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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 auxiliary systems used in analytics.

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.

2.2 Exclusions

Gas detectors – covered in specification GLSA 3520

Analysers – covered in specification GLSA 3510

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

4 Definitions and designations

GLSA – Grupa Lotos S. A.

Analysers shelter– independent structure destined for mounting of analysers and auxiliary systems in it. Analyser shelter must have dimension necessary to place inside shelter all measuring devices, auxiliary systems and two people maintenance crew that will work inside shelter with door closed.

Measuring container – independent structure destined for mounting of analysers and auxiliary systems in it, located at plant (unit) were there is no explosive zones and measured samples are not

flammable, explosive or toxic (e.g. H2S). Container must have dimension necessary to place inside all measuring devices, auxiliary systems and two people maintenance crew that will work inside shelter with door closed.

Protective cabinet of analyser – protective cabinet serving for installation of single analyser in situation, when seating of analysers' shelter is impossible due to lack of place, or if sample transport is impossible. The special case exists when single analyser is present on plant, and its design and sample conditioning system enables application of protective cabinet. The last case, however, requires LOTOS Group S.A. approval.

Shelter air-conditioning system – the system that shall provide proper temperature in shelter by heating or cooling of air stream blown into shelter. The air flowing into shelter consists of two streams, one of them forming closed loop circulation, where a fan sucks air from shelter, which after being heated or cooled down, is blown into shelter again. Stream of circulating air is supplemented with fresh air injection, drawn by two-fan unit operating in mutually redundant configuration. The air blown into shelter passes through dust filter with paper filtering element. The air blown into shelter is distributed over its interior by means of air duct routed along the whole shelter. Air must be sucked from safe area, outside Ex zone. If instrumentation cabinet with stabilised temperature is used, heating and cooling unit shall be ATEX certificated kind.

Sample preparation system for on-line analysers – a set of devices and elements serving for sample taking from process pipeline and delivering it to analyser without change of its physical and chemical parameters. The system contains all elements, starting from first cut-off device and ending on connection in analyser, including sample conditioning system.

Sample conditioning system – a set of devices and elements serving for such preparation of sample, so that it can be introduced into analyser. All elements of sample conditioning system shall be made of AISI 316 steel. Application of different materials can only result from properties of process medium, which is fed to analysers.

Such system is composed of:

- Coolers
- Filters
- Cut-off valves
- Flowmeters
- Rotameters
- Union elements
- Tubes
- Assembly jigs.

Slop system for analytics purposes – a skid composed of pressure-less tank, to which sample being blown down from analyser flows off, a pump for pumping out of the tank contents to process pipeline in order to avoid product losses, and level signalling device, monitoring liquid level in the tank and starting the pump. Skid with slop system must be such located, so that Nozzle in slop tank to which sample from analyser is being fed would be positioned on such height, that route of sample blown down by analyser after analysis completion would have inclination of approximately 1%. Slop tank must have vent connection, ended with flame arrestor that is located in place were sample will go directly to drain if failure happens. Heating system must be used to maintain sample pressure over the frizzing point temperature and even at higher level to ensure proper working condition of slop pump.

Slop pump shall be installed in such an arrangement to allow easy access for periodical dismantling without the necessity to dismantle piping and other nearby elements. The design shall foresee additional shut-off valves on pump's suction and discharge side to protect from pipe sample leakage when the pump is missing.

Slop pump control must be autonomous system both hand and automatic controlled. All elements inside slop tank (heater, temperature sensor) shall not be in direct contact with sample to be ready to be safely removed for maintenance even if slop tank is full. Slop tank must have nozzle for draining it's contain to drain.

Air-tight sampling system for laboratory determinations – piping system feeding sample to transport tank in a way precluding penetration of medium being sampled to environment. Transport tank is connected to piping by means of flexible hoses and quick-connecting unions equipped with cut-off valves. The hoses should be built of Teflon hose in metal guard. Such system enables keeping to ecological Normsand is safe for staff performing sampling.

