ANNEX 005: Technical Specifications-Requirements for Goods and Services

1. GENERAL SCOPE

This document contains the technical information necessary for the participants to prepare a technical-economic proposal in accordance with the purpose of this tender. It details the goods and services required, in order to provide suppliers with a sufficient information base that allows them to estimate costs, evaluate the viability of their offer and, where appropriate, present a comprehensive "turnkey" proposal, among other relevant aspects.

However, this document does not intend to specify all technical requirements, nor to specify the requirements already covered by applicable codes and standards. The supplier/OEM (original equipment manufacturer) that is awarded in this tender must apply sound engineering and manufacturing practices and include all equipment and services not mentioned to deliver a unit suitable for the required functionality, which conforms to current industry standards.

2. SPECIFIC SCOPE

This annex provides relevant technical information to define the monitoring system to be installed.

3. SCOPE DETAILS (minimum requirements)

APASA will install an N_2O abatement technology (which will be covered by a different tender and is outside the scope of this tender) and requires the installation of an SCME (CEMS). The supply of the monitoring system must be carried out on a turnkey basis.

The required SCME (CEMS) will consist of sets of gas analyzers (the first directly upstream of the blast chiller and the second downstream of this unit), both capable of measuring the concentration of N_2O and O_2, a tail gas flow meter that will be located in the stack **(SEE NOTE*),** sample conditioning system (one per set), sampling lines, valves, pipe fittings, data acquisition and management system (SCADA/DAHS), among other necessary elements, to monitor, store, analyze and make trend graphs of the plant's emissions, and export the stored data to Excel.

(*) NOTE. The N2O monitoring system does not necessarily have to include a stack gas flow meter, since APASA already has one that will continue to operate; however, bidders should analyze whether such a flow meter can be used and included in their technical and economic proposals. **Based on this evaluation, the following situations may arise:**

- If the Bidder determines that the existing flow meter can be used , in this case, all the work necessary to **connect** **its** **signal to the DAHS of the new N_2O monitoring system** ; - in order to **store the data and perform the relevant calculations** within the new system - will be carried out by the bidder in case of being awarded.

- **If the bidder determines that it is not possible to use the existing flow meter**, it must justify it in its technical offer and detail it in its economic offer, including in a broken down the costs associated with the provision of a new flow meter. In this case, the new instrument proposed must be QAL1 certified.

BIDDERS MUST SUBMIT THE FOLLOWING IN THEIR TECHNICAL AND ECONOMIC BID:
Bidders must include in their economic offer all the costs associated with the goods and services requested in this tender. However, they must break down and detail in particular, the costs corresponding to the following items:

1. N_2O and O_2 measurement:

- Two (2) analyzers, each with one (1) sampling point, located at:
  - Blast-chiller input (first analyzer).
  - Chimney (second analyzer).

- Analyzers shall be delivered with zero gas and calibration gas of N_2 and N_2O, with certificate of analysis issued by ISO/IEC 17025 accredited laboratory for both N_2O measurement ranges.
  The measurementswill be carried out at the entrance of the blast chiller and in the chimney. The proposed installation point must be specified in the bid, considering the conditions and specifications of the process.

2. NOx measurement (NO and NO_2): including standard gases. The measuring points will be at the blast chiller entrance and the chimney. The proposed installation point must be specified in the tender. This measurement may be considered independently; i.e. APASA may decide to purchase additional individual components at a later date.

~~1.~~3. NH_3 measurement: including corresponding standard gas and will be installed only in the chimney. Like NOx measurement, the procurement of components may be independent, but the system must allow for flexible (modular) addition of this component in the future.

4. Cost of on-site maintenance: the cost of on-site preventive maintenance must be detailed separately in the economic proposal, specifying the frequency with which it must be carried out.

