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1 Subject of specification

This specification used in conjunction with other technical specifications of LOTOS Group S.A., establishes minimal requirements regarding designing and execution of pressure measurements.

2 Scope of validity

This specification shall be used when preparing both quotations and Purchase Orders concerning planned LOTOS Group S.A. new investments and modernizations.

It shall also be a base for preparation of other detailed specifications and quotations relevant for package units or other equipment deliveries.

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 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 GLSA
- Data Sheets approved by GLSA
- This specification
- Other Specifications
- Drawings and other documents
- Standards

4 Definitions and designations

GLSA – Grupa Lotos S. A.

DCS – Distributed Computer Control System

PLC – Programmable Logic Controller

ESD – Emergency Shut Down System

SIS –Safety Instrumented System

SIL – Safety Integrity Level

Transmitter - electric or/and electronic or/and programmable element of control and instrumentation system, converting pressure to defined output signal, for example 4-20 mA. It can include local indicator of measured value.

5 Description

All characteristics features of measurement type, range of application and restrictions, apply to solutions most frequently used in industry. In each case, and particularly in regard to conditions of instrument usage, detailed agreements with producer or vendor are decisive. It is also necessary to follow requirements of system licensor, if they are more stringent than requirements of this specification or condition guarantee.

All measuring device componentsshall be adapted for continuous operation in environmental conditions present in place of location, shall be anti-corrosive and vibration resistant to commonly present industrial apparatus and pipelines vibrations.
Parts in direct contact with process media shall be made of AISI316 or other material, if required by process conditions. In case of particularly aggressive media or of very high viscosity, diaphragm separators shall be used. In case of diaphragmatic separators distance on nozzles shall be considered for minimizing high temperature influence.
Capillary media shall fulfill process temperature requirement and min. ambient temperature (-25 °C) also.

In case of the membrane direct contact with hydrogen or gasses and liquids containing hydrogen, and exactly on account of the diffusion threat of the hydrogen into the filling factor; it shall be covered with gold.

Indications of instruments measuring absolute pressure shall not change along with atmospheric pressure change.

During measurement method selection such types of instruments and method of installing them shall be chosen,so that to exclude production downtime for the maintenance or servicing.

Installation requirements are specified in specification GLSA 3020 .

5.1 Local measurements

Manometers for positive pressure, absolute pressure and differential pressure measurement.

Diameter:	for measurements on pipelines and equipment,150-160 mm as standard. Manometers installed on selling or lubrication installations of machines (compressors, pumps) 100mm diameter to use is admitted, on positioners – diameter 30 mm according to standard of manufacturer on air regulators 50-60mm or according to standard of manufacturer.
Measuring element:	Bourdon tube for pressures ≥ 1 bar diaphragm for pressures < 1 bar
Accuracy:	1% or better than 1%
Ranges:	0-1/1,6/2,5/4,0/6,0 and their tenfold value
Material of element:	AISI 316 or better, if required by process
Casing material:	Stainless steel
Protection:	- against excessive pressure 1.3 x measuring range, where design pressure significantly exceeds measuring range of manometer, protective element on manometer connection shall be used - against failure of measuring element: laminated secure glass in front, outflow at back. For pressure 10MPa and greater, the solid front preservation shall be provided

- against pulsation : indicator filling with fluid suitable for -25 deg C or special damper on connection of manometer

Connection: ½" NPT from below.

5.2 Transmitter of pressure and differential pressure requirements

- Output signal 4-20 mA + additional digital HART. Bi-wire transmitter.
- Total accuracy: better than 0.1%
- Stability of measurement: < 0.125% of Upper Measuring Range for 5 years
- Response time: for transmitters applied in safety circuits, response time shall be determined on the grounds of required by process operating time of specific circuit. Details – refer to specification GLSA 3650.
- Basic protective measure for explosion hazard zones is intrinsically safe design. Certificate according to ATEX.
- Protection class against dust and water – minimum IP 65.
- Electrical connection: M20x1,5
- Transmitter must be resistant to design pressure in place of installation. Differential pressure transmitter must withstand differential pressure equal to design pressure without any change of parameters.
- Process connections:
  - ½" NPT (F) with use of counter flange – for individual connections (without valve block) or use of valve block (manifold)
  - flanged, remote diaphragm seals 3" shall be used for viscous, crystallisable and highly corrosive liquids, always with use of flushing chambers.
- Materials:
  - for measuring element: AISI316, and better if required by medium
  - for casing: aluminium or AISI316
- Material certificate 3.1 according to EN-PN 10204 for diaphragm separator and flushing chamber.
- Transmitters have to be equipped with local LCD indicators, integrated with the transmitter or installed remotely. Indications in pressure units.

