

TECHNICAL SPECIFICATION (TS)

CONSTRUCTION OF THE HCL SYNTHESIS UNIT

1. Introduction

ANWIL S.A. uses a chlorine and sodium lye installation in membrane technology. Synthetic hydrochloric acid is used for the purification and electrolysis of brine. With this in mind, we intend to build a synthetic hydrochloric acid production unit.

2. Brief description of the process

The main raw materials for the production of synthetic hydrochloric acid will be chlorine gas and hydrogen gas. Chlorine gas will come from stream after the E141 chlorine. The hydrogen stream will come from a T181 hydrogen tank, that is a gasometer. A detailed specification of the streams can be found in APPENDIX NO. 2 – SPECIFICATION OF RAW MATERIALS AND CARRIERS. The generated synthetic hydrochloric acid will be used for the production of chlorine and sodium lye, while the surplus will be transported to storage tanks (located away from the installation).

3. Projected scope of supplies

Comprehensive performance of task referred to as "THE CONSTRUCTION OF THE HYDROCHLORIC ACID SYNTHESIS UNIT" at ANWIL S.A., based on the EPC formula, comprising the technological installation of hydrochloric acid synthesis. We expect the construction of the complete synthetic hydrochloric acid unit with requisite infrastructure (including but not limited to: structures, traffic routes, trestle bridges, occupational safety and health equipment, fire protection devices, etc.) and its embedding into the existing installations in the locations specified in APPENDIX NO. 3 – PLOT BOUNDARIES.

We expect that the newly-built unit will be based on available technology already used in industry (it will not be a prototype solution). The scope of supply in the project should include but not be limited to:

- A site inspection to the location of the planned works;
- Preparatory works including but not limited to: fencing the works area, preparation of the construction facilities, securing machinery/equipment in the immediate vicinity of the work being carried out, etc.;
- Supply of the Licence for the technological processes;
- Development of the multi-discipline project documentation (site development design, architectural-construction design, technical design and detailed design), development of requisite manuals and other documentation required according to law;
- Issuing, on behalf of ANWIL, and obtaining all requisite formal and legal decisions with arrangements for the comprehensive implementation of the task at hand, together with obtaining legally required decisions and permits;

- Preparation of documentation on the ground substrate examination in the location where the works are to be performed (together with the geotechnical opinion) to the layer of load-bearing soil, but not less than 10 m deep, and the assessment of environmental aggression of water and land.
- Confirmation that if the geological survey confirms the necessity of piling, then such piling will be performed under the building/facilities to the depths arising from the geological documentation (to be entered as a separate item in the commercial quotation. If not required, the scope of the works and the value of the remuneration will be reduced by the amount stated);
- Should the existing structural elements be used, e.g. supports, trestle bridges, foundations, etc., the Contractor is obliged to prepare a physical inventory of the existing condition and an expert opinion on the technical condition of the elements used, together with strength calculations to confirm their suitability for using in the newly designed elements. Should the load-bearing capacity prove insufficient, the Contractor is obliged to develop a design of reinforcement or design of new support structures;
- Demolition works required for the comprehensive implementation of the project (if necessary, development of a demolition design).
- Relocation of underground infrastructure in the event of a collision.
- If necessary, development of a design for the road and installation sectors.
- Confirmation that the bidder will manage the earth and debris from the excavations for the installation;
- Confirmation that materials for the pressure equipment come with an acceptance certificate 3.1 according to EN 10204, and the manufacturer of the materials has a proper quality assurance system in place, certified by a competent body established in the EU and subjected to a specific assessment of the materials for compliance with the PED;
- Confirmation of the origin of equipment and installations from recognised suppliers together with the place of manufacture in the EU, USA, Canada, South Korea, Japan, and the maintenance of such equipment is located in the EU;
- Design, execution and assembly, with all connections to the existing installation, launch and positive test of the brand new hydrochloric acid synthesis unit together with requisite protection against weather conditions on the construction site;
- Design, execution and assembly, with all connections to the existing installation, of meters of raw materials and energy carriers (electricity, cooling water) requisite for the operation of the unit);
- Design and assembly of safety devices of hot surfaces, emergency showers at every level of the installation, antisplash bands, marking of the installation and pipelines, protection and drain trays, detectors, staircases (ladders are unacceptable), maintenance platforms and emergency lighting;
- Design and execution of support structures and pipelines based on ANWIL S.A.'s guidelines on fire resistant protection devices. The protection system should be agreed

with ZSP ANWIL;