5 Description

5.1 Analysers shelter

5.1.1 Mechanical structure

Supporting structure of the shelter shall be constructed from steel sections protected against corrosion through galvanizing process or painting with paints of increased resistance. In case when paint coating would be used, thickness of the coating shall be equal to 80 microns at least.

Internal and external walls of shelter, as well as its roof shall be made of polished steel sheet of AISI 316 type, or of passivated aluminium (marine type). Thickness of steel sheet used shall be minimum 1.5 mm. Joints of individual sheets must be protected with masking covers.

Floor shall be made of riffled plate. Floor colour – black (RAL 9005). Thickness of coating at least 80 microns. The floor shall enable loading it with weight Not less than 200 kg/m^2. Tight floors with drain shall be built to ensure that no spilt sample goes and remain under floor or under shelter.

Space between internal and external wall shall be filled with insulating material of glass wool type. Wall thickness shall amount to 50 up to 80 mm. Insulating material shall have thermal conductivity coefficient approx. 0.35.

Shelter structure must ensure possibility for maintaining of positive pressure inside it, amounting to 50 Pa.

Along external, longer wall of the shelter, umbrella roofs shall be mounted, guarding cabinets with sample conditioning system or other accessories, mounted on external walls. The umbrella roofs shall have 1000 mm width, and their length shall be equal to that of shelter. The umbrella roof shall be dismantled for shelter transport period.

Inside shelter walls, assembly plates shall be mounted, enabling installation of culverts for entering of all cables and piping into shelter.

Supporting structure of shelter shall be equipped with threaded mounting points enabling installation of additional accessories on internal and external walls of the shelter.

Sample tube shall be routed between conditioning system and analyser along possibly shortest path. This is particular importance for samples of high viscosity.

Analysers' shelter shall be provided with two separate doors with self-closing devices. The door shall open outside.

Door shall be furnished with patent locks, precluding entrance of not-authorised persons to shelter. The door shall be provided with escape beam on its internal side. The door shall be furnished with windows glazed with 400 x 500 mm panes made of laminated glass. The door shall be mounted on shorter walls of shelter or at any wall if technically suitable and accepted by LOTOS.

Data plate, made of stainless steel or two-layer laminate shall be installed on external side of the door, giving information about shelter number and process numbers of analysers in the shelter.

In case when dimensions of shelter do not exceed 2500 mm by 2500 mm, use of single door is allowed.
Outside shelter, on ground level cylinder holder shall be foreseen if gas cylinders are to be used with analysers.

5.1.2 Protective box for sample conditioning system

Internal and external walls of protective cabinet shall be made of polished steel sheet of AISI 316 type, or from passivated aluminium (marine type). All junctions of steel sheets must be welded.

Space between internal and external wall shall be filled with insulating material of glass wool type. Wall thickness shall amount to 50 up to 60 mm. Insulating material shall have thermal conductivity coefficient approx. 0,35. Wall constriction must be tight so sample spilt or rain water wouldn't penetrate isolation.

Mounting plate, enabling installation of sample conditioning system elements, shall be installed on rear wall of the box. Mounting plate shall be made of AISI 316 steel.

All equipment and elements, installed on rear mounting plate shall be installed on adequate handles, ensuring aesthetics and clearness of assembly. Suspending of any elements on tubes (e.g. rotameters, filters, reducers) is impermissible; all of them must be installed on mounting plate handles. Tubes shall be installed on mounting plate by means of split handles made of plastic or metal. All elements mounted in protective box must be marked with numbers conforming to material specification contained in documentation.

