Grupa LOTOS S.A.	**TECHNICAL SPECIFICATION**	Spec. N° 8800
	Piping subject to UDT/ZDT approval	

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1 Subject and purpose of specification

This specification used in conjunction with other technical specifications of LOTOS Group S.A., establishes minimal requirements regarding designing, execution and acceptance of pipelines, subject to inspection of UDT/ZDT during operation of pipelines within GRUPA LOTOS S.A. plants (according to technical specification no 6600, attachment no 8, column 26).

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 Definitions and designations

NB –Notified body
P – Producer (the author of the documentation or the company installing the pipeline)
UDT – Office of Technical Inspection
ZDT– Factory Technical Inspection of LOTOS Group S.A.
PED – Pressure Equipment Directive
STrz – third party,
Shall – Indicate a mandatory requirement.
GL S.A. – Grupa LOTOS S.A.

3.1 Hierarchy of documents.

Should 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 Division of new pipelines and modernized pipelines in LOTOS Group.

Pipelines division is shown in table 1

Table 1. The stages of pipeline design, construction and putting into operation

STAGE	PIPELINES				
	NEW (all are subject to qualification whether they meet the PED Directive requirements)		MODERNISED		
	SUBJECT TO EVALUATION BY NB (Issue of "Design examination certificate")	NOT SUBJECT TO EVALUATION BY NB	SUBJECT TO EVALUATION BY UDT	SUBJECT TO EVALUATION BY ZDT	NOT SUBJECT TO EVALUATION BY UDT OR BY ZDT
DESIGN	- opinion given by LOTOS Group - design examination by NB - EC design examination report - EC design examination certificate	- opinion given by LOTOS Group	- opinion given by LOTOS Group - opinion given by UDT - report on agreeing the documentation within the scope of modernisation	- opinion given by LOTOS Group - opinion given by ZDT	- opinion given by LOTOS Group
CONSTRUCTION	ACTIVITIES: - CE declaration of conformity - acceptance by Inspector - final acceptance by NB - CE final assessment report - EC testing certificate	ACTIVITIES: - acceptance by Inspector and ZDT or - acceptance by Supervision Inspector	ACTIVITIES: - acceptance by Inspector - acceptance by UDT	ACTIVITIES: - acceptance by Inspector - acceptance by ZDT	ACTIVITIES: - acceptance by Inspector
PUTTING INTO OPERATION	ACTIVITIES: - revision in operation and registration with UDT	ACTIVITIES: - revision in operation and registration with ZDT or - revision in operation by Inspector	ACTIVITIES: - revision in operation and registration with UDT	ACTIVITIES: - revision in operation and registration with ZDT	ACTIVITIES: - revision in operation by Inspector

4.1 General requirements:

4.1.1 Designing, materials, fabrication and acceptance of pipelines must fulfil the requirements of the European Pressure Equipment Directive 97/23/EC and other directives EC applicable to the given pipeline.

Essential Safety Requirements (ESR) described in Annax 1 of Directive 97/23/EC establishes materials which are allowed to be use for installations approved by PED Directive, there are materials:

a) compatible with harmonized standards or

b) included in European Approval of Material (EAM), use for construction of pressure devices or,

c) use of materials within Particular Material Appraisal (PMA)

4.1.2 Materials for elements used for construction of pipelines must have guaranteed by manufacturer resistance to brittle cracking at lowest allowable working temperature.

4.1.3 For pipelines designed for media with working temperature ≥20°C, pipeline designer will provide in pipeline maintenance instruction the way of pipeline start up when ambient temperature is below 20°C (eg during winter conditions when ambient temperature has minimal value)

4.1.4 Materials used for construction of pipelines must meet requirements of standards or specifications, confirmed in acceptance certificate 3.1. or 3.2 according to EN 10204: 2005.

4.1.5 Pressure equipment such as valves, strainers or special elements must have CE marking, if required.

4.1.6 Metallurgical products must be permanently marked to allow for unambiguous identification of the material, manufacturer and heat number.

4.1.7 Pipeline shall be equipped with pipeline identification plate (acc. Standard 2620), located and orientated in way that it shall be visible from accessible place. Accessible place shall be easy to approach and see the pipeline identification plate from the ground level or from designed (for others reasons) platforms.

4.2 Pipelines subject to conformity assessment by NB

4.2.1 Technical requirements

4.2.1.1 At the designing and manufacturing stage all <u>new</u> pipelines shall be subject to assessment for the fulfilment of the criteria of the EC directives, and after qualifying to hazard category I – III according to PED they are subject to conformity assessment by NB.

4.2.1.2 Method of proper qualifying of pipeline gives consideration to following criteria:

- type of medium: group 1 – dangerous
- type of medium: group 2 – others
- type of fluid: liquid or gas
- value of PS x DN (bar) product
  where: PS[bar] – maximum allowable pressure
  DN – nominal diameter

4.2.1.3 Conformity assessment modules for pipelines of appropriate hazard categories and specific project should be each time agreed with LOTOS Group S.A.

