

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

REQUISITION

No. OL25-15

Page: 1 of 4

Heat exchanger TK-307 tube bundle

Unit: OS-1 LK-1 S-400 Oligomerization Unit (Oligom.)		Goods: OS-1 LK-1 S-400 Tube bundle of heat exchanger TK-307	
Order No.:	Labor and/or materials:		
Edition:	00		
Date:	05/08/2025		
Description:	For Inquiry		
Prepared by:	M. Rimkienė		
Reviewed by:	M. Lubys		
Agreed with:	E. Grencius		
Agreed with:	T. Čaplinskas		
Agreed with:	A. Videikis		
Agreed with:	K. Ševeliovas		
Agreed with:	M. Sutkus		
Approved by:	G. Šakys		

TABLE OF CONTENTS

- I. SCOPE OF SUPPLY
- II. TECHNICAL DOCUMENTATION
- III. CODES, REGULATIONS AND NORMS
- IV. SPECIFIC REQUIREMENTS
- V. DRAWINGS AND DOCUMENTATION
- VI. INSPECTION REQUIREMENTS
- VII. RESPONSIBILITY AND WARRANTY OF SUPPLIER

OS-1 LK-1 S-400
Tube bundle of heat exchanger TK-307

REQUISITION

No.OL25-15

Edition: 00

Date: 05/08/2025

Page 2 of 4

I. SCOPE OF SUPPLY

- A.** Fabrication of the new heat exchanger tube bundle based on the documentation of the existing heat exchanger TK-307 requirements of this requisition and the attached drawings.

Before the beginning of the fabrication the manufacturer shall coordinate the detailed drawings, strength calculations and quality control plan of the new heat exchanger tube bundle with the Owner. Submission of certificates of origin and testing certificates of materials used for fabrication as well as testing, inspection, manufacturing, quality control plan and strength calculation documentation considering the below requirements.

Items to be supplied:

OS-1 LK-1 S-400 Oligom. Heat exchanger TK-307 tube bundle:

Equipment No.	Required quantity	Description	
TK-307	1 pcs.	OS-1 LK-1 S-400 Heat exchanger TK-307 tube bundle	
PERFORMANCE OF EQUIPMENT			
Fluid Allocation		Shell	Tubes
Fluid Name		C3 + C4 + H ₂ (before oligomerization reactor)	C3 + C4 + H ₂ + oligomers (after oligomerization reactor, before stripping)
Operating Temperature	°C	105	130
Operating Pressure	bar	19,2	16,4
Design Temperature	°C	400	450
Design Pressure	bar	23,4	23,4
Corrosion Allowance	mm	-	-
Number of flows		1	1
MATERIAL SPECIFICATIONS			
Main parts	Material, Standard	Additional requirements	
Stationary tubesheet	SA-965 F321	S4, S8, IC test according to Practices A262, Practice E.	
Floating tubesheet	SA-965 F321	S4, S8, IC test according to Practices A262, Practice E.	
Tubes Ø20x2 mm	SA-213 Gr. TP321	Seamless. Applies only Tolerance+. IC test according to Practices A262, Practice E.	
Spacers tubes	SA-213 Gr. TP321		
Baffles, impingement plates	SA-240 Gr. 321		
Tie rods	SA-193 Gr. B8T/AISI321		
Nuts	SA-194 Gr. 8TA/AISI 321		
Gasket (for tube bundle tubesheet on both sides)	Metal ring AISI 321 Camprofile	321 + graphite	
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.

OS-1 LK-1 S-400
Tube bundle of heat exchanger TK-307

REQUISITION

No.OL25-15

Edition: 00

Date: 05/08/2025

Page **3 of 4**

- B.** The tube bundle of heat exchanger will be installed at AB ORLEN Lietuva refinery, Mažeikių g. 75, Juodeikių k., 89453, Mažeikių r. sav., Lithuania.

II. TECHNICAL DOCUMENTATION

- A.** Design drawings. New tube bundle shall be fabricated according to drawings designed and coordinated with the OL.

Item No.	Rev.	Number of pages	Drawing No.
1	0	3	Heat Exchanger TK-307 assembly drawing No. 209580C5

- B.** OL Specifications:

<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-002</i>	Mechanical. Positive material Identification
<i>OL-TR-MR-RP2</i>	positive material Identification (PMI) Report Tech. Spec.
<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

The 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 (equipment).

III. CODES, REGULATIONS AND NORMS

- A.** Heat exchanger tube bundle dimensions according to the attached heat exchanger drawing No. 209580C5.
- B.** Heat exchanger tube bundle designing (calculations, drawings) and fabrication according to: EN 13445 or ASME VIII Div.1 and TEMA class R latest edition and addendum, OL specifications.
- C.** PED 2014/68/EU requirements are applicable, CE marking not required.

IV. SPECIFIC REQUIREMENTS

- A.** Materials supplied from countries other than USA, Japan, Canada, European Union and Ukraine shall not be acceptable.
- B.** Manufactures must provide certificates of materials used for the manufacture of heat exchanger tube bundle in accordance with EN10204 3.1.
- C.** The requirements of NACE MR0103 and NACE MR0175 (latest editions or other referred to it) apply to materials in contact with sour water (wet H₂S service).

OS-1 LK-1 S-400
Tube bundle of heat exchanger TK-307

REQUISITION

No.OL25-15

Edition: 00

Date: 05/08/2025

Page **4 of 4**

- D.** Supplier shall perform PMI (Positive Materials Identification) for all stainless steel elements and all the performed welds.
- E.** All elements and welds made of stainless steel shall be subjected to an intergranular corrosion test in accordance with Practices A 262, Practice E.
- F.** Connection of tube and tube sheet – expansion through the whole thickness of tube sheet. Tube sheet holes shall contain 3 grooves.
- G.** Thickness of tube sheet has to be the same as existing one, see attached heat exchanger tube bundle drawing No. 209580C5.
- H.** Tube sheet is subject to 100% ultrasonic examination for discontinuity flaws.
- I.** Supplier may suggest alternative materials based on performed calculations which shall require OL approval.
- J.** Drawings, strength calculations, quality control plan must be submitted for approval before the production with OL
- K.** Supplier shall submit a Quality Control Plan to OL for approval prior to fabrication. The Plan shall include a hydrotest to be attended by OL inspector. Supplier shall inform the Owner 2 weeks in advance of hydrotest, and provide the conditions for the participation of the Owner's representative.
- L.** Maximum allowable tension during hydrotest shall not exceed 90% of material yield strength. Components not conforming to these requirements shall be recalculated.
- M.** During transportation, the item shall be properly protected 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 electronic versions of documentation (USB flash drive):
 - 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

Manufacturer shall perform hydraulic testing of tube bundle. It is required to remove all test water from the tube bundle after hydraulic testing (by purging).

VII. RESPONSIBILITY AND WARRANTY OF SUPPLIER

OS-1 LK-1 S-400
Tube bundle of heat exchanger TK-307

REQUISITION

No.OL25-15

Edition: 00

Date: 05/08/2025

Page **5 of 4**

- A.** Supplier shall be liable for mechanical design of the equipment including, but not limited to, thickness and structure of pressurized components, structure of internals, and inspection procedure.

The thickness provided in the drawings is minimal. The Supplier shall increase such at no additional cost, if this is required under the mechanical design.

- B.** 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.

- C.** 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.

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

- E.** Supplier shall guarantee the mechanical design and the delivery of the item as per the Purchase Order requirements.