

Owner: Public Company ORLEN Lietuva
Project: Revamp of Critical Equipment at OS-1
Location: MAŽEIKIAI, LITHUANIA

REQUISITION

No. OL25-12

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Heat exchanger E-109 tube bundle

Unit: OS-1 LK-2 Izomerization Unit PENEX		Goods: OS-1 LK-2 Penex Heat exchanger E-309 tube bundle	
Order No.:	Labor and/or materials:		
Edition:	00		
Date:	28/07/2025		
Description:	For Inquiry		
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I. SCOPE OF SUPPLY

- A. Design heat exchanger E-109 tube bundle based on attached documentation. The following shall be presented: certificates of origin and test certificates for the materials used for fabrication, inspection and manufacture documentation, also strength calculation as per requirements below. Detailed drawings must be provided.

Items to be supplied:

OS-1 LK-2 Penex Heat exchanger E-109 tube bundle:

Equipment No.	Required quantity	Description
E-109	1 pcs.	OS-1 LK-2 Penex Heat exchanger E-109 tube bundle
TECHNICAL DATA		
Fluid Allocation		Shell side Tube side
Fluid Name		Hydrocarbon and hydrogen gases Cooling water
Operating Temperature	°C	80 30
Operating Pressure	bar	14,4 2,8
Design Pressure	bar	17 11,5
Design Temperature	°C	204 204
MDMT (minimum design metal temperature)		-28 -28
Corrosion Allowance (CA)	mm	3,2 3,2 (not applicable for tubes)
Number of flows		1 4
MATERIAL SPECIFICATION		
Main parts	Material, standard	Additional requirement
Tubesheet	SA-516 Gr.70	Normalized, C ≤ 0.23% wt., P≤0.035% wt., S≤0.025% wt., CE ≤ 0.45%. 100% UT examination for discontinuity flaws of steel plate.
Tubes (type U)	SA-179	Seamless. Tolerance +. C ≤ 0.23% wt., P≤0.035% wt., S≤0.025% wt.
Baffle plates, impingement plate	SA-36	Normalized and tempered. C ≤ 0.23% wt., P≤0.035% wt., S≤0.025% wt.
Spacers tubes	SA-179	
Bolts	Carbon steel	
Nuts	SA-194 2H / class 8.8 EN ISO 4032 (metric (H)m=D)	
NOTE1: During competition the similar materials are available shall provide to OL for approval		

Specifications and/or standards referred to in the attached documentation but not expressly indicated herein shall not apply.

- B. Tube bundle will be installed at AB ORLEN Lietuva refinery, Mažeikių g. 75, Juodeikių k., 89467, Mažeikių r. sav., Lithuania.

II. TECHNICAL DOCUMENTATION

- A. Design drawings. New tube bundle must be designed in accordance with the design drawings:

Item No.	Rev.	Number of pages	Technical documentation (drawings, data sheets, attachments)
1	00	1	General tube bundle drawing of heat exchanger E-109 No. 480/9-02-01
2	00	1	U tubes bundle dimensions drawing of heat exchanger E-109

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			No. 480/9-02-04
3	00	1	Tubesheet drawing No. 4840/9-2-02
4	00	1	Baffles drawing No. 480/9-02-03

B. OL Specifications:

<u>Number</u>	<u>Name / Description</u>
<i>OL-TR-GR-000</i>	General. General
<i>OL-TR-CR-011</i>	Civil. Corrosion Protection and Lining. Painting
<i>OL-TR-MR-000</i>	Mechanical. General
<i>OL-TR-MR-001</i>	Mechanical. General Welding, Fabrication and Inspection
<i>OL-TR-MVR-001</i>	Mechanical. Pressure Vessels
<i>OL-TR-MER-001</i>	Mechanical. Shell and tube heat exchangers.

C. Documentation format

Supplier shall fill in the data of the equipment based on *OL-TR-MVR-001* ANNEX D example and deliver to OL together with the technical passport of the fabricated item.

III. CODES, REGULATIONS AND NORMS

- A.** Tube bundle dimensions shall be according to the attached drawings.
- B.** Tube bundle designing (calculations, drawings) and fabrication according to: TEMA class "R" and ASME VIII Div.1 latest edition and OL specifications.

IV. SPECIFIC REQUIREMENTS

- A.** Materials supplied from countries other than USA, Japan, Canada, European Union and Ukraine shall not be acceptable.
- B.** Manufacturer must submit certificates for the materials used for fabrication tube bundle of heat exchanger E-109 in accordance with EN10204 3.1
- C.** Connection of tubes and tube sheet – expansion and welding. Expansion through the whole thickness of tube sheet; tube sheet holes shall contain 3 grooves.
- D.** Welding joints quality assessment level shall be no less than B level according to the EN 5817 standard.
- E.** Tube sheet is subject to 100% ultrasonic examination for discontinuity flaws.
- F.** During competition supplier may suggest alternative materials based on performed calculations, which shall require OL approval.
- G.** Design drawings, strength calculations, quality control plan shall be submitted to OL for approval prior to fabrication.
- H.** Supplier shall submit a Quality Control Plan to OL for approval prior to fabrication. The Plan shall include a hydraulic test to be attending by OL inspector. Supplier shall inform the Owner 2 weeks in advance of hydraulic test, and provide the conditions for the participation of the Owner's representative.

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- I. Maximum allowable tension during hydraulic test shall not exceed 90% of material yield strength. Components not conforming to these requirements shall be recalculated.
- J. During transportation, the item shall be properly protecting against corrosion in accordance with OL specifications *OL-TR-MVR-001*.

V. DRAWINGS AND DOCUMENTATION

- A. Supplier is required to submit all documents and drawings, which listed in this Item. Supplier shall submit 3 packages of documentation: original with signatures, documentation copies and electronical versions of documentation:
 - 1) Drawings;
 - 2) Strength calculations;
 - 3) Materials specifications and certificates according to EN10204 3.1;
 - 4) Quality Control Plan (QCP);
 - 5) Hydraulic test report;

VI. INSPECTION REQUIREMENTS

Supplier shall arrange for a third party assessment, inspection and approval, where such are required, and cover all the related expenses.

VII. RESPONSIBILITY AND WARRANTY OF SUPPLIER

- A. Supplier shall be liable for mechanical design of the equipment including, but not limited to, thickness and structure of pressurized components, design of internals, welding procedures, PWHT and inspection procedure.
- B. Thickness values indicated on the drawings are minimal. Supplier shall increase them if required under mechanical design without any additional cost when alternative materials are to be used under agreement with the Owner.
- C. In case of any discrepancies among the documents listed herein, they shall be applied in the following order of priority:
 - 1. OL requirements, Regulations, Standards.
- D. Compliance with standards and specifications does not exempt the Supplier from the responsibility to deliver equipment and accessories which shall be duly designed and suitable for continuous operation without failures.
- E. Supplier shall guarantee the mechanical design and the delivery of the item as per the Purchase Order requirements.