- Execution of anti-corrosion protection for all steel elements in accordance with the technical requirements for the execution and acceptance of anti-corrosion protection for renovation, modernization and newly planned investment projects of ANWIL S.A.
- Design and execution of pressure devices, so that all supervision periodical tests may be performed (pressure test, internal review) in compliance with applicable legal provisions and proposing and preparing an alternative scope and time schedule of NDT tests, which will be agreed with and approved by appropriate supervising units, the Office of Technical Inspection and ANWIL S.A.'s experts in a specific discipline The Contractor will prepare a manual for supervision periodical tests as regards the performance of the aforementioned tests.
- For each device, base ultrasound measurements are to performed of wall thickness according to the measurement grid agreed with the Office of Technical Supervision and experts in a specific discipline. All such measurements are to be documented with reports and presented in the specification below.
- Compilation of all devices (in EXCEL file with the extension .xlsx) located on the newly constructed facility, containing technical data and a description of the operation of each device;
- Purchase and delivery of all requisite devices, piping with instrumentation and performance of comprehensive assembly works;
- Purchase and delivery of devices requisite for the safe operation of the installation – occupational safety and health, fire protection installations, together with marking of the installations with required pictograms;
- Intersystem connections with the existing installation (raw materials, carriers, product, waste water);
- Acquiring Environmental Permits and changes of the Integrated Permit for the undertaking, which will enable the construction, launch and use of the hydrochloric acid synthesis unit;
- Protection trays to drain leakages on all levels of the structure;
- A package of specialised training courses requisite to conduct and complete the investment properly;
- Staff training in operation of the technological process;
- Training Maintenance System specialists in assembly and maintenance.
- Author's supervision of the performance of the works;
- Development of the multi-discipline as-built documentation according to ANWIL S.A.'s standards;
- Performance of cleaning works including supplementary works within the task area;

Note: quotations and the agreement will be based on EPC formula

4. Basic requirements as regards the functioning of the new hydrochloric acid synthesis unit

We expect that the new unit:

- Will generate synthetic hydrochloric acid of at least 32% w/w concentration;
- Will allow stable operation from 30% to 100% of nominal capacity based on one indicated chlorine gas stream located after the E141 chlorine cooler.
- Will reach the expected parameters of outgoing technological flows (APPENDIX No. 1 to TS – REQUIRED PARAMETERS OF PROCESS FLOWS)
- It will come equipped with an operating (buffer) tank with a pump to send the acid to the stagnant tank;
- It will come equipped with an operating (buffer) tank with a pump for a stable supply of demineralised water to the installation;
- Will be controlled and steered by a DCS system, compatible with the one existing in our installation;
- The blockade system will be effected by the ESD system;
- The node should be designed and constructed in such a manner as for the connection to the other parts of the chlorine-alkaline installation and launch to require the minimum downtime of the entire installation;
- The acoustic pressure level generated by the synthesis unit will not exceed 80 dB (noise measured at the distance of 1 metre from the device);
- The noise level generated by the entire installation fulfils the legal requirements;
- Ensuring parts for commissioning and putting into operation;
- List and cost of spare parts for 2 years of operation.

5. Expected process guarantees

- Concentration, temperature and content of contaminants in the synthetic hydrochloric acid in compliance with APPENDIX NO. 1 – REQUIRED PROCESS FLOW PARAMETERS;
- Consumption of raw materials and carriers:
 - Consumption of cooling water [m³/t HCl wp. 100%];
 - Consumption of electricity [kW/t HCl wp. 100%];
 - Consumption of chlorine (Cl₂ wp. 100%) [kg/t HCl wp. 100%];
 - Consumption of hydrogen [kg/t HCl wp. 100%];
 - Consumption of demineralised water [m³/t HCl wp. 100%];

6. The technical quotation should include at least (as arranged below and according to the following order of issues)

- Statement on the performance of the full scope as defined in the request for proposals;
- Technical description of the subject matter of the tender and the manner of execution enabling the assessment of the compliance level of the scope subject to a quotation

with the detailed requirements defined in the technical specification in all the disciplines;