5. Flow gas meter: In the event that the bidder determines that **it is not possible to use** the existing flow meter and, therefore, proposes the provision of a **new flow meter**, it must detail this cost in the separate economic proposal.
   This flow meter must be installed in the chimney, have EN 14181 QAL1 certificate incl. installation flange for the measurement of:

- Chimney Gas Flow (Volume or Mass Flow)
- Chimney Gas Temperature
- Pressure of the chimney gases
- Installation according to EN 15259

Remarks:

- The monitoring system offered must be flexible, that is, it must allow the possibility of incorporating in the future the measurement of NOx (NO and NO_2) and NH_3, according to the previous items, in a modular way, without the need to replace the existing system.
- The invoices corresponding to the eventual contract that will be signed with the supplier that is awarded this tender must be addressed to APASA, however , the payments recorded therein will be made directly by GIZ to the Contractor and will be subject to the terms and conditions of the Contract derived from this tender. However; in case APASA decides to purchase the additional components required for the measurement of NOx and/or NH3, the purchase of such components will be paid directly by APASA to the Contractor. Due to the above, it is stated that the invoices corresponding to these items must be issued separately without including other items/concepts, and that these invoices will be paid directly by APASA. This also applies to the cost of on-site preventive maintenance.

QAL1 certification is required only for the measurement of N2O concentration in the stack and for the flow meter, in case the bidder determines that a new flow meter needs to be added (**SEE NOTE (*)**).

The supplier shall take into account the "General Specifications and Design Principles of the Monitoring System" for the supply of the SCME (CEMS).

The monitoring equipment will be installed and operated in accordance with EN14181 (latest version) requirements, including regular maintenance and calibration.

In the technical offer, the bidder must specify the proposed location for the cabinets, including their installation base, considering the possible locations indicated by APASA in the plot plan available to the bidders.

3.1 ENGINEERING

The supplier will execute all engineering work, prepare all engineering documents, including drawings and interface documents, and prepare all associated documentation, such as operation and maintenance manuals and as-built documentation.

The supplier shall prepare a master list of documents that includes all documents and drawings necessary for the performance of the work.

APASA will review the general layout drawings and design drawings for acceptance prior to manufacturing.

Delivery will include all necessary engineering designs, risk assessments, strength analysis and equipment sizing. The supplier shall provide the design documents in electronic and editable format.

Engineering, production and/or procurement, factory acceptance testing, on-site delivery, installation, commissioning, on-site support, on-site testing to ensure the warranty proposed by the bidder, training of plant personnel, after-sales service and supply of all required documentation on the **tail gas flow meter** (if applicable, SEE NOTE (*)) and in the two

continuous monitoring systems of N_2O and O_2 (one upstream and the other downstream, in the chimney, of the new abatement unit):

1. Sampling System

The sampling system will be hot extraction (wet analysis). Gas sampling probe, heated sampling line, gas sample treatment.

- Sampling probe and installation flange.
- Heated sampling line suitable for aggressive environmental conditions, high temperatures and UV radiation.
- Sample gas treatment unit with sample filtration pump.
- Sampling flow regulator.

Note: Recirculation of the sample gas into the stack is not necessary, but should not be emitted or vented to the environment.

2. Gas Analyzers

Gas analyzers for N_2O measurement (certified under EN 14181 QAL1 only for measurement in the flue gas stream in the stack)

- N_2O and O_2 (upstream of the reactor) Range 1: See Addendum-001-Plant Information. REV.2
- N_2O and O_2 (downstream of the reactor) Range 2: See Addendum-001-Plant Information. REV.2

Note: The successful bidder must provide all the valves, pressure reducers, pipes, connections and other elements necessary for the application of automatic calibration gas, as well as the zero gas and calibration gas of N2 and N2O, which must have a certificate of analysis from a laboratory accredited by the ISO IEC 17025 standard. for both N2O measurement ranges. In addition, *it must include hardware and configurations necessary for maintenance and/or remote diagnostics, which is compatible with the x800A system.*

(*): Consider a higher % of ppm to avoid saturation of the equipment.

3. Data collection and storage

Data logger with on-site display, automatic on-site backup: all raw data and all average values (log configuration to be defined) must be stored permanently without data compression, including hardware or configuration required for remote maintenance and/or diagnostics.

The monitoring system will provide separate hourly mean values for the concentration of N_2O and O_2 in the tail gases before (upstream) and after (downstream) the N_2O and O_2 reactor, based on continuous measurements that are electronically recorded, recorded, stored. These datasets are identified by a unique date and time key that indicates when exactly the values were observed. Overall abatement efficiency and emission reductions are calculated from the monitored values. The total operating hours and the number of hours in which the abatement system did not operate, performed poorly, or failed should be recorded.

The system must calculate N2O emissions, the plant's N2O emission factor, and blast chiller emission reduction over a given period of time.

Final emissions, overall blast chiller reduction efficiency and emission reductions should be automatically calculated from the monitored values. The total operating hours and the number of hours in which the abatement system did not operate, performed poorly, or failed should be recorded.