5.1.3 Shelter protection system

Analysers' shelter protection system consists of such subsystems, as:

- Monitoring of positive pressure in shelter based on signalling device, enabling monitoring of positive pressure on level 25 up to 35 Pa.
- Mounted inside shelter, local positive pressure and temperature gauge.
- Automatic and manual control of each of two overpressure fans.
- Automatic power disconnection from maintenance power socket inside shelter.
- Gas monitoring inside the shelter
- Optical indicators (inside and outside shelter) that shows status "Shelter Safe" and alarms conditions. Horns and beacons outside shelter to be noticed (heard and seen) from distance.
- Emergency power shout down pushbutton (mechanically protected from push by mistake) located outside, by the door.
- System deblockade (inhibit) with key to stop "shelter protection system" for maintenance reason. Turnings deblockade on and off can't have any effect on power or alarms.
- Monitoring of dangerous gases concentration

Depending on hazard degree resulting from introducing of dangerous media into shelter interior, at least two sensors for toxic gases and explosive gases shall be installed in the shelter.

The sensors and central unit applied must be of the same type, as those applied on specific process plant.

In the shelter only sensors shall be located, while indicator cards together with input/output cards shall be located jointly with panels controlling the sensors, which are mounted on plant.

- Controller

Controller of shelter protection monitoring system shall be based on products listed in schedule of qualified suppliers.
The controller shall be installed in flameproof enclosure and located on one of internal shelter walls (certificate shall include both controller and its enclosure).
The task of program that is to be implemented in the controller is to ensure safe work of people and operation of equipment inside the shelter.

Shelter protection system must be autonomous system inbuilt in analyser shelter.

5.1.4 Shelter air-conditioning system

Air-conditioning system shall be mounted in separate cabinet and seated on the same level as analysers' shelter. It shall be connected to analysers' shelter by means of two ventilation ducts, enabling circulation of air. Air-conditioning system operates with cooling unit, providing cooling power matched to demand.

Electrical or steam heater mounted into ventilation system provides heating of air. Fresh air is sucked by two fans operating in mutual redundancy system. Fresh air is drawn from zone that is Not endangered with explosion. The fans shall ensure five-times air exchange per hour.

Pressure in the shelter shall amount to 25 up to 35 Pa. The pressure shall be adjusted by means of shutters equipped with lever – ballast gear. Air outlets shall be furnished with grids protecting against insects penetration into shelter interior.

Air-conditioning system shall ensure stable temperature (with tolerance +/-2°C) inside the shelter with possibility to set internal temperature between 18°C to 30°C. Manufacturer must calculate heating power necessary to heat-up cold air (up to -25°C) and cold down hot air (up to 35°C) that is pushed inside shelter by overpressure fans.System operation control is accomplished by controller of shelter protection monitoring system. Signals from temperature sensor and pressure sensor shall be feed to the controller.

5.1.5 Junction boxes

Junction boxes, connecting cables running from control room to shelter cabling, shall be installed outside the shelter. Junction boxes must be dustproof, waterproof and certified for the category of explosion hazard within which they are installed. Cable glands have to be embedded exclusively in bottom part of junction box (marking and accessory equipment according to specification GLSA 3030).

5.1.6 System of shelter feeding with electric energy

Electrical switchgear shall be manufactured in flameproof enclosure and located on internal side of analysers' shelter wall.

Each consumer shall have separate outgoing feeder from the switchgear, so as to enable disconnection of voltage from each consumer separately.

If situation calls for it, 24V DC supply shall originate from electrical switchgear, however it is preferred for such feeding to be run from systems supplying field instruments. All live elements enabling disconnection of voltage from analysers shall be located in the switchgear.

Slop pump control system, i.e. isolating barriers and relays controlling the pump's contactors, shall be located in the switchgear.

In case of analysers, which signal is used for process regulation or interlock tripping, their supply shall be fed from UPS unit.

Outgoing feeder to analysers' shelter in MCC substation, shall be provided with possibility of automatic voltage disconnection from local switchgear located in analysers' shelter. Voltage from the switchgear located in analysers' shelter shall be disconnected in the moment of emergency pushbutton pressing, which is installed on external wall of shelter, as well as in case of exceeding of safety threshold coming from sensors of dangerous gases.

5.2 Protective cabinet for analyser

Protective cabinet shall be made of plastics, or steel protected against corrosion, ensuring 10-year operation guarantee without need to renovation of varnish coatings. In case of application on plants with increased corrosion occurrence hazard, the cabinet shall be made of polished, acid resistant steel sheet.

