Program plynofikace T700

ORLEN Unipetrol RPA s.r.o.

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General Specification - CEMS Container

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Content:

1 Scope 3
2 Definitions 3
3 Reference documents 3
4 General 4
5 Site conditions 4
6 Specification 5
6.1 General 5
6.2 Situational review 5
6.3 Analyzer Container (AC) 5
6.3.1 Room for Calibration bottles of the CEMS and Analyzers 7
6.3.2 Calibration facility 7
6.3.3 Air Conditioning and HVAC systems 7
6.3.4 Earthing & Lightning Protection 7
6.3.5 Tag plate 7
6.3.6 Nameplate 7
6.3.7 Special requirements 8
7 SCOPE OF SUPPLY 8
7.1 Material requirements 8
7.2 Non-material requirements 8
7.3 Exclusion 9
8 INSPECTION AND TESTING 10
8.1 Inspection 10
8.2 Testing 10
8.2.1 General 10
8.2.2 Factory Acceptance Test 10
9 PREPARATION FOR SHIPMENT 11
10 SPECIAL TOOLS AND WRENCHES 11
11 PAINTING 11
12 DRAWINGS AND DOCUMENTATION 11
13 TECHNICAL PROPOSAL PREPARATION 12
14 SPARE PARTS 12
15 ATTACHMENTS 12

1 Scope

The scope of the present specification is to define the minimum requirements for the design, manufacture, inspection, testing and the limit of supply of Analyzer Protection Houses – Containers to be installed next to flue gas lines behind boilers K19 and K20 installed for T700 Energetika Litvínov, Orlen Unipetrol RPA ČR.

2 Definitions

For this specification the following definitions are applicable.

Bidder/Vendor	the party that supplies/manufactures equipment and services to perform the duties as specified.
Contractor/Purchaser	ORLEN Projekt Česká republika s.r.o., Brno, Czech Republic
Client	ORLEN Unipetrol RPA s.r.o., Litvínov, Czech Republic

Wherever the word „**shall**“ has been used, its meaning is to be understood as mandatory.
Wherever the word „**should**“ has been used, its meaning is to be understood as recommended or advised.
Wherever the word „**may be**“ has been used, its meaning is to be understood as freedom of choice.
Specifications, Requisitions, Instructions, Specification Sheets, Standards, Drawings, and all other pertaining Documents are defined as “**Documents**”.

3 Reference documents

Equipment and materials covered by this specification shall conform to the requirements of the following codes and standards (latest edition), unless indicated otherwise.

[1]	IEC 61285	Industrial-process control-Safety of analyzer houses
[2]	IEC 79-16	Artificial ventilation for the protection of analyzer containers
[3]	EN 1092-1	Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN-designated - Part 1: Steel flanges
[4]	ISO 228, part 1	Pipe Threads where pressure-tight joints are not made on the threads. part 1: Designation, dimensions and tolerances.
[5]	ISO 724	ISO general purpose metric screw threads - Basic dimensions
[6]	ISO 128	Technical drawings – General principles
[7]	EN 10204	Inspection documents for metallic products
[8]	IEC 60079	Electrical apparatus for explosive gas atmospheres
[9]	IEC 60529	Classification of degree of protection provided by enclosures
[10]	IEC 61000	Electromagnetic Compatibility (EMC) – All parts
[11]	98/79/EEC	CE Marking
[12]	ANSI B1.20.1	Pipe Threads, General Purpose (Inch).
[13]	EN DIR. 2001/80/EC	Directive on the limitation of emissions of certain pollutants into the air from large combustion plats
[14]	EN ISO 12944-5	Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 5: Protective paint systems
[15]	EN 1090	Execution of steel structures and aluminum structures – all parts
[16]	EN ISO 10855-1	Offshore containers and associated lifting sets – Part 1: Design, manufacture and marking of offshore containers
[17]	ČSN 332130 ed. 4	Low-voltage electrical installations - Internal electric distribution lines

Appropriate Czech application testing and application license shall be supplied in case of requirement.