The system must calculate N2O emissions, the plant's N2O emission factor, and blast chiller emission reduction over a given period of time.

The following data should be monitored and stored by the N2O monitoring system:

- N2O concentration upstream of the blast chiller, ppm
- N2O concentration downstream of the blast chiller (in the stack), ppm
- N2O analyzer status (operating, maintaining, faulty)
- Stack gas velocity (signal provided by APASA if existing meter can be used), m/s
- Status of the flue gas velocity analyzer (signal provided by APASA if the existing meter can be used), (in operation, under maintenance, defective)
- Stack gas temperature (signal provided by APASA if the existing meter can be used), °C
- Stack gas pressure (signal provided by APASA if the existing meter can be used), bar
  - o Mass or volumetric flow measurement of stack gases (signal provided by APASA if the existing meter can be used), Nm3/h or kg/h
- Ammonia oxidation reactor temperature (signal provided by APASA), °C
- Ammonia Oxidation Reactor Pressure (signal provided by APASA), bar
- Ammonia flow to ammonia oxidation reactor (signal provided by APASA), Nm3/h
- Ammonia-air ratio to ammonia oxidation reactor (signal provided by APASA)
- HNO3 production (signal provided by APASA), kg/h
- Plant Operation Status (signal provided by APASA)
- Temperature in analyzer cabinet, °C
- o 3x Reserve Status
- o 3x Reserve Analog
- o Calculated value: N2O emissions in stack (kg N2O/h)
- o Calculated value: N2O emission factor (kg N2O/ t HNO3)
- Calculated value: Emission reduction in blast chiller (kg N2O/h)
- Sample Rate: 2 seconds
- Calculation of mean hourly values (for analogue and status signals)
- It must comply with EN 14181 - QAL1 (to the gas stream in the stack) - Data Capture and Evaluation.

The emissions data management system shall collect, analyse and visualise the data, as well as generate reports on it. The data must be downloadable in excel.

The DAHS shall include the following characteristics

- Ad hoc parameters measured and corrected by the CEMS.

• Summaries showing compliance with the VLE (emission limit value).

• Real-time and average data.

• Calibration reports

• Alarm displays for device errors, excessive emissions, and calibration failures over a one-year period

• Colors will be used to block or highlight a dataset, alarms, and provide visual interest and alert to the user.

• Visualization of raw, real-time, averaged, normalized, and historical data.

• Trend of such data in minutes, hours, days, months and years.

• A secure storage system and automatic backup of all data.

• Quality control charts for calibration deviation data.

Record that includes all parameters, service interventions, repairs and maintenance activities.

The system must be programmable and capable of both storing the data and performing the required measurements. It will also be accessible remotely in a formally approved cyber-secure manner to download data and check the status of the analyzer.

Note: The Data Acquisition and Handling System (DAHS) shall comply with EN14181 standards on how to calculate, record and store emissions data.

3.2 INSTALLATION AND ASSEMBLY.

All construction and assembly work will be carried out by the bidder according to design standards and specifications of the **Section 3 REFERENCES~~REFERENCES~~** and the security requirements that apply in APASA. It will be in charge of the Offeror:

1. Install the monitoring system and will be responsible for the commissioning of the equipment at the plant with the support of local personnel.
2. Installation and commissioning: The supplier shall provide final verification of mechanical completion, commissioning, and performance testing. Where appropriate, the supplier shall provide the special tools necessary for installation.
3. Training of local employees at the plant to operate and maintain the monitoring system (including training certificate). A trainer from the supplier shall be present for sufficient time to ensure proper training of APASA staff. A training schedule will be agreed. (To be evaluated in the matrix)
4. In reference to documentation, all documents submitted for engineering review must be in Spanish. All final documents to be used by operational personnel, documents and certificates and legends on panels and instrumentation will be in Spanish
5. ~~Mantenimiento anual del sistema analizador completo y sistema de registro de datos durante 3 años (de forma remota).~~

5.1. Thebidder must detail in its technical and economic offer separately how often preventive maintenance must be carried out in situ, once the monitoring system has been put into operation.

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5.2. The bidder must include in its technical and economic offer the annual maintenance of the analyzer and the data logging system for 3 years remotely.

~~5.~~6. Engineering and design of the necessary construction works and modifications of the plant in coordination with the head of APASA.