Protective analyser's cabinet shall ensure such climatic conditions, so as to analyser mounted inside it would operate in stable temperature conditions. Temperature inside the cabinet being maintained on customer set level (possible setting 18°C ÷ 30°C) and stabilised by automatic controller (tolerance +/- 2°C).

In order to ensure such conditions, air-conditioners mounted on sidewall of protective cabinet shall be used.

Air-conditioning of the cabinet shall also ensure five-times air exchange per hour. In case when dangerous gases or liquids are to be analysed, sensors of dangerous gases shall be used. Light and acoustic signalling shall be mounted outside the cabinet.

The cabinet shall have IP54 certificate.

Junction boxes shall enable connection of supply to the analyser, as well as all types of input and output signals. Junction boxes shall be mounted outside protective cabinet, most preferably on separate structure, and distance of junction boxes from protective cabinet shall not exceed 1000 mm.

5.3 Sample preparation system for on-line analysers

5.3.1 Probe introduced into pipeline for taking of sample

In case when necessity exists for introducing probe into pipeline, it shall be made of steel tube (AISI 316 material type) of diameter from 6 mm up to ½". For diameters in excess to 12 mm, the probe shall be terminated with external ½" NPT thread.

The route leading sample to sample conditioning system shall be made of precision tubes, metric series up to 16 mm diameter, inch series above 16 mm diameter, made of AISI 316 steel type both for liquids and gas transportation. Rotary welding machine is preferred for welding of tube sections, or bushings stiffening joints shall be welded on tube connections.

For emission and imission systems application of Teflon (PTFE) made pipes is allowed. Application of preinsulated tubes with electrical heat tracing embedded, made both of steel and of Teflon is allowed. Application of preinsulated tubes with steam heat tracing is not preferred; application of such solution requires GLSA approval.

5.4 Sample conditioning system

All elements of sample conditioning system shall be made of AISI 316 steel. For water treatment unit located outside refinery plants, application of PVC-type material featuring similar properties is allowed (the material can be glued with glues or hot welded). Application of Teflon is allowed for gas sampling systems, particularly in emission and imission systems.

Such system is composed of the following elements:

5.4.1 Coolers

- Pipe coolers
  Such cooler shall be built on basis of coil pipe located in vessel, through which cooling medium is flowing (cooling water or another liquid).
- Plate coolers
- Tube-in-tube coolers

  The cooler shall be built of two tubes inserted one into another, where sample flows through internal tube in direction opposite to cooling agent (counter-current) flowing through external tube. The cooler is terminated on both its ends with full-bore Tee-pipe of construction corresponding to union elements. The Tee-pipes enable connection of sample and cooling agent to the cooler. The following diameters of tubes are preferred:

  - external tube Ø ½”
  - internal tube Ø 16 mm.

  Depending on expected temperature on cooler outlet, various lengths of coolers shall be used.

5.4.2 Filters

- Plate type
- Mesh type
- Paper type
- Sintered metal type

5.4.3 Pressure reducers

- Liquid type

  One shall use reducers dedicated for reducing of liquid pressure, which shall be evidenced with adequate certificates.

  Depending on needs the reducers shall maintain stable pressure on their inlet or outlet; pressure regulation by means of letting medium down to slops is not preferred.

  Labyrinth type reducers shall be applied for reduction of steam or boiler water pressure. In case when gaseous fraction is necessary to obtain for analysis, then evaporator integrated with reducer shall be used.

  The evaporator shall be equipped with electrical heater with control system, enabling to maintain of adequate operating temperature.

  Steam-supplied evaporators are not preferred, unless required by specific application. In such case necessity for steam use shall be agreed with GLSA.

- Gas type

  One shall use reducers dedicated for reducing of gas pressure, which shall be evidenced with adequate certificates.

  Depending on needs the reducers shall maintain stable pressure on their inlet or outlet; pressure regulation by means of venting to blown down system is not preferred.

