on data plates

4.6.1 Markings on the housing

- Manufacturer's logo or name
- Pressure class of the valve (according to API)
- Symbol of the valve material
- Nominal diameter of the valve
- Gasket marking (on the flange rim, e.g. R49)
- Serial number
- Direction of flow (for one direction flow fittings)

4.6.2 Markings on the data plate

- Manufacturer's logo or name
- CE (or API) marking
- Pressure class of the valve (according to API)
- Maximum working pressure
- Symbol of the valve material
- Core material (if different from the housing)
- Nominal diameter of the valve
- Serial number
- Date of manufacture (month, year).

4.7 Requirements for shut-off fittings manufacturers

- Shut-off fittings must have inspection certificate 3.1B according to EN10204.
- The manufacturer must confirm that fittings meet the requirements of ASME/ASTM standard.
- Shut-off fittings on pipelines subject to technical inspection must have authorisation of a recognised European Community body (notified body), for instance an approval compatible with AD-2000 HPO. Such authorisation must confirm that the manufacturer meets the requirements of the European pressure equipment directive.
- Shut-off fittings must have CE marking.

4.8 Required fitting tests and inspections

Every valve must be subjected to a pressure test in accordance with API 598 standard.

Tests shall be carried out in accordance with the requirements defined in ASME B16.34.

Requirements concerning non-destructive tests acc. to API 589 should be specified by designer for selected material pipe classes and specified in so-called "long component description".

Radiographic and ultrasonic tests have to be done to check all body valves:

- build from alloy cast steel without austenite cast steel for all pressure classes.
- build from cast carbon steel for class 600 lbs and higher.

No-destructive testing procedures can be found in:

- ASTM E 94,– for radiographic tests
- ASTM A 388, ASTM A 609 – for ultrasonic tests
- ASTM E 709, ASTM A 275 – for magnetic tests
- ASTM E 165 – for the liquid penetration test.

5 Codes and standards

- API 600 (Steel Gate Valves - Flanged and Butt-Welding Ends, Bolted and Pressure seal Bonnets)
- API 602 ((Steel Gate, Globe, and Check Valves for Sizes NPS 4 (DN 100) and Smaller for the Petroleum and Natural Gas Industries)
- API 607 (Fire Test for Soft Seated Quarter-Turn Valves)
- API 608 (Metal Ball Valves-Flanged and Welding End)
- API 609 (Butterfly valves: Double Flanged, Lug- and Wafer- Type)
- API 594 (Check Valves: Flanged, Lug, Wafer, and Butt-welding)
- API 598 (Valve Inspection and Testing)
- API 6D (Specification for Pipelines Valves (Gate, Plug, Ball and Check Valves)
- API 6FA (Specification for Fire Test for Valves)
- ASME B16.5 (Pipe Flanges and Flanged Fittings)
- ASME B16.10 (Face to Face and End to End Dimensions of Valves)
- ASME B16.11 (Forged Fittings, Socket-Welding and Threaded)
- ASME B16.25 (Buttwelding Ends)
- ASME B16.34 (Valves-Flanged, Threaded and Welding End)
- BS 1873 (Steel globe and globe stop and check valves (flanged and butt-welding ends) for the petroleum, petrochemical and allied industries)
- BS 5351 (Steel ball valves for the petroleum, petrochemical and allied industries)
- BS 5352 (Steel wedge gate, globe and check valves 50mm and smaller for the petroleum, petrochemical and allied industries)
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6 Relevant documents.

"Technical Specification" issued by GRUPA LOTOS S.A. listed in Contract Files.

7 Record of changes

No.	Date	Description	Introduced by
1	09-05-2011	Added or changed statements in points 4.4, 4.8.	S. Zajaczkowski
2	30-11-2013 (rev.2)	Review, update, standardize and changes to the Standard in scope of order No. OK/990/2012	Editorial board coordinated by T.Wróbel
-	31-08-2015	Page layout corrections, no contents changes.	T. Wróbel