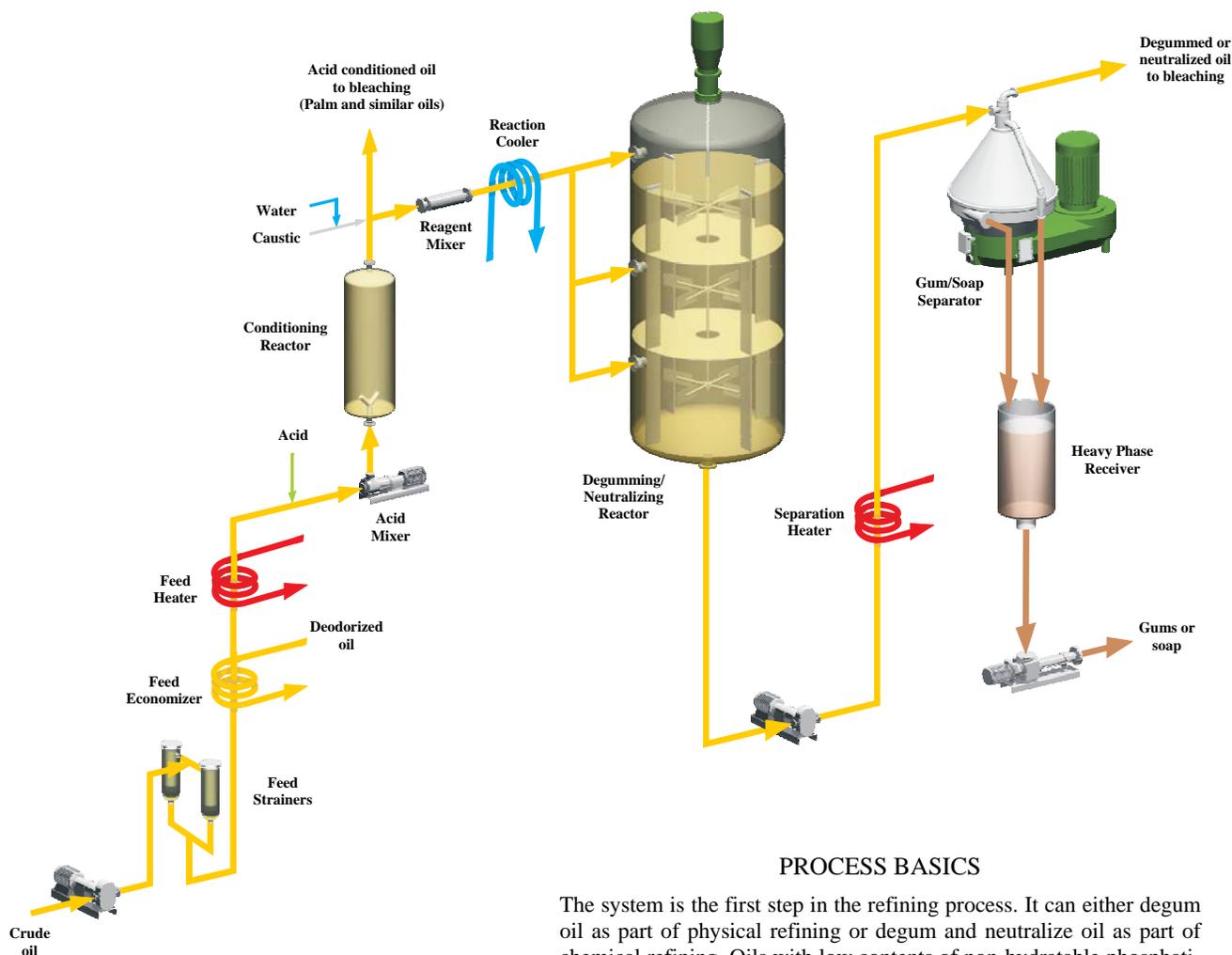




# MultiPure Degumming/Neutralizing System

## MultiPure Degumming/Neutralizing System



### PROCESS BASICS

The system is the first step in the refining process. It can either degum oil as part of physical refining or degum and neutralize oil as part of chemical refining. Oils with low contents of non-hydratable phosphatides (gums) such as palm oil can typically be physically refined, while oils with high contents, such as soybean and canola oil, should be neutralized for optimum quality.