  In case of high pressures reduction, repeatedly exceeding operating pressure of the analyser, pressure safety devices shall be used, which in case of overload shall vent excessive pressure to blown down system.

  In case of toxic gases, activation of pressure safety device shall be signalled and registered in the control system.

5.4.4 Cut-off valves

- For pipelines of diameters above ½", full-bore ball valves shall be used. Such valves shall have internal NPT threads. Valves of three-element structure shall be used. Valve design enabling replacement of ball and seat without need to dismantle the whole valve from line is prefered.

5.4.5 Flowmeters

- The flowmeters used must be provided with local indicators. Transmission to control system is not required, unless such requirement results from process engineering.
- Flowmeters destined for flanged DN15 assembly are preferred.

5.4.6 Rotameters

- Liquid type

  For purposes of liquid flow measurement one shall use metal rotameters with magnetic float, which transfers information about flow magnitude on metal ring with marker, with the ring moving against scale background. The rotameter shall have connections located on top and bottom, and they shall be threaded ½" NPT -female.

- Gas type

  Glass rotameters shall be used for gas flow measurement. In situation when the gas is aggressive or under high pressure, metal reducers of the same design as for liquids shall be used. The reducer shall be equipped with ¼" NPT –female connections. The connections shall be located behind the rotameter.

5.4.7 Connection elements

Union pieces featuring sealing system equipped with two compressing fittings shall be used. All used elements must originate from the same supplier. Union elements used inside the analyser shall, if possible, originate from the same supplier as elements used in sample preparation and conditioning system. For instances where different elements are used, external connection of analyser is considered „the battery limit" (union piece on frame of the analyser).

If piping made of Teflon or glass is used, then union elements made of Teflon or polyethylene shall be applied.

In course of connection elements supplier selection, one shall follow list of qualified suppliers.

5.4.8 Tubes

In sample conditioning systems one shall use seamless tubes made of acid resistant steel of AISI 316 type. Applied tubes shall be of precision series of types (calibrated), etched. (For some applications electro-polished tubes shall be used). For emission and imission systems, borosilicate glass or Teflon shall be used. Metric series tubes shall be used up to 16 mm tube diameter, while inch series tubes above this diameter.

5.4.9 Assembly clamps

Assembly jigs shall feature design consisting of two shaped slides, between which a tube is located. Lower part shall be permanently bounded with base, while upper part shall be screwed to lower part by means of two bolts.

5.4.10 Flushing system for sample preparation system

The task of flushing system relies on feeding of medium in aim to displace liquid or gaseous sample taken for analysis to analysers' shelter. Displacement of liquid or gas is employed when samples being taken are of high toxicity or viscosity. Such proceeding shall be foreseen for safe performance of maintenance and repair activities.

5.4.11 A system enabling automatic calibration run

In case when automatic calibration of liquid analysers is used, the system must be equipped with tanks for reference liquids and transport system of master to the analyser. Transport system can be accomplished basing on pressure vessels, from which the master is displaced by inert gas or by means of micropump drawing reference liquid from the tank. Solution employing micropump is preferred.

5.5 Slop system for analytics purposes

The system is to be built in form of skid, composed of supporting frame on which slop tank and impeller pump with piping are mounted. All connections to the skid shall be of flanged class 300 RF type.
Frame of the skid shall be built from steel sections, hot galvanized or painted with paints of increased impact resistance.

The design of the frame shall allow easy access to clean the sample spillage.Slop tank is pressure-less drum with capacity from 200 up to 300 l, horizontally seated. In its upper part a flange enabling installation of level indicator shall be designed. Pump connection shall be made in lower part of drum bottom. If medium of high freezing temperature is to be carried away to the tank, then a flange enabling bringing a heater into tank, shall be provided in one of the drum bottoms with integrated jacked so heater could be removed when tank full of sample. Heater and temperature sensor must be always below minimum sample level in slop tank to avoid "dry work". When sample content doesn't become solid, but there is possibility of water (or similar) content hole slop tank can be steam or electrically heated from outside. The tank must be equipped with drain valve located in lowest point and piped in such a way, so that carrying away of product outside the skid frame would be possible.