~~6.~~7. Civil works necessary for the execution of the project.

~~7.~~8. The Analyzer Cabinet should be installed in an air-conditioned room or in a separate container.

~~8.~~9. Valves, pressure reducers, pipes, fittings, etc. for automatic application of calibration gas.

~~9.~~10. Zero gas and N2O and N2O calibration gas with certificate of analysis from an ISO IEC 17025 accredited laboratory for both N2O measurement ranges

~~10.~~11. Frame for Calibration Gas Cylinders

~~11.~~12. A spare parts fund will also be provided for 1 year of regular maintenance, for 1 year a list of specifications of standard spare parts and for 2 years a list of critical spare parts for its proper operation.

3.3 CHECKS

The tests shall be carried out in accordance with the procedures indicated in the applicable standards.

3.3.1. Factory Acceptance Test (FAT)

Seller's or OEM's technicians shall test the entire system, including sample conditioning, in the Seller's or OEM's workshop. The Seller/OEM shall prepare the procedure and provide all necessary testing equipment to perform the Factory Acceptance Test (FAT).

The FAT shall include, but is not limited to:

1. Simulation of all inputs and outputs, showing all associated triggers, alarms, and trigger action outputs.
2. All simulated inputs and outputs will be organized and labeled for easy identification during FAT.
3. Complete functional testing of the analyzer's power, ventilation, and HVAC system.
4. Alignment and cleaning.
5. Visual inspection of the sampling system.
6. An audit of the arrangements for the effective management and maintenance of the CEMS system.
7. Leak controls.
8. Bias (system integrity) checks.
9. Zero and span calibration checks.
10. Linearity check.
11. Linearity check for N2O with 5 points for each range (20, 40, 60, 80 and 100% of total deflection). In the case of a nonlinear calibration curve, a minimum of 10 concentrations is required.

12. Response time.
13. Documentation supplied
14. The test gases used must be traceable according to ISO 17025.
15. Accredited suppliers will be used for the calibration gas. The uncertainty of the gas mixture used will be better than ± 2% with 95% confidence for all gases according to ISO 17025 gas accreditation standards.

3.3.2 Test Report

The test report shall include, but is not limited to, the following:

1. References to applicable international standards.
2. Complete identification of sample gases and calibration: quality, concentration, uncertainties.
3. Circumstances in which the tests have been carried out: locations, conditions, etc.
4. Sample programming: date and time.
5. Test results: calibration, lower limit of detection, accuracy, zero and range drift (including temperature effect), linearity, effect of interferences on the determinant, response time, standard deviations and systematic errors and a statement of compliance with this specification.

3.3.3 On-Site Test (SAT)

The bidder shall install the monitoring equipment and carry out the commissioning and commissioning of the monitoring system.

At the APASA plant, the supplier representative will be required to install the monitoring equipment and test the system installation prior to commissioning. The representative will also need to perform the OEM standard tests required to verify the proper operation of the system after boot-up. The supplier's representative shall prepare the relevant documentation to report on the commissioning activities on site.

Acceptance tests shall be carried out under real operating conditions on a sample.

The new **chimney gas flow meter** **(if applicable, SEE NOTE (*))** and N2O analyzers will undergo a QAL2 test shortly after installation. The OEM will assist the independent and authorized body in the first certification of the test system according to QAL2.

The CEMS shall have facilities that allow for on-site testing and QAL 2 after installation, as well as facilities that allow for regular maintenance and calibration.

3.3.4 Wiring

The bidder will provide the engineering, materials and labor necessary for the construction and commissioning of all the electrical installations necessary for the perfect operation of the SCME Continuous Emissions Monitoring System (CEMS) subject to these specifications. Including the assembly of motive power and lighting circuits, commands, conductor laying, earthing, etc.

Note: Consider the data of the APASA plant: 480V, 60Hz.

3.3.5 Instrumentation and control

The bidder will be responsible for carrying out all the tasks listed below, plus those necessary for the perfect functioning of the work facilities, taking into account that the list is not exhaustive:

1. Installation, assembly and connection of instruments.
2. Laying of conduits, power wiring and signals between the instrumentation and control room.

3.4 PROJECT DELIVERABLES

Listed below is a minimum series of the project's deliverable engineering documents. It does not exclude or limit the delivery of other documentation that the bidder deems necessary. All documentation must be delivered in digital format (editable PDF, DOC, XLS and DWG) with the exception of the operation and maintenance manuals of the equipment, which in addition to their digital copy must be delivered two printed copies of the same.