4.2.1.4 Qualifying to proper category should progress according to principles given in tables N° 2 and 3:

Table 2. Criteria of qualifying pipelines transferring dangerous media, group 1

Fluid	Criteria	Hazard category
Gases, Liquefied gases, Gases dissolved under pressure, Vapours, Liquids, for which positive vapours pressure at maximum allowable temperature TS is higher than 0.5bar	PS > 0.5 bar and DN ≤ 25	2)
	PS > 0.5 bar and 25 < DN ≤ 100 and PS × DN ≤ 1000 bar	**I** 1)
	PS > 0.5 bar and 100 < DN ≤ 350 and PS × DN ≤ 3500 bar, or 25 < DN ≤ 100 and PS × DN > 1000 bar	**II** 1)
	PS > 0.5 bar and DN > 350 or 100 < DN ≤ 350 and PS × DN > 3500 bar	**III**
Liquids, for which positive vapours pressure at maximum allowable temperature TS is lower than 0.5bar	PS > 0.5 bar and DN ≤ 25 or PS > 0.5 bar and DN > 25 and PS × DN ≤ 2000 bar	2)
	0.5 bar < PS ≤ 10 bar and PS × DN > 2000 bar	**I**
	10 bar < PS ≤ 500 bar and DN > 25 and PS × DN > 2000 bar	**II**
	PS > 500 bar and DN > 25	**III**

1) *Pipelines for unstable gases, qualified according to the table to I category, or II should be numbered among III category.*
2) *Requirements conforming to commonly acknowledged engineering practice (COP)*

Table 3. Criteria of qualifying pipelines transferring remaining media (not listed in group 1), group 2

Fluid	Criteria	Hazard category
Gases, Liquefied gases, Gases dissolved under pressure, Vapours, Liquid, for which positive vapours pressure at maximum allowable temperature TS is higher than 0.5bar	PS > 0.5 bar and DN ≤ 32 or PS > 0.5 bar and DN > 32 and PS × DN ≤ 1000 bar	2)
	PS > 0.5 bar and DN >32 and 1000 bar < PS × DN ≤ 3500 bar, or 32 < DN ≤ 100 and PS × DN > 3500 bar	**I**
	PS > 0.5 bar and DN >100 and 3500 bar < PS × DN ≤ 5000 bar or 100 < DN ≤ 250 and PS × DN > 5000 bar	**II** 1)
	PS > 0.5 bar and DN > 250 and PS × DN > 5000 bar	**III**
Liquids, for which positive vapours pressure at maximum allowable temperature TS is lower than 0.5bar	PS > 0.5 bar and DN ≤ 200 or 0.5 bar < PS ≤ 10 bar and DN > 200 or PS > 10 bar and DN > 200 and PS × DN ≤ 5000 bar	2)
	10 bar < PS ≤ 500 bar and DN > 200 and PS × DN > 5000 bar	**I**
	PS > 500 bar and DN > 200	**II**

1) *Pipelines containing fluids of temperature higher than 350ºC are numbered among III category.*
2) *Requirements conforming to commonly acknowledged engineering practice (COP)*

4.3 Pipelines subject to UDT inspection

4.3.1 Technical requirements

4.3.1.1 At the designing and manufacturing stage all modernised pipelines are subject to assessment for the fulfilment of the PED directive criteria, and after qualifying to hazard category I – III, according to UDT requirements, they are subject to immediate testing preceded by the agreement of the technical documentation within the scope of modernisation, for conformity with UDT or ASME technical conditions.

4.3.1.2 Materials use for modernization of pipeline shall be providing from manufacturer approved by UDT.

4.3.1.3 The following pipelines subject to UDT technical inspection:

- Process pipelines of nominal diameter higher than DN25, intended for transferring dangerous fluids under pressure exceeding 0.5 bar, having toxic, caustic or flammable properties which are:

  1) compressed gases, liquefied gases, gases dissolved under pressure, vapours and liquids whose vapour overpressure at the highest allowable temperature exceeds 0.5 bar;

  2) liquids whose vapours at the highest allowable temperature have overpressure lower than 0.5 bar if the product of the liquid overpressure and the pipeline nominal diameter is more than 2000 bar,

and classified according to rules specified in table N° 4,

- Steam pipelines, connecting boiler with turbine generator - classified according to rules specified in table N° 5,
  while giving consideration to below given criteria:

  - type of fluid: liquid or gas (not applicable to steam pipelines connecting boiler with turbine generator)

  - value of PS x DN product
    where: PS[bar] – maximum allowable pressure
    DN – nominal diameter

Table 4. Classification criteria for pipelines transferring dangerous fluids

Fluid	Criteria	Hazard category
Gases, vapours, liquids, which positive vapour pressure at maximum allowable temperature Ts is higher than 0.5 bar	PS > 0.5 bar and 25 < DN ≤ 100 and PS × DN ≤ 1000 bar	I [1)]
	PS > 0.5 bar and 100 < DN ≤ 350 and PS × DN ≤ 3500 bar or 25 < DN ≤ 100 and PS × DN > 1000 bar	II [1)]
	PS > 0.5 bar and DN > 350 or PS > 0.5 bar and DN > 100 and PS × DN > 3500 bar	III
Liquids, which positive vapour pressure at maximum allowable temperature Ts is lower than 0.5 bar	0.5 bar < PS ≤ 10 bar and PS × DN > 2000 bar	I
	10 bar < PS ≤ 500 bar and DN > 25 and PS × DN > 2000 bar	II
	PS > 500 bar and DN > 25	III
1) Pipelines for unstable gases transfer, qualified according to table among I category, or II should be numbered among III category.		