4 General

Vendor shall clearly state on its proposal the acceptance of the responsibility for design, fabrication, assembly and testing procedures of the equipment and shall provide mechanical guarantee to cover the design.
The Vendor is responsible for the correct selection of proper equipment and its material with respect to the conditions and application specification described herein the General specification. The Vendor shall be responsible for the design, engineering, coordination of Sub-Vendors/Vendors, testing and delivery of the equipment.
The Vendor shall inform the Contractor about any conflict or ambiguity found in this specification.
Any comment and deviations from the specified design Codes for the components proposed according to Vendor's internal standards shall be clearly evidenced on the attached Deviation list Form and must be submitted for the approval of Purchaser.
The equipment will be expected to operate for the life of the Boiler which is taken to be 30years. Stress levels shall be kept to levels which ensure a creep life at the maximum temperature of at least 100,000 operating hours.

Order of priority
The order of priority of the documentation is the following:

1. Contract
2. Project specifications
3. This specification and relevant attachments
4. Codes and Standards
5. Vendor's bid

In case of conflict between the requirements of this specification and data sheets or related standards and codes the most stringent shall be followed.

5 Site conditions

All equipment of this specification shall be located in T700 Energetika, ORLEN Unipetrol RPA, Litvínov ČR.

Outdoor conditions

Design Temperature	-33 ÷ +50°C
Air Temperature	
Average Maximum on Record	+19,9 °C
Average Minimum on Record	-3,3 °C
Relative humidity	68-100%
Average Pressure	100,04kPa
Corrosive air pollutants	May-be – Next to Unit are Petrochemical areas
Rainfall – Average highest rainfall	40 mm / h
Wind load – Max wind speed	33 m/s +10% at 10m
Snow load	100 kg/m2 / 50cm height
Area classification	Non-Hazardous

Container-House REQUIRED inside conditions

Operating Temperature	+15 … +25 °C
Relative humidity	60 - 90%
Heat transfer coefficient	$U_N \leq 0.3$ W.m^{-2}.K^{-1} acc. to ČSN 73 0540-2

The equipment and accessories shall be located in the plant area and above grade. It is required that all herein specified instruments shall endure all above mentioned site conditions within the working life.

Utilities for instruments

Instrument air pressure Minimum 3,0 bar(g)
Design 10,0 bar(g)

Electricity: 3N/PE 400VAC, 50 Hz TN-S and 1N/PE 230VAC-50 Hz TN-S from UPS Power supply; 24 VDC for solenoid valves – to be delivered if required

6 Specification

6.1 General

It is the responsibility of the Vendor to ensure that any supplied devices meet all the requirements of this specification together with the related attachments and data sheets. The devices and their accessories shall therefore be suitable for the intended process duty and for the environment of the installed plant area.
Vendor shall provide following services:

- Completion of the attachments where requested.
- Confirmation of the requirements as per this specification and the attached data sheets.
- Inform the buyer of any irregularities found in this specification and the attached data sheets.

The design requirements are:

- Prototypes shall not be allowed; only a proven design shall be acceptable.
- Bidder is responsible to check and advise of any component, which he considers a necessary part of the system for proper operation, even if not indicated herein.

Therefore, any component or item not indicated in this Specification, but which may be required to meet the operation and guarantee conditions, is deemed to be integrally included in the Scope of Supply.
All necessary devices to prevent damages from shipping and erection shall be included.

6.2 Situational review

Two pcs of Boiler shall be installed then two sets of completed Analyzer Containers (AC) are required to be provided. Two flue gas lines are installed on site i.e. one per boiler. Sample probe and heated line shall be connected to analyzer cabinet with CEMS to be located in the container.
The CEMS cabinet includes emission measurement equipment in accordance with European directives (flue gas and incineration conditions) as an extractive online measurement system to be located in a dedicated container. Emission measurement according to EN 15259.
Actual ID of a flue gas line is approximately H x W 2480x1680mm and bottom line is to be +5,1m above ground – it shall be confirmed before PO.
Both Analyzer Containers (ACs) shall be placed under the flue gas lines on the base concrete plinth at +0,15m above surrounding area see Attachment.

