

Technical Specification - 8191423 (SAP Code of Materials)

Specification of materials, equipment and spare parts:

Description of Materials	Dimensions	Fabrication Materials	Standard / Drawing	UoM	Quality Standard
Antiscalant for RO plant				kg	

Attachments / special technical requirements (allowed deviations, specific packagings)

Purpose of antiscalant dosing is to avoid precipitation of inorganic salts, mostly CO_3^{2-} , SO_4^{2-} on RO membrane surface.

RO plant description:

3 RO trains, each 50% of design flow (2 in operation, 1 in stand by)

Inlet flow: $98 \text{ m}^3/\text{h} \div 120 \text{ m}^3/\text{h}$ per train

RO unit recovery rate: 85%

Permeate production is $84 \text{ m}^3/\text{h} \div 102 \text{ m}^3/\text{h}$ per train

3 stages unit: concentrate of stage 1 is inlet for stage 2, concentrate of stage 2 is inlet for stage 3.

RO trains are protected mechanically by cartridge filters with $5 \mu\text{m}$ mesh size. Cartridge filter vessels, 3 pieces per train, are integrated at the bottom of the RO rack for easy access and change of cartridges.

RO membranes are protected from residual chlorine by measurement of ORP and respective dosing of NaHSO_3 .

For each RO train antiscalant dosing is foreseen in suction line of RO pump.

Type of membrane: LANXESS RO B 400 LE ASD

Semipermeable membrane - filter for small molecules and ions $< 0,001 \mu\text{m}$

85% recovery

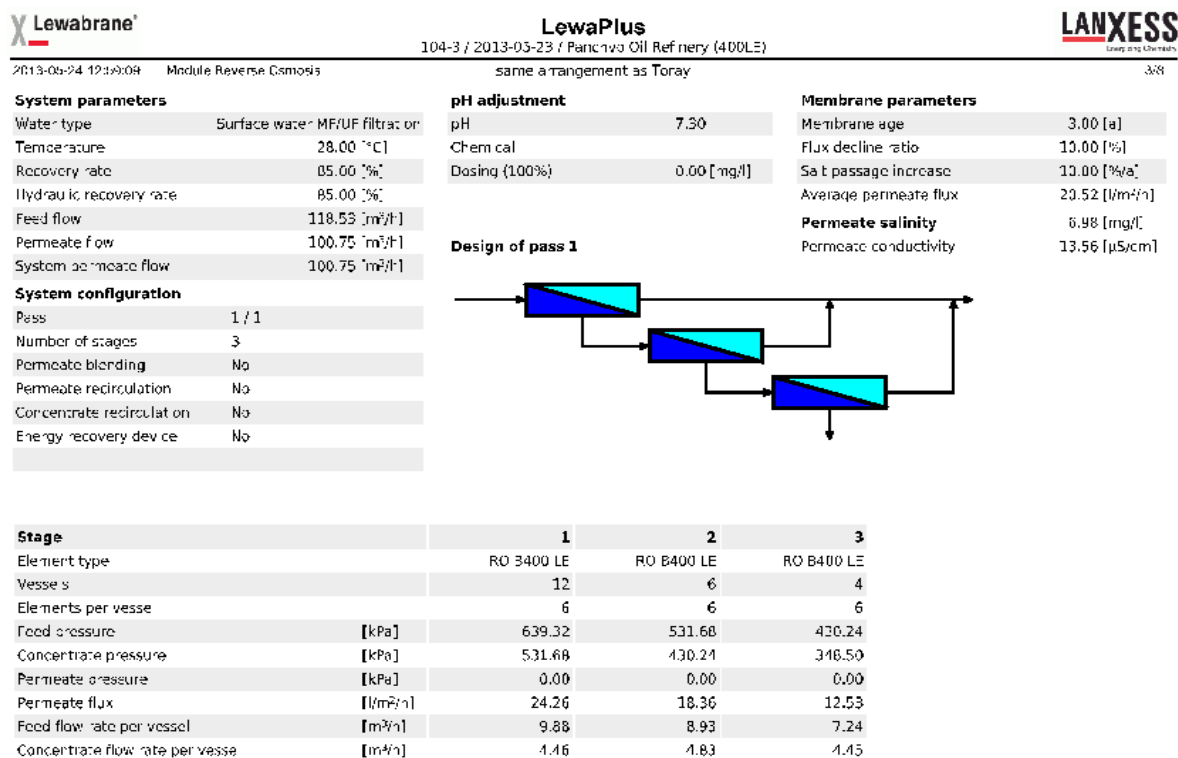
Salt rejection $< 10\%$

Operating Temperature: $2,3 - 35^\circ\text{C}$ (winter – summer)