Table 5. Classification criteria for steam pipelines

Criteria	Hazard category
DN > 32 i 1000 bar <PS x DN ≤ 3500 bar or 32 < DN ≤ 100 and PS x DN > 3500 bar	**I**
DN > 100 i 3500 bar < PS x DN ≤ 5000 bar or 100 < DN ≤ 250 and PS x DN > 5000 bar	**II** [1)]
DN > 250 and PS x DN > 5000 bar	**III**
1) Pipelines of steam temperature higher than 350°C, qualified according to table among II category should be numbered among III category.	

4.4 Pipelines subject to ZDT inspection

4.4.1 Technical requirements

4.4.1.1 To technical inspection of ZDT are subjected new pipelines and pipelines under modernization that have not been qualified under UDT inspection, of nominal diameter starting from DN50 transferring:

- dangerous liquids or gases (flammable, explosive, toxic and caustic), of working pressure above 6 bar,
- steam of working pressure above 32 bar,
- hot water of working temperature above 100ºC and working pressure above 32 bar,
- other pipelines, considered by designer or user as requiring inspection, after approval of ZDT manager.

4.4.1.2 Division of pipelines, subject to ZDT, on classes is given in table No 6.

4.4.1.3 During designing and manufacturing stages, all pipelines qualified under ZDT inspection must meet conditions of technical requirements specified in WUDT-UC-WO-O, ASME B31.3 or ASME Boiler and Pressure Vessel Code Section VIII- Pressure Vessels

4.4.1.4 Manufacturer has to ask ZDT for inspection (piping examination and pressure test) with reference to these lines, which are under ZDT inspection during operation.

Table 6. Classification of pipelines according to type of medium, design pressure and design temperature

Pipeline class	Design temperature [°C]	Design pressure [bar]	Type of working medium
I	$-40 \le t_0 \le 200$	$0 \le p_0 \le 20$	safe
II	$-40 \le t_0 \le 200$	$0 \le p_0 \le 20$	dangerous
	$-200 \le t_0 \le -40$	$0 \le p_0 \le 40$	safe
	$200 \le t_0 \le 300$		
	$-40 \le t_0 \le 200$	$20 < p_0 \le 40$	
III	$-200 \le t_0 \le 300$	$40 < p_0 \le 64$	safe
	$300 < t_0 \le 450$	$0 \le p_0 \le 64$	
	$450 < t_0 \le 800$	$0 \le p_0 \le 0,7$	
	$-40 \le t_0 \le 200$	$20 < p_0 \le 64$	dangerous
	$-200 \le t_0 < -40$	$0 \le p_0 \le 64$	
	$200 < t_0 \le 450$		
	$450 < t_0 \le 800$	$0 \le p_0 \le 0,7$	
IV	$-200 \le t_0 \le 450$	$64 < p_0 \le 320$	safe
	$450 < t_0 \le 800$	$0,7 < p_0 \le 320$	dangerous
V	$-40 \le t_0 \le 450$	$p_0 > 320$	safe dangerous
If values of specific parameters for factor are overlapping different classes, then the pipeline should be qualified to higher class.			

5 Technical documentation

5.1 Technical documentation of pipelines subject to conformity assessment by NB

5.1.1 Technical documentation must be accompanied with design examination certificate, issued by Notified Body that is carrying design examination.

5.1.2 Independently from basic technical documentation, for each pipeline qualified to I, II, III hazard category according to PED, passport documentation is required according to Specification N° 8820.

5.1.3 For pipelines requiring registration with UDT the passport documentation according to the Specification N° 8820 should be agreed with Notified Body after review by ZDT.

5.2 Technical documentation of pipelines subject to UDT inspection

5.2.1 Independently from basic technical documentation, for each pipeline qualified to I, II, III hazard category according to UDT, passport documentation is required according to Specification N° 8820.

5.2.2 Technical passport of pipeline according to Specification N° 8820 is to be agreed with UDT, after review by ZDT.

5.3 Technical documentation of pipelines subject to ZDT inspection

5.3.1 Independently from basic technical documentation, for each pipeline qualified under ZDT inspection, passport documentation is required according to Specification N° 8820.

5.3.2 Technical passport of pipeline according to Specification No 8820 is to be agreed with ZDT.

6 Requirements relating to manufacturing

Installation of pipelines subject to acceptance may be performed by entities having an implemented quality management system.

