EST. - 1939

KUMAR

GEARED FOR PROGRESS

Contact:

Kumar Metal Industries Pvt. Ltd.

Corporate Head Quarters:
101, Kakad Bhavan, 30th Road,
Opp. Gaiety Galaxy Cinema,
Bandra (West), Mumbai-400050, India.

Tel: +91-22-2644 1667 / 73 / 74,
+91-22-2642 7982
Fax: +91-22-2642 8136

Manufacturing Unit:
Plot No. 7, Mira Co-op. Industrial Estate,
Mira Road, Dist. Thane-401164, India.

Tel: +91-22-2845 9100,
+91-22-2845 8300
Fax: +91-22-2845 6263

Website: www.kumarmetal.com

E-mail: kumarind@vsnl.com

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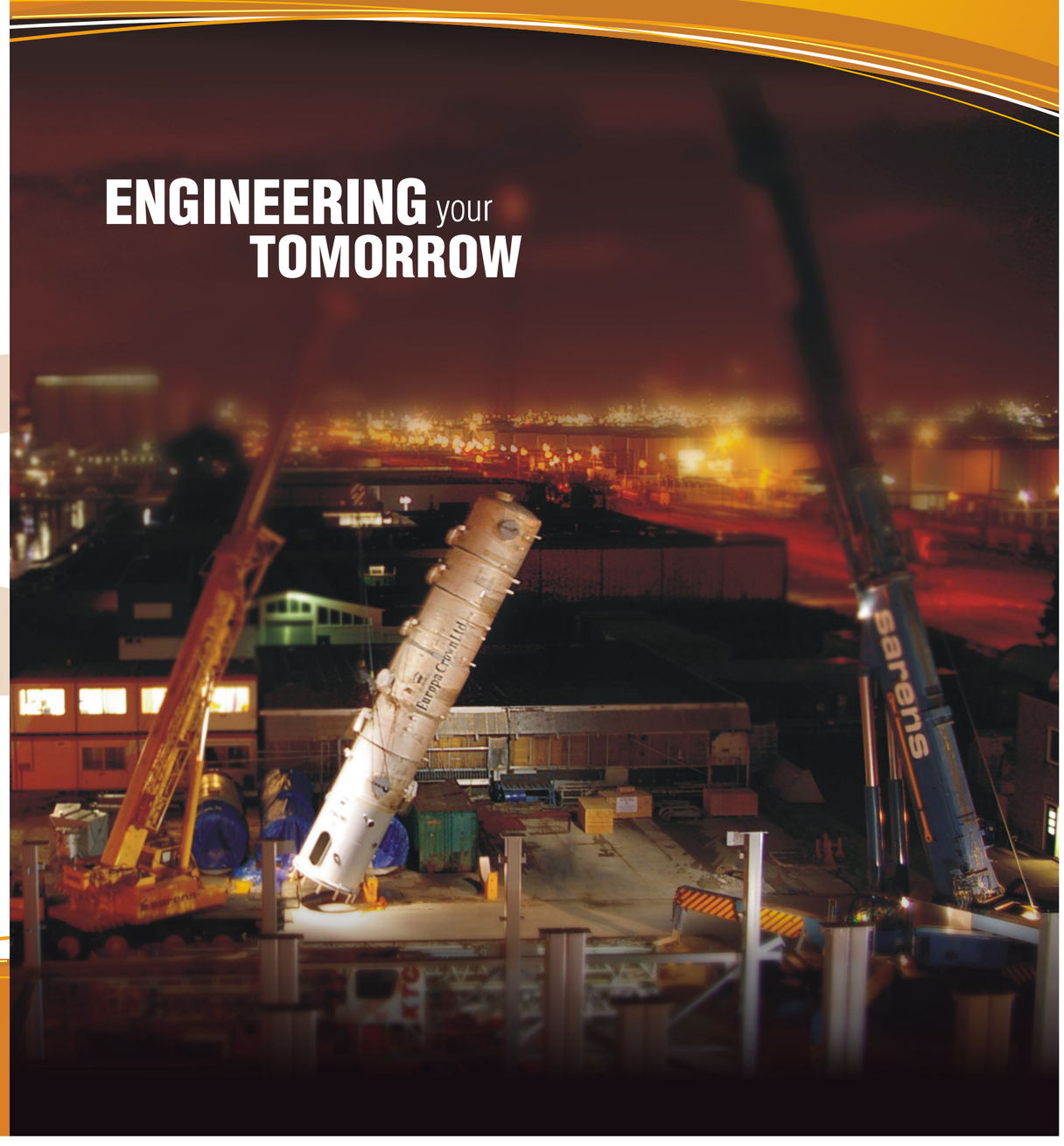
Kumar Refining Systems