Material: cross linked polyamid composite

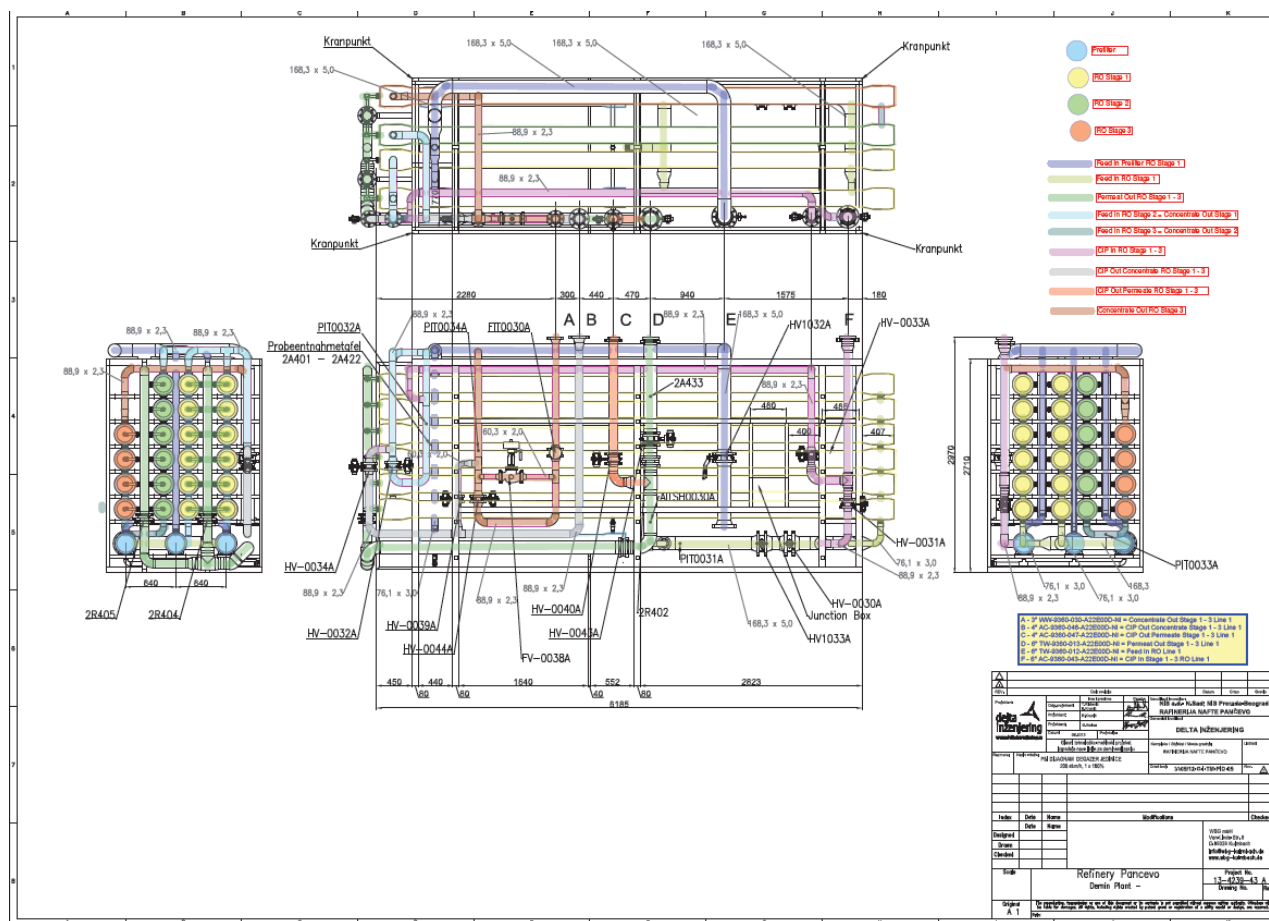
Number of element per train: 132 (72 in 1.stage, 36 in 2.stage, 24 in 3. stage)

Number of pressure vessels: 22 ($12+6+4$); every vessel contains 6 RO elements



Feed water quality, in front of RO unit:

Parameter		number of samples	min	max	avg
Electrical conductivity at 25°C	µS/cm	4	374	460	415
Permanganat indeks	mg/l	45	3.1	25	13
pH, at 25 °C		23	7.5	8.14	7.82
PO ₄ ²⁻	mg/l	46	0.15	2.0	1.06
Fe	mg/l	50	<0.1	0.4	<0.1
Cl ⁻	mg/l	44	13	39	23
SO ₄ ²⁻	mg/l	37	11	92	41
Suspendid solids	mg/l	54	<2	10	<2
Ca hardness	°dH	46	4.01	10.2	6.43
Mg hardness	°dH	46	0.15	4.36	1.93
Total hardness	°dH	46	4.75	14.56	8.374
NH ₄ ⁺	mg/l	23	0.1	1.8	0.6
K	mg/l	22	1.6	3.5	2.8
Na	mg/l	23	8	26	14
SiO ₂	mg/l	47	0.47	13	2.53
Al	mg/l	23	<0.5	<0.5	<0.5
Total alkalinity (m alkalinity)	mmol/l	27	2,3	3,92	2,71



The required documents / reference list

Appendix 1 - Form, Reference list

Product Test Reports (chemical composition, mechanical properties, physical and chemical properties)

Choose an item.

Choose an item.

Other:

Applied Management System Certificates:

Choose an item.

Choose an item.

Other:

Product Quality Certificates:

Choose an item.

Choose an item.

Other:

Other certificates

Choose an item.

Choose an item.

Other:

Technical documentation

EX certificates ☐

Catalogue with Spare Part Numbers..... ☐

Instructions for Use (in Serbian)..... ☒

Instructions for Maintenance (in Serbian)..... ☐

Instructions for Transportation..... ☒

Instructions for Storage (in Serbian) ☒

MSDS (Material Safety Data Sheet in Serbian) ☒

Data Sheet..... ☐

TDS (Technical Data Sheet)..... ☒

Certificate proving that the manufacturer has implemented the prescribed occupational safety measures at the operating device..... ☐

Product Performance Certificate ☐

REACH Registration Certificate..... ☐

Other requirements

- Warranty / warranty period☐
- Expiry date☐
- Product packaging☐
- Spare parts for 2-year operation☐
- Inspection during production before delivery.....☐
- FAT (Factory Acceptance Test)☐
- SAT (Site Acceptance Test)☐
- Training☐
- Post-sales servicing and technical assistance☐
-☐

Requests for acceptance control / Inspection Schedule

--

-Contact person for acceptance control:.....

HSE aspect

--

Energy efficiency

--