6.3 Analyzer Container (AC)

Due to the ambient conditions the CEMS cabinet shall be located in a weather protection Container.
Analyzer container design, its installation shall comply with requirements specified in reference documentation (see IEC 61285). Emergency lights included. Fire protection REI 15min as min.
The AC will provide sufficient room for any required operator's activities and will be equipped with electric lights, cooling/heating elements, thermostat and automated conditioning unit. The ventilation system (HVAC) can be designed only after client approval. Container shall offer a protection of IP67 (IEC 60529)
Estimated preliminary space is 2380x2940x2600mm inside the Container equipped with safety door and safety window.
Simple flat roof is not approved – the roof with slope and rain gutter is required.

The following parts of the Analyzer Systems and accessories shall be installed in the Container:

- Cabinet 800x800x2200 for CEMS analyzer

- Cabinet 800x800x2200 for NH_3+H_2O analyzer system – SPARE for Future
- wall mounted power supply cabinet located inside – cca 1000x600x300 (400/230Vac, 50Hz, TN-S)
- wall mounted power supply JB 2pcs located outside – cca 200x200x190 (400Vac/230Vac, 50Hz, TN-S)
- separated room for calibration cylinders 2-3pcs – with pressure and flow regulators, gauges, fixing supports, light, draw fun controlled by temperature etc.

The container has to be solved and equipped with air conditioning unit/system and in accordance with requirements of the standards EN 61285.

Container shall be equipped with following accessories as minimum:
- Lights and emergency lights inside the Container and Calibration bottle room
- Air conditioning / ventilation system
- Safety door 900mm as min. with the window and the panic bar
- Safety fixed window
- Fire safety wall openings (Roxtec or equal) for sample hoses IN + OUT, power and signal cable income
- Openings and tubing connections between room with calibration bottles and room with analyzer cabinet
- Fully equipped Power distribution cabinet and interconnection Junction Boxes (JB) both based on the CEMS design provided by Contractor
- Ready to install: Inside a Fire smoke detector and Outside a Manual Call point – both addressable, interconnected and ready to connect to existing central “EPS” system (manufacturer Esser) Items shall be provided by Client on site
- Ready to install: Gas detectors of Oxygen concentrations – ready to connect to main GDS
- Auxiliary wall socket – 16A/230Vac Non-UPS
- Complete power cable internal connections and connection between Internal Power Distribution box and external interconnection boxes of power supply (UPS and Non-UPS)

Signal cable connections and final power supply wiring of supplied analyzers, control units and accessories shall be provided by Others on site. Vendor shall prepare all equipment for cable connections. Cable plugs and cable glands shall be (metric type preferred) included.

General Construction – Recommended
Walls should be of sandwich wall panel PIR 80 mm, EI15, sheet metal 0.6-0,8mm, condensation effect removed. Any condensate that would form in the space between the facade plate of the container and sandwich panel drained through the drain holes under the container.
Expected insulation value Uc [W / m2 K] = 0.30

Ceiling should be of sheet metal 2 mm with C5 surface treatment (300 µm). Insulation shall be mineral wool 80 mm and sandwich wall panel PIR 80 mm, EI15, sheet metal 0.6 mm, condensation effect removed.
Expected insulation value Uc [W / m2 K] = 0.26.
The roof drainage will be directed to the side/back of the module and led to the sewer.