In joint venture with Crown Iron Works Company, USA

CROWN EST. 1895

ENGINEERING your TOMORROW



Superior performance

Process economy:

a. Electrical power – Systematically designed process piping manifold, heat exchangers with low pressure drops, precisely determined duty parameters and selection of high efficiency process pumps result in lower electrical power consumption compared to conventional plant suppliers.

b. Steam/ heat energy – Kumar's Process is designed such that optimum heat is recovered from hot oil.

c. Chemicals and adsorbents - High shear mixers from reputed manufacturers ensure intimate contact of phosphoric/citric acid; hence lower acid consumption per MT of oil. Efficient design of bleaching reactor ensures low adsorbent consumption.

d. Cooling water circulation – The deodorizer is designed for optimum efficiency to use minimum stripping steam which leads to reduction in barometric water circulation rate.

Lower oil losses:

a. Pretreatment and bleaching – High efficiency bleaching and reduced adsorbents result in lower loss of oil.

b. Chemical process – Our Selection of Centrifugal separators, Mixers and Heat Exchangers lead to control heating of the oil to the required temperature. Proper mixing of oil with the chemical and superior separation of gums and soap from the oil leads to lower losses.

c. Deodorization – The deodorizer consists of precisely designed structured packings for low pressure drop and high surface density that ensure intimate contact of stripping steam with oil, resulting in lesser free oil entrainment with stripping steam.

Operator friendly and easy maintenance:

We select superior quality hardware in our process plants. Construction of equipment is simplified for operation and maintenance. Operating as per the procedures given in the manual will ensure low operation and maintenance costs.

Excellent quality of output oil:

Refined oil from our refining systems is in acceptance with all required parameters of the International market such as FFA, Color, Peroxide Value, etc.

International Certifications:

As per applicable international norms, equipments and machinery are manufactured in compliance with ASME & EU directives.

The Process

The Process

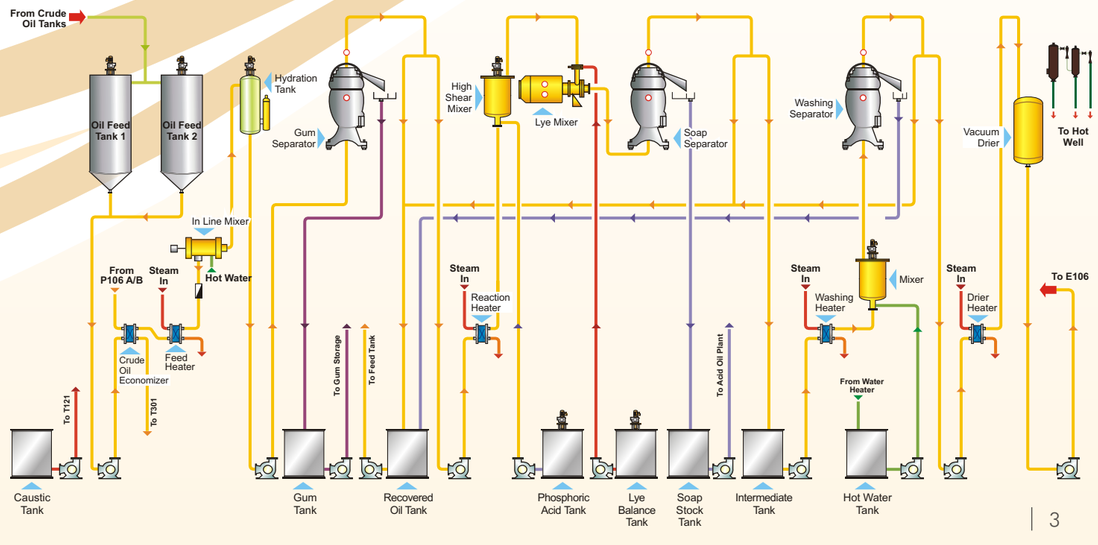
Degumming, Neutralisation, Washing & Vacuum Drying