**Acid Conditioning:** The first step in both degumming and neutralizing is to treat the oil with acid to precipitate impurities such as non-hydratable phosphatides and trace metals. The incoming oil is heated and intensively mixed with acid in the Acid Mixer and Conditioning Reactor. Palm oil and similar low gum content oils can be sent directly to bleaching after acid conditioning.

**Degumming:** Water and (in some cases) a small amount of caustic soda is mixed with the conditioned oil in the Reagent Mixer. In some cases the oil temperature is reduced in the Reaction Cooler. The treated oil enters the Reactor where the gums, precipitated by the acid and water treatment, agglomerate. The mixture is gently discharged via the Separation Heater to the Separator where the gums are removed and sent to storage.

**Neutralizing:** The “Super Long-Mix” process is similar to degumming with the difference being that the acid conditioned oil is treated with enough caustic to fully neutralize (saponify) the free fatty acids in the oil as well as remove gums and other impurities. The resulting soap is removed in the Separator.

The degummed or neutralized oil is immediately sent to bleaching where special adsorbents remove the remaining gums/soap.

When the system is used for degumming only, a vacuum drying section is added after the Separator.

**Designed for optimum quality, maximum yield and minimum energy consumption.**

**“Super Long-Mix” neutralizing method eliminates need for water washing which saves water and reduces environmental impact.**



Crown Iron Works

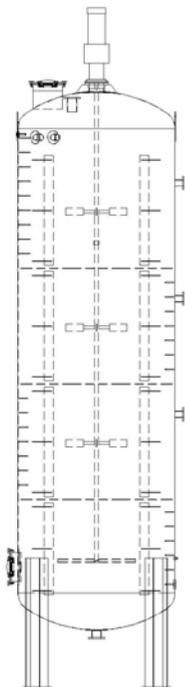
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# MultiPure Degumming/Neutralizing System

## FEATURES AND ADVANTAGES

- Multi-purpose system designed for Acid Conditioning, Water Degumming, Enhanced (Special) Degumming, Enzymatic Degumming and Neutralizing.
- Optimum conditions for both Degumming and Neutralizing due to optional cooling before reaction and variable retention time and agitation in Reactor.
- Reactor designed to allow precipitated materials to agglomerate and stay in suspension. This design is the core of "Super Long-Mix" Neutralizing which is the optimum neutralizing method for minimizing product losses and residual impurities in the separated oil.
- Water Washing eliminated due to low amounts of residual soap in neutralized oil combined with the use of special soap adsorbing materials in bleaching.
- Minimum reagent consumption due to high shear variable speed mixer for intensive mixing of oil and reagents.
- Plant sizes from 50 to 1,200 TPD (metric tons per 24 hours).



## REACTOR DESIGN

- "Plug Flow" optimized
- Gum/soap flocs maintained in suspension
- No breaking-up of flocs
- Minimum power
- Variable retention time
- Multiple inlets eliminate splashing
- Easy access

## UTILITY CONSUMPTION

Typical figures per metric ton of oil heated to 70 °C by deodorized or bleached oil in Feed Economizer:

- Electric Power: 4 - 10 kWh depending on plant size
- Steam (2 barg): 0 - 30 kg depending on process
- Cooling Water (30 °C): 0 - 3 m<sup>3</sup> at ΔT 6 °C depending on process
- Phosphoric/Citric Acid: 0.5 - 1.0 kg
- Caustic Soda (50%):
  - Special Degumming: 1.9 kg/kg acid + 0.5 - 1.0 kg
  - Neutralizing: 1.9 kg/kg acid + 0.3 - 0.6 kg/kg FFA
- Process Water: 10 - 30 kg

Note: Cooling water is amount circulated per metric ton of oil.

## EQUIPMENT SPACE REQUIREMENTS

- 50 - 200 TPD: Two levels, each 55 m<sup>2</sup> with 6 m elevation
- 200 - 600 TPD: Two levels, each 60 m<sup>2</sup> with 8 m elevation
- 600 - 1200 TPD: Two levels, each 120 m<sup>2</sup> with 8 m elevation

Note: Control room and MCC not included

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