Floor should be load-bearing steel cross sections profiles of the floor of the container "C or I" type. Floor load capacity should be 800 kg/m2. Waterproof floorboard on the underside and edges to be covered by asphalt coat or equal. Heavy-duty PVC shall be inside room of the container. The color shall be agreed by Contractor. Insulation value Uc [W / m2 K] = 0.30
Consider proper holes in the bottom for possible condensate or rain drainage under the container – if applied

Main doors should be steel thermally insulated doors 900 x 2000 mm with panic lockable fittings, with the door’s window 500 x 400 mm (insulating safety glass).
Service door double leaf type (1000 x 2000 mm): steel thermally insulated type, weather-stripping, fixing system of upper and lower part frame’s door
Always a surface treatment powder coating, door with key cylinder FAB and INOX handle.
Aluminum anti-slip threshold with a drawn "trench" bar on the bottom of the container frame’s profile INOX visor over any door.

Basic electrical wiring:
Vendor will provide 4pcs of outdoor and 2pcs of indoor earthing points. It shall be made of SS M10 system, welded on, fitted with SS M10 screw and appropriate washers with an earthing mark (the steel parts are all connected and documented).
Power installation to be done according to ČSN standards and connected from the Power Distribution Box.

- 1-piece Sockets 230 V / 16A, IP65
- 2 pcs LED lamps with plastic cover IP 54, with emergency ACU backup system which starts in the event of a power failure
- 1x switch, IP65
- 1x switch in the gas cylinder room (door opening switches light in the gas cylinder cabinet)

Cables are routed hidden under the insulating sandwich panels and led to the place of switchboard with a sufficient length and cable labels. Internal cables shall be LSZH flame retardant type.

Outside Surface treatment shall be C5-I environment category for more than 20 years thickness 300µm as min. (applied to the perimeter walls of sandwich panels and any outside surfaces). ISO load-bearing cubes in the corners of the container provided with a reflective tape-sticker.
RAL colors 9002 or 9010 for perimeter walls shall be confirmed by Client before PO placement.

6.3.1 Room for Calibration bottles of the CEMS and Analyzers

Others shall provide calibration gas bottles but pressure reducing regulators, pressure gauges, manifolds etc. for calibration gas cylinders shall be installed and ready to connect in the separated part of the Container or additional box next to the cabinet in AC or in separated room in the AC. Assembly instruction and installation requirements to the cylinders with calibration gasses in AC are to be provided according to [1].

6.3.2 Calibration facility

Accessories to permit on line calibration of the analyzer, regulators, gauges, valves, shall be included in the AC specification. Calibration bottles can be provided by CEMS Vendor or by others – it shall be confirmed within 2 weeks after Purchase Order.

6.3.3 Air Conditioning and HVAC systems

It is a part of AC. It shall be provided in accordance heat dissipation of the CEMS and AES. Contractor shall provide data for proper design of the HVAC or Conditioning Units in AC. Air conditioning units will have mounting brackets for installation. The outdoor air conditioning unit will be installed next to the gas cylinder cabinet.

6.3.4 Earthing & Lightning Protection

Earthing system shall comply with the requirements of IEEE 80.
The cross sections of the various earth conductors shall be determined in accordance with IEEE. However, the minimum copper conductor cross sections shall be 10mm2 as minimum.

6.3.5 Tag plate

Each component used for the CEMS shall be provided with a stainless-steel tag plate showing the Vendor's project number and for selected items also client's tag number. Both shall be securely attached to the component in a prominent position by means of a stainless-steel wire or chain. Letter height on the tag-plate shall be 8 mm and depth 0,5mm as minimum.

6.3.6 Nameplate

Each analyzer container shall have non-corrosive nameplate permanently fastened to part of analyzer wall
The nameplate shall include:

- Manufacturer's name

- Serial number
- Model number of the transmitter (including options code)
- Cell Constant
- Range limits

6.3.7 Special requirements

Material certificate
Material certificate EN 10204 2.2 shall be provided.
Asbestos or asbestos-containing materials shall not be used.