- Dimensional sketches of the installation on offer;
- Description of the process;
- Initial time schedule of the performance of the investment;
- Simplified process diagrams (pressure, temperature, stream content);
- Specification of procedural guarantees in accordance with point 5 of the TS;
- The list of key devices and Control and Instrumentation Equipment;
- Confirmation of the performance on behalf of ANWIL S.A. of all formal, legal and administrative activities (including the preparation of amendments to the Integrated Permit) for the comprehensive implementation of the task at hand;
- Confirmation of the preparation of the documentation of the ground investigation at the site of the works together with issuing the geotechnical opinion;
- Confirmation of piling (if necessary);
- Confirmation of the preparation of a multi-discipline construction design to obtain the Polish building permit;
- Confirmation of obtaining a decision on environmental conditions and its finality;
- Provision of the author's supervision;
- Confirmation of the performance of a detailed design in all the required disciplines, including such details as may be not included in the construction designed and detailed technical requirements of ANWIL SA;
- Confirmation of the acquisition of the construction permit by the bidder together with all requisite arrangements (occupational safety and health, fire production, etc.) and permits for the operation of the installation;
- Confirmation of the delivery of Certificates of Constancy of Performance, Certificate of Approval, KOT, EOT, Declaration of Performance, Certificates of Conformity;
- Confirmation of the performance of deliveries;
- Confirmation of the delivery of such interlocking equipment as to enable the application of the ANWIL S.A. LOTO (Lock-out/Tag-out) system, whereas any and all equipment and apparatus supplied should be suitable for the application of the LOTO system;
- Confirmation of the comprehensive performance of all construction and assembly works;
- Confirmation of the performance of the mechanical and technological commissioning;
- Confirmation of the preparation of documentation for the registration of equipment / apparatus / pipelines with the Office of Technical Inspection / Transport Technical Supervision / Technical Inspection Authority and their registration with the relevant organs of the Office of Technical Inspection / Transport Technical Supervision / Technical Inspection Authority with obtaining administrative decisions to authorise their operation
- Confirmation of the completion of the scope of works pursuant to APPENDIX NO. 4 –

REQUIREMENTS OF THE INSPECTION DEPARTMENT OF THE OFFICE OF TECHNICAL INSPECTION / TRANSPORT TECHNICAL SUPERVISION / TECHNICAL INSPECTION AUTHORITY.

- Confirmation of the completion of the HAZOP analysis, classification of explosion hazard zones and the EPD (Explosion Protection Document) in accordance with the internal regulation in force at ANWIL S.A. and submission of quantitative data of SEVESO III substances (required for updating the documentation of the High Risk Facility);
- Confirmation of the data for the development of the manuals specified in APPENDIX NO. 9 – DATA FOR THE DEVELOPMENT OF MANUALS;
- Confirmation of the preparation of the evacuation plan for the building;
- Confirmation of the development of the following manuals: workstation, machine and equipment operation, occupational safety and health, environmental protection, fire safety in accordance with the internal regulations in force at ANWIL S.A.;
- Confirmation of the creation of a construction facility book in accordance with the Polish Construction Law;
- Confirmation of a training organised for the supervision, installation operation, Maintenance System personnel in the operation of the installation, devices, apparatus and maintenance of technological operation;
- Confirmation of the delivery of the detailed design and as-built design to ANWIL S.A., requisite for the operation of the installation in compliance with the Polish legal provisions and other requirements in line with the good engineering practices and standards effective at ANWIL S.A.;
- Confirmation that the bidder has participated in a site inspection and acknowledged the conditions and the scope of the works directly at the facility;
- The Contractor's confirmation of the acknowledgement and application of technical conditions of execution and acceptance by ANWIL S.A.;
- Confirmation of documents uploading to the ARCHEO system;
- Confirmation by the Contractor of the implementation of the AUR system;
- Confirmation of issuing the declaration of conformity CE, confirming compliance with proper directives and harmonised standards – respectively of the completed installation/machine 2A;
- Potential exclusions from the scope of supplies.

Note: all documents should be delivered in Polish or in Polish and in English.

7. Standards

- The design and equipment must be in compliance with the legal provisions applicable in Poland and in the European Union;
- The engineering documentation must be prepared in accordance with the applicable Polish standards, regulations and ANWIL S.A. policies.
- All the equipment supplied must be CE- or B-marked;

- The marking system of devices, instrumentation, pipelines, valves, blockades, etc. should comply with the system applied at ANWIL S.A.'s installation and must be accepted by ANWIL S.A.