6.1 Requirements for manufacturing of pipelines subject to conformity assessment by NB

6.1.1 The manufacturer should have a contract signed with the Notified Body UDT-CERT for providing the services of conformity assessment within the framework of B1+F or G modules.

6.1.2 Conformity assessment modules are shown in table 7.

Table 7. Conformity assessment modules with respect to the hazard category

Item	**Hazard categories**	**I, II, III**	**I, II, III**	**Notes**
	Conformity assessment modules	**G** [1)]	**B1+F** [1)]	
1	Materials assessment (if necessary)	**NB** [2)]	**NB** [2)]	
2	Design examinations – EC design examination report	**NB**	**NB**	
3	Issue of EC design examination certificate	**-**	**NB**	
4	Examination of welders – as per EN 287	**STrz**	**STrz**	

Item	Hazard categories	I, II, III	I, II, III	Notes
	Conformity assessment modules	**G** [1)]	**B1+F** [1)]	
5	Welding technology acceptance – as per EN 288	**STrz**	**STrz**	
6	NDT personnel certification – as per EN 473	**STrz**	**STrz**	NDT personnel as per EN 473
7	Qualification and certificate check	**NB**	**NB**	
8	Production and final testing control	**NB**	**NB**	
9	Final assessment, document check	**NB**	**NB**	
10	Final acceptance and pressure test	**NB**	**NB**	
11	Protecting accessories check	**NB**	**NB**	
12	EC declaration of conformity	**P**	**P**	
13	EC conformity certificate for carried out tests	**NB**	**NB**	

Notes:

1) Conformity assessment modules for the given design, shall be agreed with LOTOS Group in each time.

2) Materials must be used according to harmonised standards or they must be subjected to PMA (particular material appraisal).

6.2 Requirements for the manufacturing of pipelines subject to inspection by UDT

6.2.1 Pipelines should be manufactured in accordance with the UDT or ASME requirements.

6.3 Requirements for the manufacturing of pipelines subject to inspection by ZDT

6.3.1 Pipelines should be manufactured in accordance with the UDT or ASME requirements.

7 Requirements for acceptance tests

7.1 Requirements for acceptance testing of pipelines subject to conformity assessment by NB

7.1.1 Pipelines and their elements shall be subjected to tests to assess their manufacturing conformity with PED and with the design technical documentation. The acceptance of pipelines subject to final assessment according to the conformity assessment procedure app. III to Directive PED shall be done by authorised experts of the Notified Body.

7.1.2 Depending on adequate hazard category, among which the pipeline has been numbered and the application of the appropriate conformity assessment module, relevant acceptance competencies shall be used according to PED and agreements between user and Notified Body.

7.1.3 For projects executed in the LOTOS Group it shall be recommended to apply acceptance competence according to the tables Nos. 8, 9 and 10 below.

Table 8. Documents for design examination – competence

No.	Document type	Hazard category Conformity assessment module		Notes
		I, II, III G	I, II, III B1+F	
1	Hazard analysis and operation manual	**NB**	**NB**	
2	Pipeline material classes specific for the given task	**NB**	**NB**	
3	Pipeline supports specific for the given task	**NB**	**NB**	
4	Type of the strength analysis	**NB**	**NB**	
5	The maximum allowable spans between pipeline supports	**NB**	**NB**	
6	Description of standard components of pipelines	**NB**	**NB**	
7	Specification of all media	**NB**	**NB**	
8	P&I Diagrams	**NB**	**NB**	
9	Specification of pipelines	**NB**	**NB**	
10	Description of special elements of pipelines	**NB**	**NB**	
11	Welding specification / Welding data sheets (WDS)	**NB**	**NB**	
12	Strength analysis	**NB**	**NB**	To verify the adequate strength of pipelines
13	Type testing certificates	**NB**	**NB**	E.g. for safety valves
14	Design documents	**NB**	**NB**	E.g. isometric drawings with materials specifications
15	Technical data sheets	**NB**	**NB**	E.g. safety valves, expansion joints, spring supports and special supports

Table 9. Documents for pipeline construction inspection – competence

No.	Document type	Hazard category Conformity assessment module		Notes
		I, II, III G	I, II, III B1+F	
1	All documents as in Table 8	**NB**	**NB**	
2	Reports on material tests	**NB**	**NB**	To be enclosed by the contractor to the pipeline passport.
3	Pipeline component certificates	**NB**	**NB**	For components for which the producer issued a conformity certificate, marked CE
4	The welding documents collected by the manufacturer (WPAR and WPS) and welders' examination certificates	**NB**	**NB**	
5	NDT test reports and NDT personnel competence certificates	**NB**	**NB**	E.g. radiographic, ultrasonic and liquid-penetrant examinations
6	Heat treatment certificates issued by the pipeline contractor	**NB**	**NB**	To be enclosed by the contractor to the pipeline passport.
7	Certificates of material tests issued by the pipeline contractor	**NB**	**NB**	After installation and heat treatment
8	Welding logbook (containing isometric drawings) made by the pipeline contractor	**NB**	**NB**	Giving the identification of examined welds and post-welding conditions.