General:

- Design Bases
- Project Execution Plan
- Descriptive Report of Processes
- Process Flow Diagrams
- Equipment List
- P&ID's
- List of Lines
- Operations Guide
- Operation, Control and Safety Philosophy

Piping:

- Equipment Lay-Out
- Piping Class
- Specifications and Design Typicals
- Descriptive report of pipes

Electricity:

- Detailed Electrical Installation Description Report
- Single Line Diagrams
- Technical Specification of Electrical Equipment
- List and load balancing
- Electrical Materials List
- Electrical connection plan
- Connection diagrams

- Electric routes

Instruments and control system:

- Descriptive report of the instrumentation and control installation
- Typical Electrical and Mechanical Instrument Assembly
- Specification of Communications Systems
- Cable Compute and Installation Materials
- Instrument Cable Duct Drawing
- Instrument Implementation Layout/Step Boxes/Field Panels
- Analyzer data sheet, accessories, standard gases, etc.
- Equipment configuration backup

4 REFERENCES

The following are the codes, national and international standards, specifications and recommendations, only applicable to all structures and equipment to be designed, modified or built.

This listing does not exclude the specific norms, good practices and construction standards that apply to the technology to be supplied. The bidder must take them into account for its technical proposal.

1. Objectives:

The intention is to define a state-of-the-art CEMS, which will provide:

- Efficient operation
- Reliability under harsh operating conditions
- Long-lasting analyzer accuracy
- Ease of maintenance and repair
- Ease of installation
- Long service life
- Reduced running costs
- Certified high-precision measuring ranges
- Flexible (modular) addition of additional measuring components
- Automatic verification cycles (sample gasless)

2. Particular codes, rules and regulations

1.1.1. * The performance of the CEMS must comply with the Industrial Emissions Directive (IED), EPA 40 CFR 60, "New Source Performance Standards (NSPS)" and EPA 40 CFR 75, "Acid Deposition Control (Acid Rain)"

1.1.2. * The EN 14181 standard, "Stationary source emissions – Quality assurance of automated measuring systems", shall apply to installed CEMS systems.

1.1.3. * The quality assurance and uncertainty of the CEMS automated measurement system shall be in accordance with EN 13284, "Stationary source emissions – Determination of low range mass concentration of dust"

1.1.4. * The location and safe accessibility of the CEMS to generate a homogeneous and representative sample must be in accordance with the standards EN 13284, "Stationary source emissions - Determination of low range mass concentration of dust" and 15259, "Stationary source emissions – Requirements for the measurement sections and sites and for the measurement objective, plan and report"

The latest editions of the codes and standards will be used. In the event of any discrepancy or conflict between the standards and codes and the requirements set forth herein, the stricter requirement shall apply

3. Analyzers

3.1. General design principles

- CEMS will be designed fail-safe for the safety of personnel and to maintain the integrity of Austin Powder's facilities and equipment.
- All analyzer systems and their components shall be specified and designed to be "fail-safe" in the event of a failure of instrument air or power supply.
- All analyzer systems will be designed and verified in situ as "fit for use".
- All analyzers and their components shall include a detailed description of the required preventive maintenance program (e.g., for analyzers, required periodic control, calibration, validation, service procedures, etc.). The CEMS will include facilities that allow operators and test laboratories to perform zero, calibration, cross-sensitivity to other determinants and linearity tests. Test data on the interferents must be provided by the CEMS supplier/OEM.
- The use of special tools for operation and maintenance shall be avoided.
- All components must be replaceable in the field.
- EMSCs shall be protected against overpressure. The use of switches will be avoided

3.2. Requirements

- The CEMS shall not generate a noise greater than 85 dBA at 1 m away from the system under all process conditions.
- The Seller/OEM will inspect the installation site and provide dimensional drawings so that all sensors are installed in an accessible location in order to be able to perform, as needed, repairs and replacements.
- The on-line analyzer systems shall conform to the EEMUA 138 (Design and Installation of On-Line Analyzer System) standard.

- The supplier has to provide data sheets for each certified range (QAL1) for each specific component measured.
- The installation of the CEMS must ensure its integrity and correct operation in full compliance with the required standards. The seller shall assist the independent and authorised body in the first certification of the analysis system in accordance with QAL2.
- The CEMS must have facilities that allow linearity and QAL 2 tests to be carried out after installation.

