

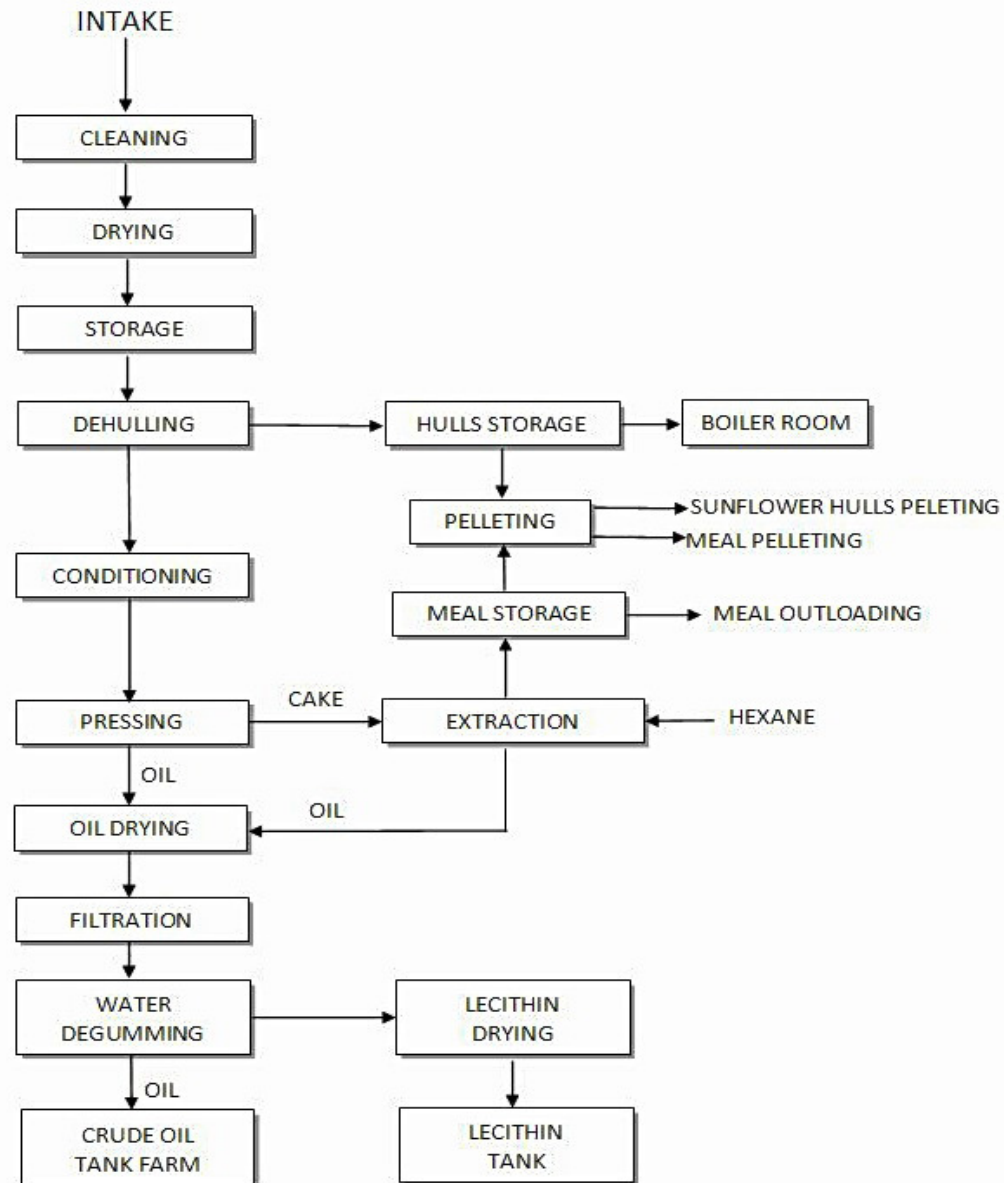
PRODUCTION OF TECHNICAL ACID OIL FROM REFINERY WASTE

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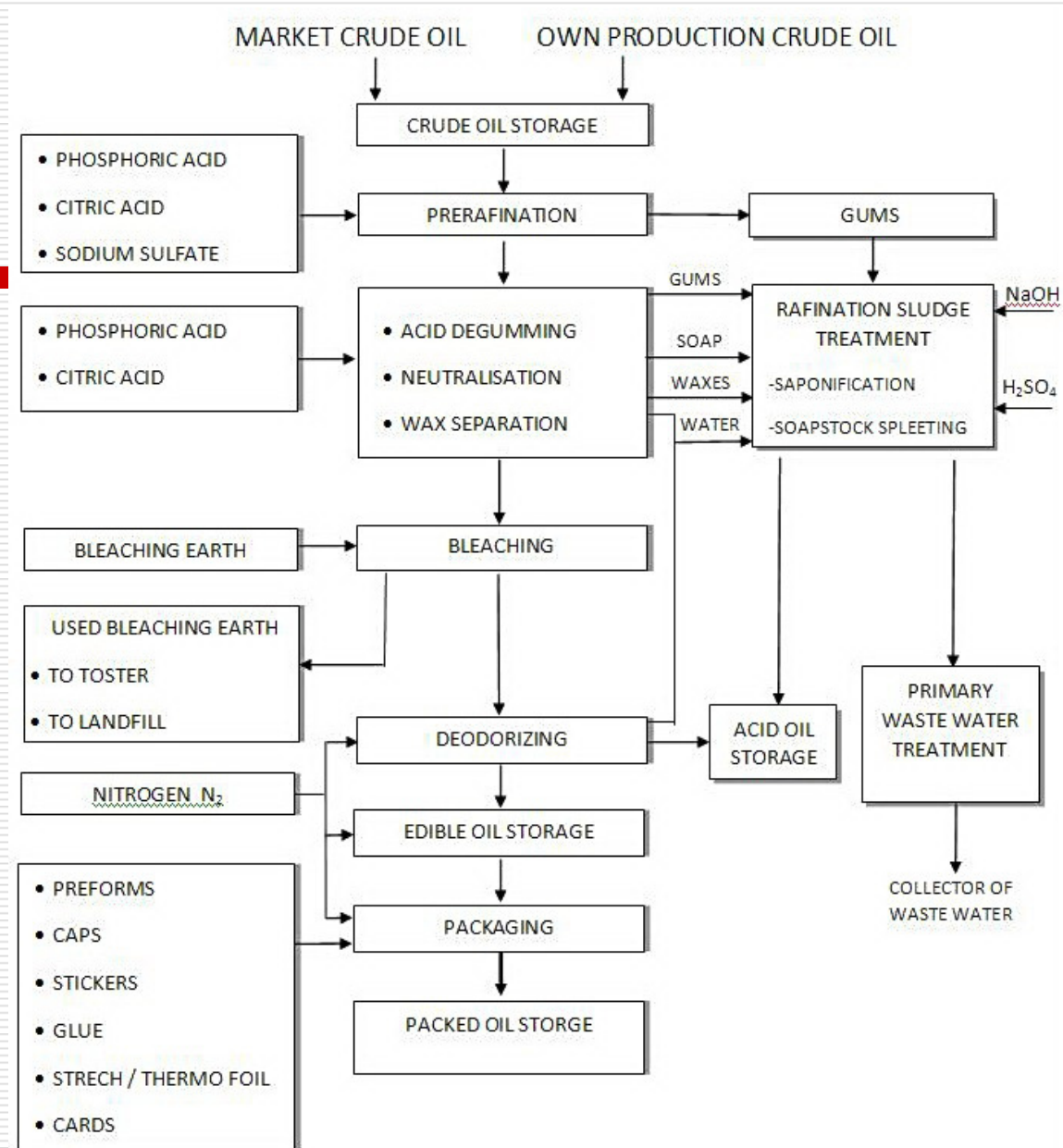
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UM-ING

Block Diagram Crude Oil



Block Diagram Edible Oil



REFINING SLUDGE CONTENT

- ☐ Gums - complex mixture of phosphatidic compounds
 - ☐ Soaps
 - ☐ Waxes
 - ☐ Water from Oil washing
 - ☐ Neutral Oil (occluded and leisure)
 - ☐ Oil from oil trap - leakage
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GUMS (SLUDGE) – CRUDE PHOSPHATIDES

CRUDE PHOSPHATIDES AS A PRODUCT OF CRUDE OIL DEGUMMING ARE A COMPLEX MIXTURE OF:

- *Phosphatidic compounds*
- *Series of additional impurities*

IN ADDITION THESE CRUDE PHOSPHATIDES CAN CONTAIN FOLLOWING CHEMICALS:

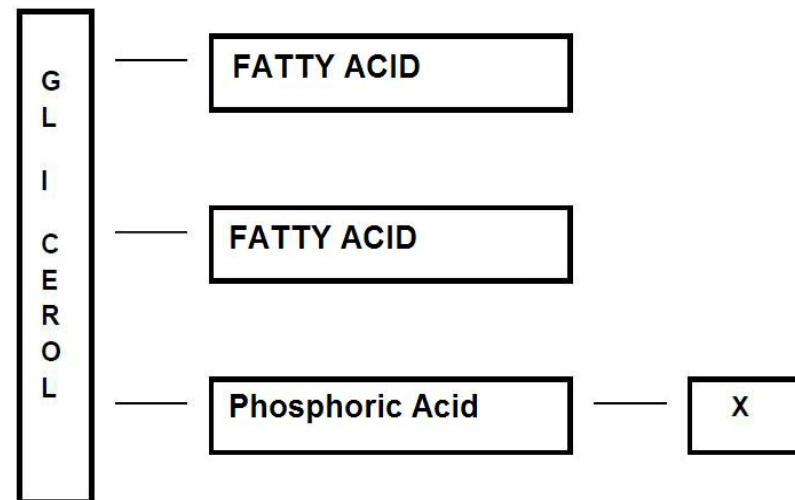
- *Citric Acid*
- *Phosphoric Acid*

IN CASE OF DEGUMMING OF SUNFLOWER OIL AT LOW TEMPERATURE WITH REMOVAL OF WAXES, THE FOLLOWING CAN ALSO BE FOUND IN CRUDE PHOSPHATIDES:

- *Waxes*
 - *Fatty Acid Soaps*
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COMPOSITION OF PHOSPHATIDES MOLECULE

- ❑ When we look at phosphatides molecules it shows that the glycerol molecule is bound with:
- ❑ two molecules of fatty acid
- ❑ And that third hydroxyl group is bound to phosphoric acid molecule and over this connection also connected to compound X, but above all:
- ❑ Choline (PC)
- ❑ Etanolamin (PE), and
- ❑ Inositol (PI)



PHOSPHATIDES REMOVAL TECHNOLOGIES

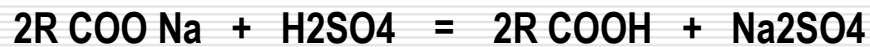
- If we look at the technology of processing phosphatides from refining technology lines then we have **three** basic options:
 - To use separated phosphatides as a base material for the production of lecithin and lecithin derivatives. This option goes after **water degumming** of raw oils.
 - Dosing phosphatides in DTDC and use as animal feed if that is possible.
 - Saponification of phosphatides and hidrolisis of soaps in acid enviroment to acid oil.
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Chemical refining

- To use separated phosphatides as a soap component in process of neutralisation of free fatty acids.

This option goes with **Chemical Refining** and treating phosphatides together with soap stock splitting plant, with adding of concentrated sulfuric acid on temperature of 95°C and pH 1-2, the process of *ACIDOLYSIS* and producing of technical acid oil.

The process is carried out according to the formula:



soap + sulfuric acid = fatty acid + sodium sulfate

Physical refining

- To have a separated phosphatides as a secondary refining product

This procedure we have when it comes to **physical refining** and includes:

Partly saponification of the refining residue with a solution of NaOH at a pH of about 12 to 13, which can be carried out for several hours at a temperature below 95°C.

When it comes to the consumption of **NaOH** in the process of saponification of phosphatides, water content in crude phosphatides affects consumption because in the aqueous phase must provide a high pH.

In addition, it must neutralize acid who participated in the process of degumming (citric, phosphoric).

And finally there is a need of consumption of **NaOH** to complete saponification of the neutral oil as part of fatty acids from phosphatides.

Saponified product is divided by the same technology as in the soap obtained by neutralizing the oil.