Table 10. Documents for pressure tests in the place of installation of the pipelines prior to putting them into operation – competence.

No.	Document type	Hazard category Conformity assessment module		Notes
		I, II, III G	I, II, III B1+F	
1	All documents as in Tables 8 and 9	**NB**	**NB**	
2	Specification of piping systems subject to a pressure test	**NB**	**NB**	
3	Connection diagrams of pipelines subject to a pressure test	**NB**	**NB**	
4	Certification of a professional making of a piping installation.	**NB**	**NB**	

7.1.4 Non-destructive testing of pipelines

The testing methods are subject to agreement with the organ of the competent NB for the scope and the application of testing techniques, the measuring and testing equipment, the possibility of fault identification and the qualifications of the testing personnel.

7.1.4.1 Unless the agreed technical documentation specifies more strict requirements, the number of welded joints subject to non-destructive examination that should be tested shall not be less than stated in table 11 below.

Table 11. Pipelines subject to classification according to directive PED

Hazard category according to PED	Joint quality level according to PN-EN ISO 5817	% of girth welds examined by the radiographic or ultrasonic method	% of fillet welds examined by the liquid-penetrant or magnetic particle inspection
I	**B**	**10**	**100**
II	**B**	**20**	**100**
III	**B**	**50**	**100**

7.1.4.2 Welded joints that have been subjected to post-weld heat treatment shall be 100 % examined by the radiographic or ultrasonic method.

7.1.4.3 Field welds shall be examined at a proportion not less that shown in Table 11.

7.1.4.4 Fillet welds shall be non-destructive examined 100%.

7.1.4.5 In design documentation, where the scope of radiographic examinations is specified (% of RT) , the substitution of this method with the ultrasonic one shall be allowed (UT) – only for field welds of diameters not less than 3" and of wall thickness not less than 8 mm –after agreement with NB.

7.1.5 Pipeline construction examination

Pipeline construction examination consists in external inspection of the pipeline over its whole length and in checking in particular the following:

- conformity of the pipeline construction with the technical design documentation, particularly conformity of material and fittings use for pipeline construction and its manufacturer tests certificates with material requirements specified in standards and technical specifications as required in design.
- conformity of tests results with the requirements,
- completeness and correctness of the as-built documentation,.
- licenses of people performing welding, heat treatment and plastic working,
- conformity of person authorisations responsible for the pipeline manufacturing and quality control with the personnel lists and with the enclosed manufacturing and quality control licenses,
- conformity of pipeline marking with the rules provided in the documentation.

The result of pipeline construction examination shall be considered to be successful if the above-mentioned requirements have been fulfilled.

7.1.6 Pressure tests

7.1.6.1 A pressure test shall be done by means of appropriate equipment and applying the necessary safety measures, so that persons responsible for the test can safely control all parts of the pipeline under test pressure.

7.1.6.2 A pressure test can be made as one of two possible types, according to the documentation:

- a water-pressure test,
- a pneumatic test.

7.1.6.3 Conditions of conducting a pressure test

A pressure test during technical acceptance shall be carried out:

- after the heat treatment,
- before painting or insulating,
- after conducting non-destructive tests,
- after conducting the construction examination and other required inspections.

7.1.6.4 The water-pressure test

- The water-pressure test is made with water. The water quality shall be such that equipment is protected against corrosion and undesirable substances. If other liquids are used, safety measures suitable for the type of the liquid shall be taken.
- water used for testing piping systems of austenitic steel shall be controlled for chlorides content which shall not exceed 30 ppm.
- Test pressure should be in accordance with design documentation requirements.

7.1.6.5 The pneumatic test

This test shall be allowed only in cases where a water-pressure test would be harmful to the pipelines or impossible to carry-out; this applies in particular to pipelines in processes in which even trace quantities of liquid are not allowed.

A pneumatic test may be made only with the operator's consent and the consent of the competent unit of technical inspection, on the basis of an agreed instruction.

Due to the threats involved in a pneumatic test, the executor of the test shall pay special attention to keeping the maximum possible safety conditions during the test, ensuring that only personnel appointed for the test can access the hazard area by enclosing and posting warning signs and no-entry signs around the area.

Pneumatic tests are made using air or other gas.

Pneumatic test pressure shall not be lower than 1.1 of the allowable pressure (PS).

7.1.7 Manufacturing, inspection and test reports

- EC final assessment report, EC conformity certificate.

7.2 Requirements for acceptance testing of pipelines subject to inspection by UDT

7.2.1 After completion of manufacturing process, pipelines and their elements should be subjected to tests for assessment of manufacturing conformity to design technical documentation and technical requirements agreed with UDT. Authorized inspectors of UDT execute acceptance of pipelines.