4. ANALYZER CABINET, CONTAINER, FREESTANDING PROTECTED CABINET

- The CEMS will be protected from the environment and will be systematically installed in a weatherproof analysis booth/container/cabinet in a shelter equipped with a forced ventilation/air conditioning system.
- All ventilation shall provide a minimum of five air changes per hour.
- A dust filtration system will be installed at the ventilation inlet.
- An alarm will be available in the event of failure of the ventilation system.
- The Cabinet/container/cabinet will be of the prefabricated type, fully assembled and pre-tested.
- The Cabinet/container/cabinet shall be insulated, robust and provided with all the necessary equipment to meet the environmental conditions required for the CEMS.

5. PROCESS CONDITIONS

- The CEMS shall be suitable for process temperature limits, overpressure limits and line pressure limits with a safety factor of 1.5 over the given maximum design pressure and 30 °C over the maximum operating temperature values.

6. MECHANICAL SPECIFICATIONS

- EMSCs shall be moisture and dust proof. The glass used in the devices must be ammonia-proof and shatter-proof.
- Each analyzer shall be provided, to the greatest extent possible, with a process isolation valve, an analyzer isolation valve, and drain/vent valves.

7. SCREENS

- The screen of the analyzer will be of the LCD or OLED type. You will need to display the numeric value and also have a 0-100% scale bar graph corresponding to the analog output. It will be possible to configure the display for more than one parameter (process value(s), scaled output(s), sensor temperature(s); maintenance information and alert(s); status

indication(s); verification result(s...); In this case the screen will change/scroll to show all the selected parameters. The screen will show all alarms and alerts.

Construction:

- ANSI/CEMA 550 (Conveyor Equipment Manufacturers Association): Classification and Definitions of Bulk Materials
- ASTM (American Society for Testing and Materials): Materials must meet the ASTM standard.
- CIRSOC Std. 103 (mandatory): INPRES-CIRSOC Regulation 103 "Argentine Standards for Seismic Resistant Constructions".
- ASCE Std. 7 (reference): American Society of Civil Engineers Std. 7.
- AISC: American Industry of Steel Construction.
- D-1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort. (ASTM).
- D-1883: Standard Test Methods for CBR (California Bearing Ratio) of laboratory Compacted Soils. (ASTM)

Manufacturing:

- ASME B 31.3: “Process Piping”
- ASME B 16.25: “Butt welding Ends”.
- ASME B 16.5: “Pipe Flanges and Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard”.
- ASME SEC I: “Rules for Construction of Power Boilers”.
- ASME SEC II: “Material Specification Part A – Ferrous”.
- ASME SEC V: “Nondestructive examination”.
- ASME SEC VIII: “Division 1 Pressure Vessels”.
- IEC-60529 Standard (Mandatory)

American Institute of Steel Construction (AISC):

- AISC/ANSI 327-05 “Seismic Design Manual”
- AISC/ANSI 360-05 “Manual of Steel Construction”
- AISC 303-05 “Code of Standard Practice for Steel Buildings and Bridges”.
- RCSC “Specification for Structural Joints Using ASTM A325 or A490 Bolts”.

American Welding Society (AWS):

- AWS D1.1/D1.1M:2006 “Structural Welding Code – Steel”
- ANSI/AWS D2.4-98 “Standard Symbol for Welding, Brazing, and Nondestructive Examination”.

APASA Design Specifications:

- DOCUMENTATION CONTROL FOR DRAWINGS AP-ES-09
- Subject under ATEX standards - Explosive atmosphere (mandatory)

- Subject to IEC-61511 standards (mandatory)
- PIPE-STRUCTURE PAINTING AP-ES-28
- PRESSURERIZED SYSTEMS AP-ES-31
- A1290-01-50-C01-ESP-201-0
- A1290-01-90-C01-ESP-001-4
- A1290-01-90-C01-ESP-004-3
- A1290-01-90-C01-ESP-005_2
- A1290-01-90-C01-ESP-006-0
- A1290-01-90-C01-TEC-001-0
- A1290-01-90-C01-TEC-421_0
- A1290-01-90-T09-ESP-202_4
- A1290-01-90-T09-ESP-201-1
- A1290-01-90-T09-ESP-203-2
- A1290-01-90-T09-ESP-204-0
- A1290-01-90-T39-TEC-201_C
- A1290-01-90-T11-ESP-201-3
- A1290-01-90-T11-ESP-201-4
- A1290-01-90-I03-003-1
- A1290-01-90-I03-004-1
- A1290-01-90-I03-006-1

Note: In case documentation corresponding to any area is missing, it can be sent later without inconvenience.