WHAT IS OUR GOAL

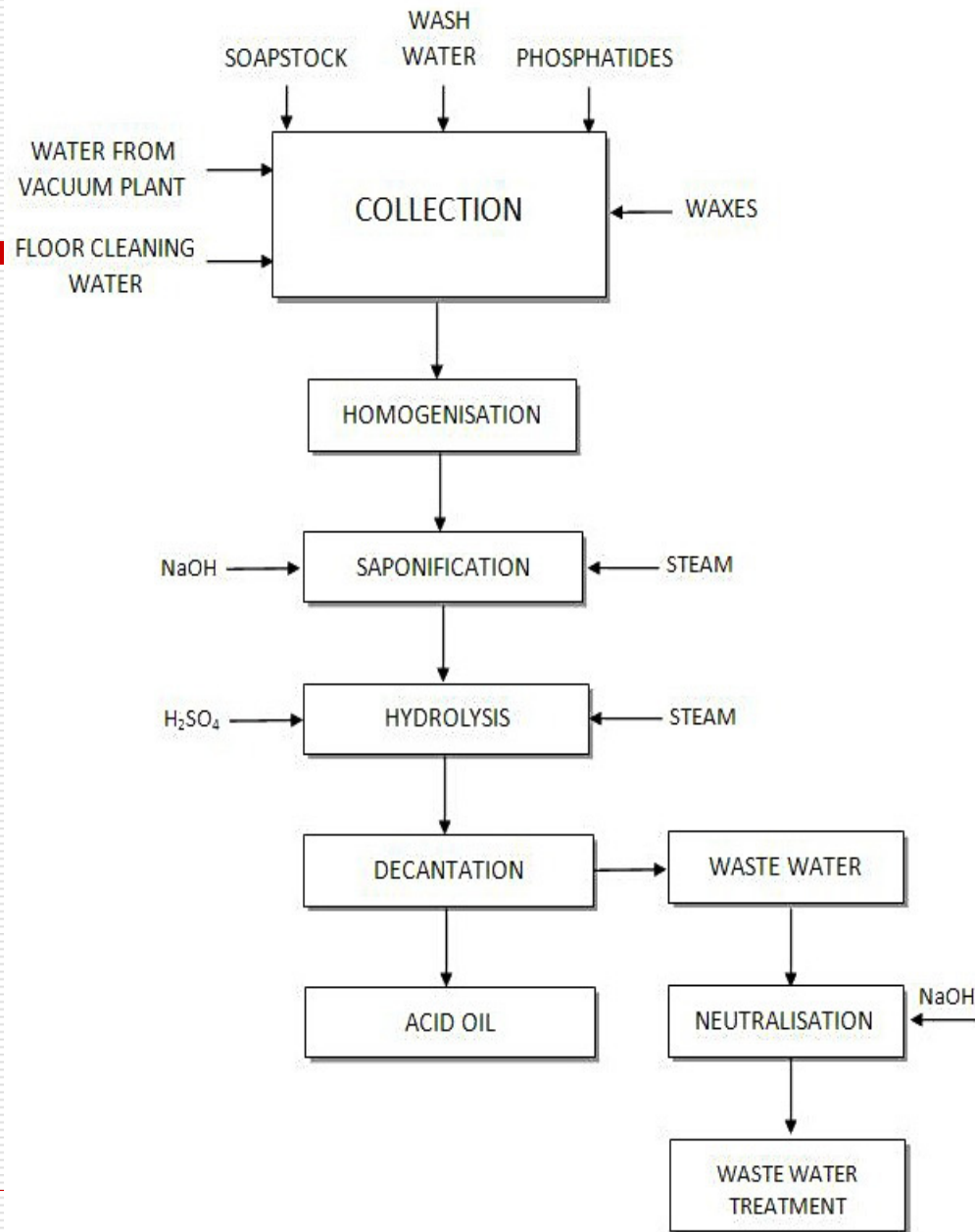
- Each of these solutions involves special technological solutions:
 - *That separated phosphatides transfer to a form that has commercial application.*
 - *That requires a minimum of processing costs.*

Important note for treating of crude phosphatides is that they are:

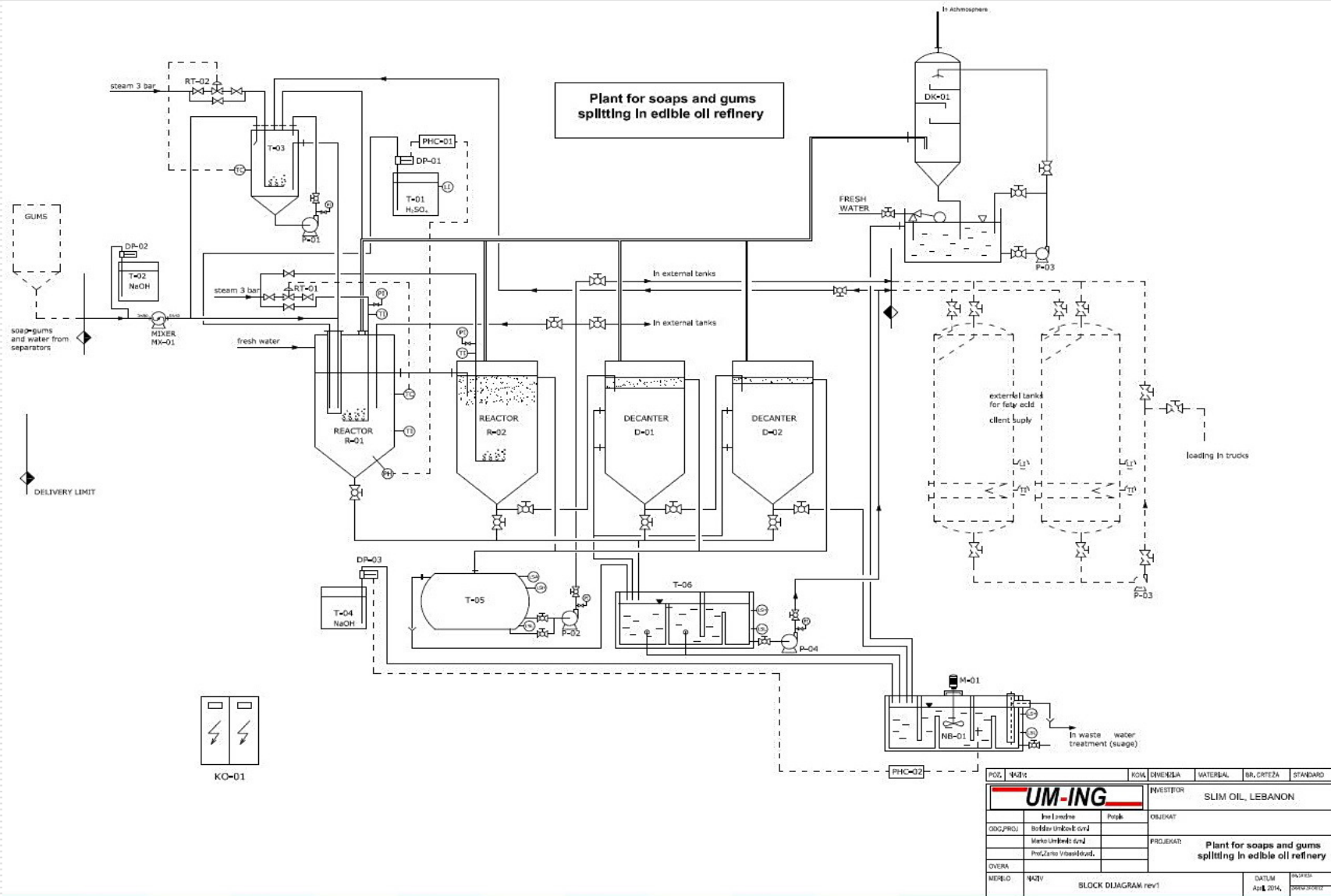
- *susceptible to infection and the various processes of decomposition (stench),*
- *not suitable for storage and transport*

In addition, it is important to observe the energy consumption and environmental impact.