7.2.2 Acceptance competence for modernised pipelines subject to technical supervision by UDT are shown in tables 12, 13 and 14 below:

Table 12. Documents required for the agreement of the documentation of pipeline

No.	Document type	Hazard category			Notes
		I	II	III	
1	Pipeline material classes specific for the given task	**UDT**			
2	Pipeline supports specific for the given task	**UDT**			
3	Type of the strength analysis	**UDT**			
4	The maximum allowable spans between pipeline supports	**UDT**			
5	Description of standard components of pipelines	**UDT**			
6	Specification of all media	**UDT**			
7	P&I Diagrams	**UDT**			
8	Specification of pipelines	**UDT**			
9	Description of special elements of pipelines	**UDT**			
10	Welding specification / Welding data sheets (WDS)	**UDT**			
11	Strength analysis	**UDT**			To verify the adequate strength of pipelines
12	Type testing certificates	**UDT**			E.g. for safety valves
13	Design documents	**UDT**			E.g. isometric drawings with materials specifications
14	Technical data sheets	**UDT**			E.g. safety valves, expansion joints, spring supports and special supports

Table 13. Documents for the control of the construction of the pipeline.

No.	Document type	Hazard category			Notes
		I	II	III	
1	All documents as in Table 12	**UDT**			
2	Reports on material tests	**UDT**			To be enclosed by the contractor to the pipeline passport.
3	Pipeline component certificates	**UDT**			For components for which the producer issued a conformity certificate, marked CE
4	The welding documents collected by the manufacturer (WPAR and WPS) and welders' examination certificates	**UDT**			
5	NDT test reports and NDT personnel competence certificates	**UDT**			E.g. radiographic, ultrasonic and liquid-penetrant examinations
6	Heat treatment certificates issued by the pipeline contractor	**UDT**			To be enclosed by the contractor to the pipeline passport.
7	Certificates of material tests issued by the pipeline contractor	**UDT**			After installation and heat treatment

No.	Document type	Hazard category			Notes
		I	II	III	
8	Welding logbook (containing isometric drawings) made by the pipeline contractor	**UDT**			Giving the identification of examined welds and post-welding conditions.

Table 14. Documents for pressure tests in the place of installation of pipelines before their putting into operation.

No.	Document type	Hazard category			Notes
		I	II	III	
1	All documents as in Tables 12 and 13	**UDT**			
2	Specification of piping systems subject to a pressure test	**P**			
3	Connection diagrams of pipelines subject to a pressure test	**P**			
4	Certification of a professional making of a piping installation.	**UDT**			

7.2.3 Non-destructive testing of pipelines

The testing methods are subject to agreement with the organ of the competent NB for the scope and the application of testing techniques, the measuring and testing equipment, the possibility of fault identification and the qualifications of the testing personnel.

7.2.3.1 Unless the agreed technical documentation specifies more strict requirements, the number of welded joints subject to non-destructive examination that should be tested shall not be less than stated in table 15 below.

Table 15. Pipelines subject to classification according to UDT regulations

Hazard category according to UDT	Joint quality level according to PN-EN ISO 5817	% of girth welds examined by the radiographic or ultrasonic method	% of fillet welds examined by the liquid-penetrant inspection
I	**B**	**10**	**100**
II	**B**	**20**	**100**
III	**B**	**50**	**100**

7.2.3.2 Welded joints that have been subjected to post-weld heat treatment shall be 100 % examined by the radiographic or ultrasonic method.

7.2.3.3 Field welds shall be examined at a proportion not less that shown in Table 15.

7.2.3.4 Fillet welds shall be non-destructive examined 100%.

7.2.3.5 In design documentation, where the scope of radiographic examinations is specified (% of RT), the substitution of this method with the ultrasonic one shall be allowed (UT) – only for field welds of diameters not less than 3" and of wall thickness not less than 8 mm – after agreement with UDT.

7.2.4 Pipeline construction examination

Pipeline construction examination consists in external inspection of the pipeline over its whole length and in checking in particular the following:

- conformity of the pipeline construction with the technical design documentation, particularly conformity of material and fittings use for pipeline construction and its manufacturer tests certificates with material requirements specified in standards and technical specifications as required in design.
- conformity of tests results with the requirements,
- completeness and correctness of the as-built documentation,
- licenses of people performing welding, heat treatment and plastic working,
- conformity of person authorisations responsible the pipeline manufacturing and quality control with the personnel lists and with the enclosed manufacturing and quality control licenses,
- conformity of pipeline marking with the rules provided in the documentation.

The result of pipeline construction examination shall be considered to be successful if the above mentioned requirements have been fulfilled.

7.2.5 Pressure tests

7.2.5.1 A pressure test shall be done by means of appropriate equipment and applying the necessary safety measures, so that persons responsible for the test can safely control all parts of the pipeline under test pressure.

7.2.5.2 A pressure test can be made as one of two possible types, according to the documentation:

- a water-pressure test,
- a pneumatic test.

7.2.5.3 Conditions of conducting a pressure test

A pressure test during technical acceptance shall be carried out:

- after the heat treatment,
- before painting or insulating,
- after conducting non-destructive tests,
- after conducting the construction examination and other required inspections.