The pump shall be of impeller type and capacity approx. 20 l/min and minimum pressure 0,5MPa. The pump shall be driven with three-phase motor. Supply and control of the pump proceeds from a switchgear installed in analysers' shelter. Control column, enabling switching over of pump on manual operation shall be mounted on the skid.

Level signalling device shall feature four points of signalling:

- LSHH - high level alarm signalling
- LSH - pump switching on
- LSL - pump switching off
- LSLL - interlock shall preclude switching the pump on also in „MANUAL" position.

5.6 Air-tight system of samples taking for laboratory determinations

5.6.1 Protective box

Protective box shall be built on base of acid resistant steel sheet, unless specifics of product drawn in the cabinet impose another material. (Application of cabinets made of plastic is allowed. The condition for their acceptance is submitting on preliminary design stage of adequate certificates, confirming suitable electrostatic parameters and fire resistance not less than 1-hour).

Protective box shall be provided with heating, conforming to selected for specific plant heating type (steam, electric) of protective boxes (e.g. for differential pressure transmitters). In particular cases, where liquids of high vapour pressure are being drawn (gasoline with propane addition), the box shall be provided with air-conditioning system able to maintain temperature 16°C in the box. In such case box walls must have suitable thermal insulation.

5.6.2 Elements mounted on supporting plate

- Cut-off valves (preferred valves ¼"NPT)
- By-pass valve
- Sample filter
- Lower quick-joining union piece (must be SWAGELOK SS-QTM4-D-4PM)
- Piping
- Element fastening flexible hose to mounted upper quick-joining union piece (must be SWAGELOK SS-QTM4A-B-4PF)
- Mechanical fastening gear for fastening of cylinder to which sample is being drawn

5.6.3 Feeding connections for sample, cooling water or steam shall protrude out the protective box contour by approx. 50 mm.

The connections shall have threads ½" NPT-female.

5.6.4 The route leading sample into protective cabinet, in which sample taking system has been embedded, shall be made of metric series calibrated tubes.

5.6.5 Material of tubes: AISI 316 steel.
Other quick-connects then SWAGELOK SS-QTM4-D-4PM i SS-QTM4A-B-4PF can be used only after receiving individual and written approval form Grupa LOTOS S.A..
In case of samples that becomes solid at temperature above 40°C it is recommended to use other hermetic sample taking device that enables to take sample directly to glass bottle. Construction described above might not be suitable for vacuum residue and similar application.

6 Measuring containers

Measuring container is a simplified analysers shelter that can only be used on plant (unit) where there is no explosion danger areas and measured samples are not flammable, explosives or toxic (e.g. H2S). Typical applications are imision and emission monitoring systems and nitrogen production

plant. It is forbidden to use measuring container on plat (unit) with Ex zones but outside Ex zone – this application requires analysers shelter.

Measuring container is to be design to place analysers, auxiliary systems and to be work place for two men maintenance crew and therefore it must have dimensions necessary to fit all equipment and people inside.

Measuring container is to be equipped with:

- Electrical power distribution system powered from MCC and equipped with surges protection, residual current devices and at least two spears.
- UPS power distribution or individual cables that power analyzers from UPS.
- Pushbutton located outside for emergency power shut down. Pushbutton must me mechanically protected from being pressed by mistake.
- Air condition unit suitable to maintain internal temperature at 21°C when all devices are working and there is +35°C outside.
- Heater suitable to maintain internal temperature at 18°C when all devices are turned off and ventilation fan is working and there is -25°C outside.
- Natural or fan forced ventilation.
- Doors locked by patented key. Minimum 3 keys are to be attached to each door. If there is more than one container on-site it is recommended to use single key system (one key suitable to open all doors).
- Internal walls must be able to sustain attaching heavy (at least 50kg) equipment.
- Infernal light must provide sufficient light to enable service activities inside container.
- In cases, when sample can be dangerous for human (e.g. nitrogen) it is recommended to place gas detection system. Horn and beacon must be placed inside and outside container and alarm/failure must be forwarded to DCS.
- In cases when liquid sample is measured container must be protected from sample spills. Protection must include tight floor with drain and shaped so sample goes to drain and not remain inside.
- Cable and pipe entrances must be foreseen at bottom and at the top of side wall. Preferred solution is to use stainless steel plate fixed to rectangular hole in the wall. Stall plate shall have holes for pipes and holes with cable glands fore cables – ten spare cable glands must be foreseen.