SOAPSTOCK SPLITTING BLOCK DIAGRAM

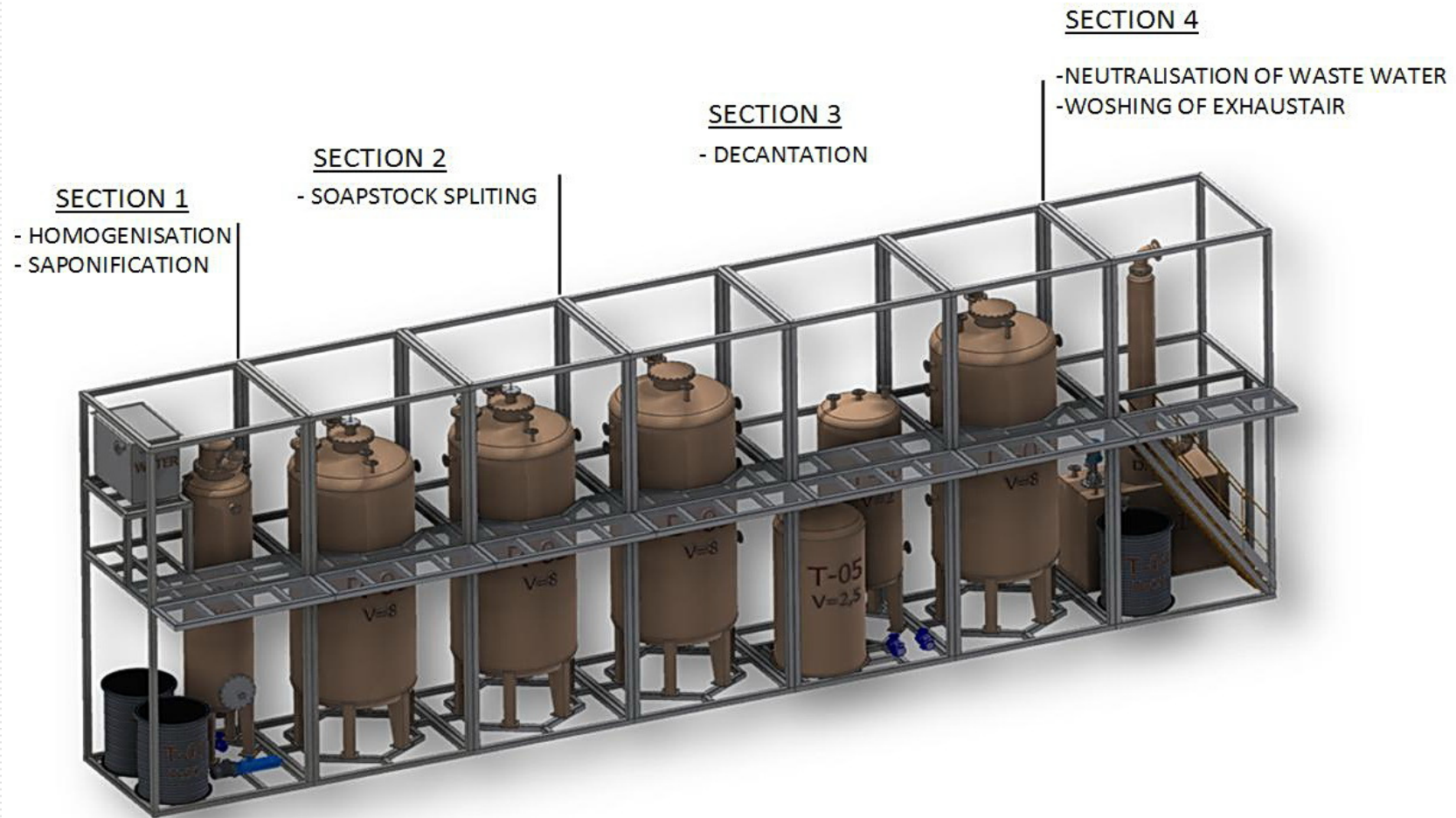


PID - process



3D plant

GENERAL PLANT LAYOUT



Container type plant before shipment



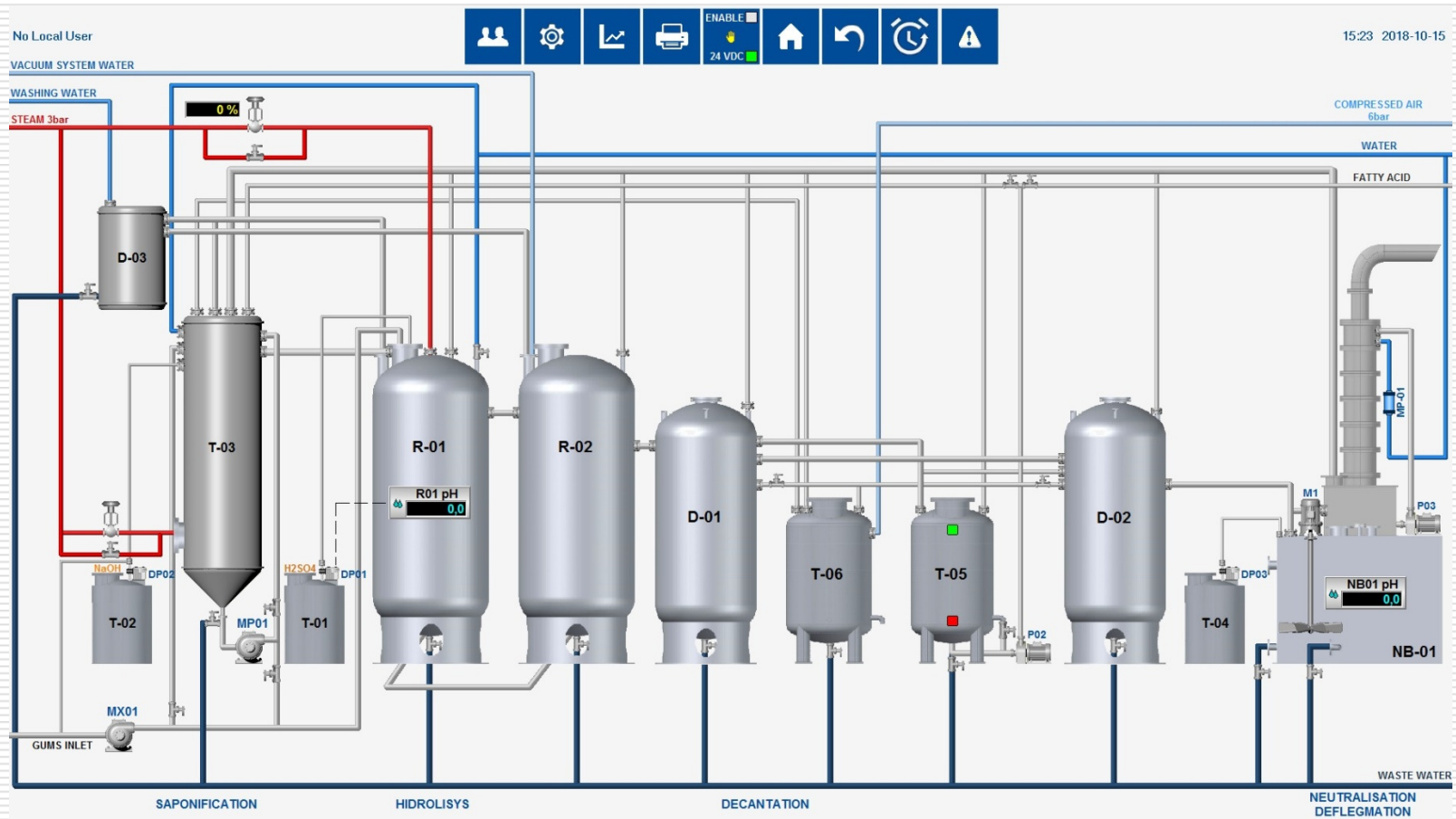
Container type plant before shipment



Installed Plant



Control System Visualisation



EXISTING INSTALLATIONS



□ Standard *UM-ING* plants

We have developed a standard plants for refineries of:

- 50 t/24h
 - 100 t/24h
 - 200 t/24h
 - 300 t/24h
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BASIC TECHNICAL DATA OF THE *UM-ING* PLANTS

- Continuous, automatic operation (PLC and monitoring)
 - Build by most advanced materials (polyester reinforced with fiber glass, acid-resistant stainless steel, polyethylene...)
 - Low consumption of chemicals (NaOH, H₂SO₄)
 - Low consumption of energy (steam, electric energy)
 - Plant can be built as a container type plant
 - Short installation time
 - Turn key option, without civil works
 - Low investment cost compared to the competition
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REFERENCE LIST IN OUR REGION

- ☐ BIMAL – Brčko, 100 t/24h , Bosnia and Herzegovina (distrikt)
 - ☐ Sunce – Sombor, 100 t/24h, Serbia
 - ☐ Nt-kft – Kiskunfelegyhaza, 400 t/24h, Hungary
 - ☐ Brilliant – Štip, 150 t/24h, Macedonia
 - ☐ Mlin Stojčev – Bitola, 100 t/24h , Macedonia
 - ☐ Blagoj Giorev – Veles, 100 t/24h, Macedonia
 - ☐ Sun Oil – Beirut, 120 t/24h, Lebanon
 - ☐ Maritza Olio – Pleven, 200 t/24h, Bulgaria
 - ☐ Fluidi – Gnjilane, 100 t/24h , KiM
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THANK YOU FOR YOUR ATTENTION!