7.2.5.4 The water-pressure test

- The water-pressure test is made with water. The water quality shall be such that equipment is protected against corrosion and undesirable substances. If other liquids are used, safety measures suitable for the type of the liquid shall be taken.
- water used for testing piping systems of austenitic steel shall be controlled for chlorides content which shall not exceed 30 ppm.
- Test pressure should be in accordance with design documentation requirements.

7.2.5.5 The pneumatic test

This test shall be allowed only in cases where a water-pressure test would be harmful to the pipelines or impossible to carry-out; this applies in particular to pipelines in processes in which even trace quantities of liquid are not allowed.

A pneumatic test may be made only with the operator's consent and the consent of the competent unit of technical inspection, on the basis of an agreed instruction.

Due to the threats involved in a pneumatic test, the executor of the test shall pay special attention to keeping the maximum possible safety conditions during the test, ensuring that only personnel appointed for the test can access the hazard area by enclosing and posting warning signs and no-entry signs around the area.

Pneumatic tests are made using air or other gas.

Pneumatic test pressure shall not be lower than 1.1 of the allowable pressure (PS).

7.2.6 Manufacturing, inspection and test reports

Certificates of the construction examination and the pressure test of the pipeline.

7.3 Requirements for acceptance testing of pipelines subject to inspection by ZDT

7.3.1 After completion of manufacturing process, pipelines and their elements should be subjected to tests for assessment of manufacturing conformity to design technical documentation and technical requirements agreed with ZDT. Authorized inspectors of ZDT execute acceptance of pipelines.

7.3.2 Acceptance competence tables for pipelines subject to technical inspection by ZDT are given below in tables 16, 17 and 18:

Table 16. Documents for design examination

No.	Document type	Piping class			Notes
		II	III	IV	
1	Pipeline material classes specific for the given task	**ZDT**			
2	Pipeline supports specific for the given task	**ZDT**			
3	Type of the strength analysis	**ZDT**			
4	The maximum allowable spans between pipeline supports	**ZDT**			

No.	Document type	Piping class			Notes
		II	III	IV	
5	Description of standard components of pipelines	**ZDT**			
6	Specification of all media	**ZDT**			
7	P&I Diagrams	**ZDT**			
8	Specification of pipelines	**ZDT**			
9	Description of special elements of pipelines	**ZDT**			
10	Welding specification / Welding data sheets (WDS)	**ZDT**			
11	Strength analysis	**ZDT**			To verify the adequate strength of pipelines
12	Type testing certificates	**ZDT**			E.g. for safety valves
13	Design documents	**ZDT**			E.g. isometric drawings with materials specifications
14	Technical data sheets	**ZDT**			E.g. safety valves, expansion joints, spring supports and special supports

Table 17. Documents for the pipeline construction inspection

No.	Document type	Piping class			Notes
		III	III	IV	
1	All documents as in Table 16	**ZDT**			
2	Reports on material tests	**ZDT**			To be enclosed by the contractor to the pipeline passport.
3	Pipeline component certificates	**ZDT**			For components for which the producer issued a conformity certificate, marked CE
4	The welding documents collected by the manufacturer (WPAR and WPS) and welders' examination certificates	**ZDT**			
5	NDT test reports and NDT personnel competence certificates	**ZDT**			E.g. radiographic, ultrasonic and liquid-penetrant examinations
6	Heat treatment certificates issued by the pipeline contractor	**ZDT**			To be enclosed by the contractor to the pipeline passport.
7	Certificates of material tests issued by the pipeline contractor	**ZDT**			After installation and heat treatment
8	Welding logbook (containing isometric drawings) made by the pipeline contractor	**ZDT**			Giving the identification of examined welds and post-welding conditions.

Table 18. Documents for pressure tests in the place of installation of pipelines before their putting into operation.

No.	Document type	Piping class			Notes
		II	III	IV	
1	All documents as in Tables 16 and 17	ZDT			
2	Specification of piping systems subject to a pressure test	P			
3	Connection diagrams of pipelines subject to a pressure test	P			
4	Certification of a professional making of a piping installation.	ZDT			

7.3.3 Non-destructive testing of pipelines

The testing methods are subject to agreement with the organ of the competent NB for the scope and the application of testing techniques, the measuring and testing equipment, the possibility of fault identification and the qualifications of the testing personnel.

7.3.3.1 Unless the agreed technical documentation specifies more strict requirements, the number of welded joints subject to non-destructive examination that should be tested shall not be less than stated in table 19 below.

Table 19. Pipelines subject to classification according to ZDT requirements

Class of the pipeline subject to inspection by ZDT		Joint quality level according to PN-EN ISO 5817	% of girth welds examined by the radiographic or ultrasonic method	% of fillet welds examined metodą penetracyjną
II	safe media	**C**	**10**	**100**
	hazardous media	**C**	**20**	**100**
III	safe media	**C**	**10**	**100**
	hazardous media	**B**	**50**	**100**
IV	safe media	**C**	**100**	**100**
	hazardous media	**B**	**100**	**100**

7.3.3.2 Welded joints that have been subjected to post-weld heat treatment shall be 100 % examined by the radiographic or ultrasonic method.