8. Miscellaneous requirements/information

- The quotation should be submitted in Polish or in Polish and in English;
- ANWIL S.A.'s specialists can visit at least one (1) reference installation designed and implemented by the bidder;
- This specification with the request has been sent to suppliers of technology and to engineering companies. It may happen that engineering companies may apply to suppliers of technology with request for the same design.
- It is the Contractor's responsibility to be familiar and comply with the Internal Organisational Regulations (IOR) of ANWIL S.A., including the Technical Standards of ANWIL S.A. (Annex 16) for the respective disciplines;

9. Requirements as regards the unit

9.1. The requirements of the following disciplines: Control and Instrumentation Equipment, construction, mechanical, electrical and centrifugal machinery for the unit are specified in:

- APPENDIX NO. 5 – CONSTRUCTION DISCIPLINE REQUIREMENTS
- APPENDIX NO. 6 – ELECTRICAL DISCIPLINE REQUIREMENTS
- APPENDIX NO. 7 – CONTROL REQUIREMENTS
- APPENDIX NO. 11 – MECHANICAL DISCIPLINE REQUIREMENTS
- APPENDIX NO. 16 – TECHNICAL STANDARDS OF ANWIL S.A.

9.2. Requirements for corrosion and chemical resistance

All the steel elements except acid-resistant steel should be protected against corrosion in atmosphere corrosivity class C5 according to PN-EN ISO 12944-2. Materials of one system of protection devices should be used. Anti-corrosion painting sets of the following companies: Hempel, Teknos, International have been checked and are used on the premises of ANWIL S.A. . The technology of protection devices must be agreed and accepted by the Ordering Party. The detailed information is contained in the Technical requirements for the execution and acceptance of anti-corrosion protection for renovation, modernisation works and newly planned investment projects at ANWIL S.A. The temperature of the pipelines must also be considered when selecting a system corrosion protection system.

The chemical protection should be selected according to the carrier involved.

NOTE: support structures of apparatus and pipelines should be protected pursuant to ANWIL S.A.'s guidelines on fire resistant protection devices. The protection system

should be agreed with ZSP ANWIL;

9.3. Environmental protection requirements

- The technology used should ensure compliance with environmental protection requirements and regulations, including such BAT requirements as may apply to the installation, as well as requirements under national law. The technology used must not cause emission standards to the environment to be exceeded, both at the stage of project implementation and installation operation;
- The installation should emit the lowest possible noise and the lowest possible levels of potential emissions to air and waste water;
- Application of ANWIL S.A. Technical Standards and guidelines for contractors working on the premises of ANWIL S.A. during the design and execution stages.
- Obtaining Environmental Permits for the undertaking;
- Analysis of the risk of soil, ground and groundwater contamination by substances causing such risk where necessary: initial report on the status of soil, ground and groundwater contamination by substances causing such risk;
- Before commissioning the installation, the Contractor will conduct measurements related to emissions into the air in the event of new potential emission sources emerging. These measurements will be conducted pursuant to the currently applicable legal provisions;
- Before commissioning the installation, the Contractor will conduct noise emission measurements. Such measurements will be conducted pursuant to the currently applicable legal provisions and in accordance with the applicable standards within this scope;
- Waste management requirements:
 - At the stage of applying for the decision on environmental conditions, the Contractor will indicate the method of the management of such waste as may be generated both during the construction and subsequent operation of the project and specify the type and catalogue name of such waste (waste code). In addition, the Contractor will specify the quantity of waste generated (in Mg/year unit) together with: a brief description of the origin of its generation, its physical and chemical properties; should the waste be classified as hazardous, the Contractor will indicate its properties to confirm the aforementioned classification. The Contractor will confirm this information in the detailed design;
 - The Contractor will be responsible for the waste generated during the construction stage of the installation and will, at its own expense, dispose of such waste (other than steel scrap) generated during the performance of the task to a suitable landfill site;
 - Scrap from dismantling works, generated in the course of the task, is the property of the Ordering Party. During the works, the Contractor will store such scrap metal in a designated area. Upon completing the works, the Contractor will transfer such scrap metal to the designated scrap site

located at Anwil S.A. and provide scrap metal return documents with weighing reports and a list of waste generated. The method of scrap segregation and preparation is specified in the guidelines of the Order entitled "Management of scrap metal and waste intended for resale at ANWIL S.A.," available on the Ordering Party's website;