6.4 Vendor List

According to Client standards N11022/23 next list of Manufacturers is valid for equipment and accessories:

Air Conditioning System	DAIKIN or equal
Cabinet:	RITTAL
Junction Boxes:	GENERI / STAHL / CEAG / CZ-EX
Cables:	LAPPKABEL / PRAKAB / KABEX / CICM
FDS / GDS:	ESSER / HONEYWELL
Gas-proof and water-proof plugs:	HILTI / ROXTEC
Acessories	Ph.Contact / Weidmuller / Siemens / Schneider / OEZ

7 SCOPE OF SUPPLY

7.1 Material requirements

Vendor shall supply the Container as described herein and indicated on the drawing No. 24LT7P-01-ID-179:

- Container with the door, window, REI15 approved to be ready for complete CEMS installation inside
- Air conditioning system (internal/external units) with air filters and draining out of Container
- Main power supply cabinet with interconnection to outside JB's
- Calibration gas reducing panel with Variable Area Meters and tubing to Cabinets – in coordination with selected Analyzer Vendor
- Integral Supports for JB´s, Cabinets , AC and another installed equipment
- Earthing system and points
- Internal and emergency lights
- Protection shelters over the door and space of AC, JB´s and cable opening
- Fire safety openings for cables, heated hoses and calibration/drain/vent-off tubing
- Internal power cable distribution of lights, sockets, AC Unit and consumers provided by Vendor
- Any assembly accessories, transport eyes or agreed cable trays inside and supports outside
- Ready to install: Fire detectors and Manual Call Points, Gas detectors and warning lights – if applied

7.2 Non-material requirements

- Design and Manufacture,
- Testing, examination and inspection,
- Preparation for shipment (after the testing the container shall be dried and cleaned, dirty not tolerated),
- Supply of documentation acc. to Required Technical Documentation
- Guaranties for Mechanical Design, Material and Workmanship
- Inspection and shop tests – FAT
- Itemized list of Spare parts for 2-years of operation

7.3 Exclusion

Following work and deliveries do not belong to Vendor's scope of supply:

- Fire detectors, Manual Call Points – by Client
- Site Installation and erection

8 INSPECTION AND TESTING

The equipment manufactured will meet normal industry quality standards and shall be free from defects in material or workmanship.
Vendor will hand over for approval to the Purchaser the Quality Control Plan / Inspection and Test Program to be applied for the construction.

Shop Inspection and Tests
Inspection and tests in compliance with the specified codes and other tests according to Vendor's standards will be carried out in Vendor's or his Sub-Supplier's workshops.
During the fabrication period the equipment can be subject to inspection by the Purchaser's, Owner's and/or

8.1 Inspection

The inspection and testing requirements are in addition to manufacturing and fabrication standards of the Vendor.
Mechanical items to be checked against the following:

- Compliance with design drawings and materials used to be in compliance with approved bill of material.
- Check conformity to data sheets, specifications and manufacturer's specifications and vendor drawings.
- Visual inspection for quality of workmanship.
- Test and/or material certificates shall be available prior to inspection.
- Alloy verification to be provided by means of material certificates.

Inspection on products part of this requisition, resides under the responsibility of Vendor.
Contractor inspection shall be limited to monitoring Vendor by means of random inspection and auditing of the QA/QC system. In case the inspection of Vendor is deemed not sufficiently, Contractor will impose corrective actions. In this case Contractor reserves the right to perform inspections at the production facilities. All expenses for tests are included in the scope of supply.

8.2 Testing

8.2.1 General

All installed equipment and accessories shall be fully pre-tested prior to shipment to demonstrate that they are healthy and function performs as specified.
The results of complete checking and tests shall be added to the Final Documentation. Vendor's test documentation is required for approval before delivery.
The following tests are required as minimum:

- Air conditioning unit certified for the Czech republic (EU) keeps required power and temperature inside
- Lights and emergency lights, buttons
- Enclosure Degree of protection of power distribution cabinet, JB´s + EMI
- Declaration of REI
- CE marking
- Fire protection declaration and certificates of openings installations
- Complete set of Certificates required by Client or Czech Authorities

8.2.2 Factory Acceptance Test

Both Analyzer containers shall be inspected and tested at manufacturer's workshop according to agreed factory acceptance test procedure prior to shipment.