5 RESPONSIBILITIES

5.1 SUBMISSION OF RESPONSES TO THE SIP

The bidder must analyze all the documentation that is part of the tender. In case of discrepancies, inconsistencies or lack of definition, the bidder may inform APASA in accordance with the schedule defined in the bidding specifications, these must be sent in writing via e-mail to the technical representative by the CLIENT.

6 WARRANTY

6.1 PERFORMANCE GUARANTEE

Parameters and specifications provided by the supplier will be guaranteed. Limits and tolerance ranges shall be declared, established.

The performance test will be carried out after installation, the system shall meet the performance test for 60 hours of continuous operation . Once the performance test is complete, commissioning is completed and the system is officially declared operational.

If the supplier is not successful due to faults or deficiencies revealed during the test, it must correct everything as soon as possible at no cost to APASA and then perform a new warranty test.

6.2 MECHANICAL/ELECTRICAL/ELECTRONIC WARRANTY

The equipment shall be warranted against design, material, welding, workmanship, or other defects for all components of the equipment in working condition.

The bidder must ensure the correct supply, machining, heat treatment, welding, corrosion protection and accessories as a mechanical/electrical guarantee.

Any defect, described herein, that occurs during the warranty period, will result in the application of the requirements set out in the particular and general terms and conditions.

The bidder must include a minimum warranty of one (1) year for the equipment. During this period, the bidder must provide specialized technical support to diagnose and correct any errors that may occur in the system.

6.3 WARRANTY INTEGRATION OF MONITORING TECHNOLOGY WITH SAMPLE CONDITIONING SYSTEM

A sample conditioning system is required to be included with the monitoring system equipment, in order to guarantee the reliability and representativeness of the measurements. This sample conditioning system may be presented in a single and integral solution and must be detailed in the technical proposal.

6.4 SOFTWARE WARRANTY WITH TRAINING

The offer must include the operation, diagnosis and data analysis software, accompanied by formal training programs for plant personnel.

The proponent must attach a signed training plan, which certifies its commitment to the execution of the additional service offered.

Likewise**,** the ability of the system to anticipate possible failures or deviations through predictive diagnosis will be evaluated, favoring the reduction of risks and optimizing the availability of the equipment.

6.5 CEMDA/DAHS ON-SITE TECHNICAL SUPPORT ASSURANCE

The bidder must include in the bid, for the **PEM** (commissioning) of the emission monitoring system, a **guarantee of technical assistance**, which must be **duly signed**.

7. Ddiversion

The bid submitted to participate in this tender is binding if awarded. Any deviationIo Regarding the specifications indicated in this document or the applicable codes and standards, it must be informed in writing by the supplier awarded this tender.

If the successful bidder is able to offer equipment/goods/services that do not fully comply with this submitted specification/offer, but that represent a technical or commercial advantage, it may propose them as an alternative, justifying the benefits they would bring to APASA. In the event that APASA accepts the exception, it will be included in the order documentation at no additional cost to APASA.

8. Additionalinformation - current measurements carried out by APASA

The following data are currently measured at the APASA nitric acid plant:

- NOx concentration (NO and NO2) downstream of the abatement reactor [ppm]
- Status of the currently installed NOx analyzer (in operation, under maintenance, Fault)
- Chimney Gas Velocity (Stack), [m/s]
- Status of the stack gas velocity analyzer (in operation, under maintenance, faulty)
- Stack Gas Temperature, [°C]
- Stack Gas Pressure, [bar]
- Stack gas flow (volumetric or mass flow), Measurement of mass or volumetric flow of gases, [Nm3/h or kg/h]
- Temperature in the analyzer cabinet, this being the cabinet's own, [°C]
- 3x Digital Status Reservation
- 3x analogue backup
- Calculated value: NOx emissions (kg NOx/h)
- Calculated value: NOx emission factor (kg NOx / Tn HNO3)
- Sampling Rate: 150 milliseconds to PLC
- Data collection time: 1 second
- Calculation of hourly mean values (for analogue and status signals)