- The Contractor is obliged to have agreements with authorised waste collectors and, at the request of the Ordering Party, to present relevant documents to confirm the transfer of the aforementioned waste. The site will be tidied up before the installation is put into service;
- Having rendered the service, the Contractor becomes the Waste Producer and assumes full liability for its initial storage, transport and delivery to an authorised recipient.

The list of internal organisational regulations binding for contractors is published at:
<http://www.anwil.orlden.pl/PL/StrefaZakupow/Strony/Wytyczne-ANWIL-dla-Oferentow-i-Wykonawcow.aspx>

9.4. Documentation requirements

- APPENDIX NO. 4 – REQUIREMENTS OF THE INSPECTION DEPARTMENT:
OFFICE OF TECHNICAL INSPECTION / TRANSPORT
TECHNICAL SUPERVISION / TECHNICAL INSPECTION
AUTHORITY
- APPENDIX NO. 8 – DOCUMENTATION REQUIREMENTS
- APPENDIX NO. 9 – DATA FOR THE DEVELOPMENT OF MANUALS
- APPENDIX NO. 17 – DESIGNATION OF INSTALLATIONS

9.5. Fire requirements.

- APPENDIX NO. 10 – DESIGN GUIDELINES AND FOR THE PREPARATION OF
FIRE PROTECTION DOCUMENTATION

9.6. Process Safety Requirements

- APPENDIX NO. 14 – PROCESS SAFETY REQUIREMENTS

9.7. Occupational Safety and Health Requirements

- APPENDIX NO. 15 – OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS

9.8. Requirements for the chemical alarm and telecommunications system

- APPENDIX NO. 12 – CHEMICAL ALARM SYSTEM REQUIREMENTS
- APPENDIX NO. 13 – TELECOMMUNICATIONS SYSTEM REQUIREMENTS

List of appendices to the TECHNICAL SPECIFICATION:

- APPENDIX NO. 1 to TS – REQUIRED PARAMETERS OF PROCESS FLOWS
- APPENDIX NO. 2 to TS – SPECIFICATION OF SURFACES AND CARRIERS
- APPENDIX NO. 3 to TS – BORDERS OF THE PLOT
- APPENDIX NO. 4 to TS – REQUIREMENTS OF THE INSPECTION DEPARTMENT: OFFICE OF
TECHNICAL INSPECTION / TRANSPORT TECHNICAL SUPERVISION /
TECHNICAL INSPECTION AUTHORITY
- APPENDIX NO. 5 to TS – CONSTRUCTION DISCIPLINE REQUIREMENTS
- APPENDIX NO. 6 to TS – ELECTRICAL DISCIPLINE REQUIREMENTS
- APPENDIX NO. 7 to TS – CONTROLS REQUIREMENTS
- APPENDIX NO. 8 to TS – DOCUMENTATION REQUIREMENTS
- APPENDIX NO. 9 to TS – DATA FOR THE DEVELOPMENT OF MANUALS
- APPENDIX NO. 10 to TS – GUIDELINES FOR THE DEVELOPMENT AND PREPARATION OF
DOCUMENTATION AS REGARDS FIRE PROTECTION
- APPENDIX NO. 11 to TS – MECHANICAL DISCIPLINE REQUIREMENTS
- APPENDIX NO. 12 to TS – CHEMICAL ALARM SYSTEM REQUIREMENTS
- APPENDIX NO. 13 to TS – TELECOMMUNICATIONS SYSTEM REQUIREMENTS
- APPENDIX NO. 14 to TS – PROCESS SAFETY REQUIREMENTS
- APPENDIX NO. 15 to TS – OCCUPATIONAL SAFETY AND HEALTH REQUIREMENTS
- APPENDIX NO. 16 to TS – TECHNICAL STANDARDS OF ANWIL S.A.
- APPENDIX NO. 17 to TS – DESIGNATION OF INSTALLATIONS
- APPENDIX NO. 18 to TS – TEMPORARY FACILITIES – Manual and annexes