Testing shall comprise a full check on the operational requirements and on proper functioning of all hardware. Calibration lines shall be demonstrated with a test sample gas giving approximately one-half scale reading for the measured components.

It shall be Vendor's responsibility to provide all facilities and man power required to demonstrate that the container has been manufactured in accordance with the Requisition. The Owner's representative shall witness and approve the FAT and shall have the right to approve or reject the test procedure and the results. Vendor shall specify duration, place and charge of a witnessed FAT to be carried out according to Manufacturer's standard test procedures.
All tests shall be properly recorded and will be part of supplied documentation.

9 PREPARATION FOR SHIPMENT

Packing and shipping shall be made after all testing and inspection has been accomplished and the Purchaser has released the equipment for shipment.
It shall be the Vendor's responsibility to ensure that the equipment and its components are adequately braced and blocked for shipment as well as to ensure that damage is not caused during loading, shipment and unloading. The small components shall be shipped in boxes or otherwise protected against damage or loss.
All construction spares must be packaged separately and packing must be marked as a "Spare Parts" and delivered together with the equipment.
Vendor will advise specific requirements (IP, min-max temperature etc.) for outdoor storage up for one-year period as part of the bid.

10 SPECIAL TOOLS AND WRENCHES

A complete set of special tools and wrenches for equipment installation, maintenance and repair shall be included in the supply. These or similar special tools shall be used during the shop assembly and post-test disassembly of the equipment.
The special tools shall be packed in separate, rugged metal boxes and marked "special tools for (tag/item number)." Each tool shall be stamped or tagged to indicate its intended use.
The Bidder shall include in his proposal a list of the necessary tools and wrenches.

11 PAINTING

Painting shall be in accordance with Manufacturer standard but as minimum Vendor shall follow the given requirements:

Paints shall not contain sulfur, lead, chloride or any harmful metal that causes corrosive attack. The paint shall be suitable to withstand the design temperature and ambient temperature as indicated herein.
Flange facing shall be coated with a suitable corrosion inhibitor.
Corrosion protection for any steel painting should be provided acc. to [14]. Total dry film thickness ≥160 µm and expected durability **"High"**.
Any stainless-steel part shall not be painted or coated.

12 DRAWINGS AND DOCUMENTATION

Vendor shall provide set of documentation as specified in the "Documentation instruction for I&C and ELE" 24LT7P-00-DI-003 and "Schedule of required technical documentation" 24LT7P-01-IN-055.
All documents shall be elaborated in Czech or bilingual Czech & English languages except certificates (e.g. material certificate, quality certificate, calibration certificate) that can be in English or Czech language.

13 TECHNICAL PROPOSAL PREPARATION

Vendor's / Bidder's quotation shall contain as minimum:

- Specification of Container parts, quoted equipment and Container accessories
- General Drawings with material and item identification
- Scope range identification
- Technical description of items, i.e. Specification datasheets with material used, minimum design metal temperature comments, accessories description
- List of Quality and Technical Documentation of delivery + General ITP
- Spare parts information (2-years spares)
- Delivery time and Warranty

14 SPARE PARTS

The Vendor shall separately specify

- Recommended quantity (minimum 1 pc per type of accessories)
- Delivery Period
- Unit price

of spare parts / instruments and accessories for:

- Pre-commissioning, commissioning and start-up
- 2 year operation

15 ATTACHMENTS

Analyzer Container – Layout	doc. No. 24LT7P-01-ID-179
Schedule of Required Documentation	doc. No. 24LT7P-00-IN-055
Spare parts list form	doc. No. 24LT7P-00-IN-056
Standard deviation list form	doc. No. 24LT7P-00-IX-901