Pneumatic transmitter of pressure and differential pressure shall not be used.

5.3 Pressure and differential pressure switches

- It is not recommended to use the pressure switches for Shut Down and signalling application. Signalling of the process state shall be realised by programming a threshold on continuous measurement value from transmitter. Application where use of continuous measurement is purposeless, or where beside of continuous measurement independent signslling of pressure exceeding is required, the pressure switches can be used after GLSA approval.
- Process connection: ½" NPT (F) from bottom
- Materials:

- for measuring element: AISI316, unless standard materials of producer are better for specific fluid.
- for casing: AISI316.

- Output signal: intrinsically safe proximity sensor, or gold plated change-over contact (24DC 0,5A SPDT or DPDT). Signal of proximity sensor must conform to EN 60947-5-6 (DIN 19234), in order to connect it directly to DCS or PLC input.
- Point of actuation: adjustable in whole range defined in specification. Hysteresis: according to detailed specification.
- Accuracy: < 0.5% of specified setting range.
- Protection class: at least IP65.
- Electrical connection: M20x1,5.

5.4 Cable glands

Each pressure transmitter and switch shall be delivered with suitable cable gland.

6 Relevant documents

Any “Technical Specification” issued by GRUPA LOTOS S.A. listed in Contract Files.

7 Standards and regulations

Designing, execution and installation shall conform to the latest editions of below listed standards and regulations.

Only specific standards related to pressure measurements are given here. Remaining standards, regarding control and instrumentation, are given in specification GLSA 3010 - General requirements for instrumentation.

Directive of European Union:

- 94/9/WE Equipment explosive atmospheres (ATEX).
- 97/23/WE Pressure equipment

8 Enclosures

EnclosureNo:1 , Documentation requirements

EnclosureNo:2 , Instrument data sheets

9 Record of changes

No.	Date	Description	Introduced by
1		This specification entirely replaces the former LOTOS Group S.A. standard No. PR 07 310 with the same title.	M. Domaniewski
2	30-11-2013 (rev. 1)	Review, update, standardize and changes to the Standard within scope of order No. OK/990/2012	Editorial board coordinated by T.Wróbel
-	31-08-2015	Page layout corrections, no contents changes.	T. Wróbel

	WITH BID	WITH DELIVERY	NOTES
MANUFACTURER'S DATA SHEET	Yes	yES	
LIST OF DEVIATIONS TO INQUIRY SPECIFICATIONS	Yes		
LIST OF SPARES RECOMMENDED FOR 2 YEARS OPERATION WITH ITEMIZED PRICES	Yes		
LIST OF SPARES RECOMMENDED FOR COMMISSIONING AND PROVISIONAL ACCEPTANCE TEST	Yes		
TEST CERTIFICATES		Yes	If specified
MATERAIL CERTIFICATES ACCORDING TO EN-10204 3.1		Yes	If specified
CERTIFICATES ISSUED BY OFFCIAL ORGANIZATIONS FOR EQUIP. TO BE UTILIZED IN HAZARDOUS AREAS	Yes	Yes	If applicable
CERTIFICATES ISSUED BY OFFICIAL ORGANIZATIONS FOR EQUIPMENT TO BE UTILIZED FOR CUSTODY TRANSFER			
OUTLINE AND DIMENSIONAL DWGS, ELECTRICAL ARRANGEMENT	Yes	Yes	
ELECTRICAL DIAGRAMS		Yes	
INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTION MANUALS		Yes	
DOCUMENTS IN ELECTRONIC VERSION ON CD		Yes	
INSPECTION BOOK		Yes	If specified
FABRICATION QUALITY CONTROL PLAN		Yes	If specified
MANUFACTURERS DECLARATION OF CONFORMITY WITH EU DIRECTIVES		Yes	
MANUFACTURING CERTIFICATES		Yes	If specified
CALIBRATION CERTIFICATE		Yes	If specified
HYDROSTATIC TEST REPORT		Yes	If applicable