7.3.3.3 Field welds shall be examined at a proportion not less that shown in Table 19.

7.3.3.4 Fillet welds shall be non-destructive examined 100%.

7.3.3.5 In design documentation, where the scope of radiographic examinations is specified (% of RT), the substitution of this method with the ultrasonic one shall be allowed (UT) – only for field welds of diameters not less than 3" and of wall thickness not less than 8 mm – after agreement with ZDT.

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- completeness and correctness of the as-built documentation,.
- licenses of people performing welding, heat treatment and plastic working,
- conformity of person authorisations responsible the pipeline manufacturing and quality control with the personnel lists and with the enclosed manufacturing and quality control licenses,
- conformity of pipeline marking with the rules provided in the documentation.

The result of pipeline construction examination shall be considered to be successful if the above-mentioned requirements have been fulfilled.

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7.3.5.2 A pressure test can be made as one of two possible types, according to the documentation:

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- a pneumatic test.

7.3.5.3 Conditions of conducting a pressure test

A pressure test during technical acceptance shall be carried out:

- after the heat treatment,
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- after conducting non-destructive tests,
- after conducting the construction examination and other required inspections.

7.3.5.4 The water-pressure test

- The water-pressure test is made with water. The water quality shall be such that equipment is protected against corrosion and undesirable substances. If other liquids are used, safety measures suitable for the type of the liquid shall be taken.
- water used for testing piping systems of austenitic steel shall be controlled for chlorides content which shall not exceed 30 ppm.
- Test pressure should be in accordance with design documentation requirements.

7.3.5.5 The pneumatic test

This test shall be allowed only in cases where a water-pressure test would be harmful to the pipelines or impossible to carry-out; this applies in particular to pipelines in processes in which even trace quantities of liquid are not allowed.

A pneumatic test may be made only with the operator's consent and the consent of the competent unit of technical inspection, on the basis of an agreed instruction.

Due to the threats involved in a pneumatic test, the executor of the test shall pay special attention to keeping the maximum possible safety conditions during the test, ensuring that only personnel appointed for the test can access the hazard area by enclosing and posting warning signs and no-entry signs around the area.

Pneumatic tests are made using air or other gas.

Pneumatic test pressure shall not be lower than 1.1 of the allowable pressure (PS).

7.3.6 Manufacturing, inspection and test reports

Certificates of the construction examination and the pressure test of the pipeline.

8 Relevant documents.

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

9 Standards and regulations

- European Pressure Equipment Directive (PED) 97/23/EC
- WUDT-UC-RT: Conditions of Office of Technical Inspection – Pressure Equipment – Process pipelines
- WUDT-UD-WO-O: Conditions of Office of Technical Inspection – Pressure Equipment – General Requirements – Strength calculations
- EN 10204 (2005 edition) – Metallic products. Types of inspection documents.
- PN-EN 729-3:1997 – Welding technology – Metal welding – welding quality control requirements

Standard use for process media pipelines.

- ASME B31.3: Process Piping. ASME Code for Pressure Piping, B31
- ASME – Boiler and Pressure Vessel Code: Section VIII - Pressure Vessels

Standards use for auxiliary media pipelines.

- PN-EN 10216 - Seamless steel tubes for pressure purposes Technical delivery conditions Part 1: to Part 5.
- PN EN 10028 - Flat products made of steels for pressure purposes - Part 1 to Part 7.
- PN EN 10222 - Steel Forgings for Pressure Purposes - Part 1 to Part 5.

10 Record of changes

No.	Date	Description	Introduced by
1		This specification entirely replaces the former LOTOS Group S.A. standard No. PR 07 880 with the same title.	B. Kowalewski
2.	22.11.2006	changed points: 3, 4, 4.1.1, 4.1.2, 4.1.3, 4.2.1.1, 4.3.1.1, 4.3.1.2, 4.3.1.3, 4.4.1.1, 4.4.1.3, 4.4.1.4, 5.1.2, 5.1.3, 5.2.1, 6.1 ("notes"), 6.1.1, 6.2, 6.2.1, 6.3, 6.3.1, 7.1.1, 7.1.5, 7.1.6.4, 7.2, 7.2.4, 7.2.5.4, 7.3, 7.3.4, 7.3.5.4, 9 Removed point: 4.4.1.5 Added point: 6.1.2 changed tables: 1, 7, 8, 9, 10, 11, 12, 13, 15, 19	M.Rapior
3	13-06-2011	Changed points: 1, 4.1.2, 4.1.3, 6.1.2 note 2). Deleted point 4.3.1.3. Added points: 4.4.1.4 Changed tables: 11, 15 Updated point: 9 Standards and regulations.	TD
4	30-11-2013	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