Measuring container is a work place for maintenance crew and shall provide necessary condition to perform maintenance activities. It is forbidden to place inside shelter noisy devices that generates sound higher than 50dB e.g. pumps or compressors.

Mechanical construction and used material must provide guaranteed 10 years corrosion protection. Containers walls shall be thermally isolated like analyser shelter walls.

7 Relevant documents

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

8 Norms and standards

Designing, execution and erection shall comply with the latest editions standards; ASTM, TUF, EPA, PN-EN.

Only norms that are specifically connected with auxiliary analytics systems are listed here. The other norms concerning Instrumentation are quoted in specification GLSA 3010 – Instrumentation general requirements.

NAMUR Recommendations

9 Enclosures

- Enclosure No.1, Requirements regarding documentation
- Attachment No. 2 System of samples preparation
- Attachment No. 3 System of chromatograph samples preparation
- Attachment No. 4 Equipment list for annexes No. 1 and 2
- Attachment No. 5 Analysers' shelter – vertical projection
- Attachment No. 6 Slop tank
- Attachment No. 7 Protective cabinet of analyser
- Attachment No. 8 Closed system of sample taking

10 Record of changes

No.	Date	Description	Introduced by
1		This specification entirely replaces the former LOTOS Group S.A. standard No. PR 07 252 with the same title.	M. Domaniewski
1	05.05.11	This specification entirely replaces the former LOTOS Group S.A. standard No. PR 50 020 with the same title.	P. Skoneczny M. Domaniewski
2	30-11-2013 (rev. 2)	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

Grupa LOTOS S.A.	**ENCLOSURE No. 1**	Spec. N^{o}
	Requirements regarding documentation	3530

	WITH OFFER	ON DELIVERY	NO..TES
TECHNICAL SPECIFICATION OF MANUFACTURER	Yes	Yes	
LIST OF DEVIATIONS TO TENDER QUERY SPECIFICATION	Yes		
LIST OF SPARE PARTS ALONG WITH PRICES, RECOMMENDED FOR 2-YEAR OPERATION	Yes		
LIST OF SPARE PARTS FOR PRE-COMMISSIONING AND COMMISSIONING PERIOD	Yes		
CERTIFICATES OF TESTS		Yes	if specified
MATERIAL CERTIFICATES ACCORDING TO EN-10204 3.1		Yes	if specified
CERTIFICATES OF CONFORMITY FOR EQUIPMENT INTENDED FOR OPERATION IN EXPLOSION HAZARD ZONE	Yes	Yes	if applies
CERTIFICATES ISSUED BY APPROPRIATE BODY FOR EQUIPMENT SERVING SETTLEMENT MEASUREMENTS		Yes	if applies
DIMENSIONAL DRAWINGS	Yes	Yes	
ELECTRICAL WIRING DIAGRAMS		Yes	
ASSEMBLY, OPERATION AND MAINTENANCE INSTRUCTIONS		Yes	
ELECTRONIC VERSION ON CD CARRIER		Yes	
INSPECTION BOOK		Yes	if specified
PRODUCTION QUALITY PLAN	Yes	Yes	if specified
DECLARATION OF CONFORMITY TO EUROPEAN UNION DIRECTIVE (CE MARK) ISSUED BY MANUFACTURER	Yes	Yes	
CERTIFICATES OF MANUFACTURER		Yes	if specified
CALIBRATION SHEETS		Yes	if specified
HYDROSTATIC TEST REPORT		Yes	if applies