Chemical refining is subject to degumming, neutralization and washing process to remove hydratable and non-hydratable phosphides, free fatty acid , soap PPM and some coloring bodies from the oil. In this process oil is heated to the suitable degumming temperature and water as well phosphoric acid is added for degumming. Subsequently diluted caustic is mixed with the oil to convert the free fatty acid into soap. Gum and soap is subject to centrifugal separation. Lastly, oil is washed with hot water to remove the last traces of soap PPM.

Salient Features :

- Gentle heating of oil to optimum degumming temperature.
- Appropriate mixing of Phosphoric acid and water in the oil during degumming.
- Correct residence time provided in the hydration tank.
- Adequate mixing of Caustic solution in the oil.
- Accurate degumming, neutralization and washing temperature is maintained.
- Proper mixing of hot water and oil for washing.
- Accurate removal of soap after neutralization.
- Lower Soap PPM after washing.
- Consistent dried oil.

Continuous Degumming & Neutralization Section



Pretreatment / Bleaching

Pretreatment:

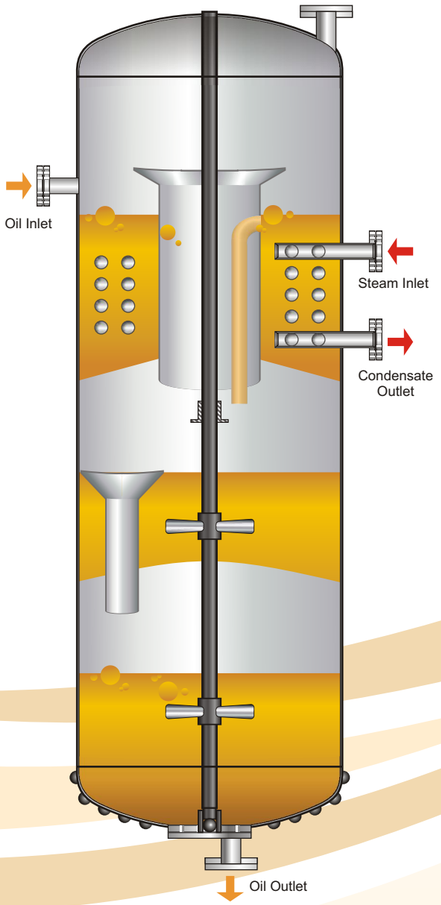
During Physical Refining, oil is subject to phosphoric acid addition for the phopshotides to react with phosphoric acid. Proper retention ensures phosphoric acid and phopshotides to react with each other properly.

Bleaching:

During Physical Refining, pretreated oil and during Chemical Refining, neutral oil is subjected to the bleaching process. Pretreated / Neutral oil contains yellow, green and red pigments. This is a physical absorption process where the oil is heated to the required bleaching temperature and then bleaching earth is added which adsorbs the coloring bodies. This oil passes through pressure leaf filters and then the polishing filter.

Salient Features :

- Accurate quantum of phosphoric acid addition.
- Adequate oil and phosphoric acid mixing.
- Correct residence time for pretreatment.
- Process design is flexible to have adjustable bleaching temperature in wide ranges.
- Appropriate quantity of bleaching earth and carbon is dosed. High efficiency bleaching reactor requires lower adsorbent quantity.
- Outstanding filtration due to proper selection of filter elements.
- Lower retention of oil in spent earth.
- Easy cake discharge.
- Excellent polishing to remove any traces of bleaching earth.

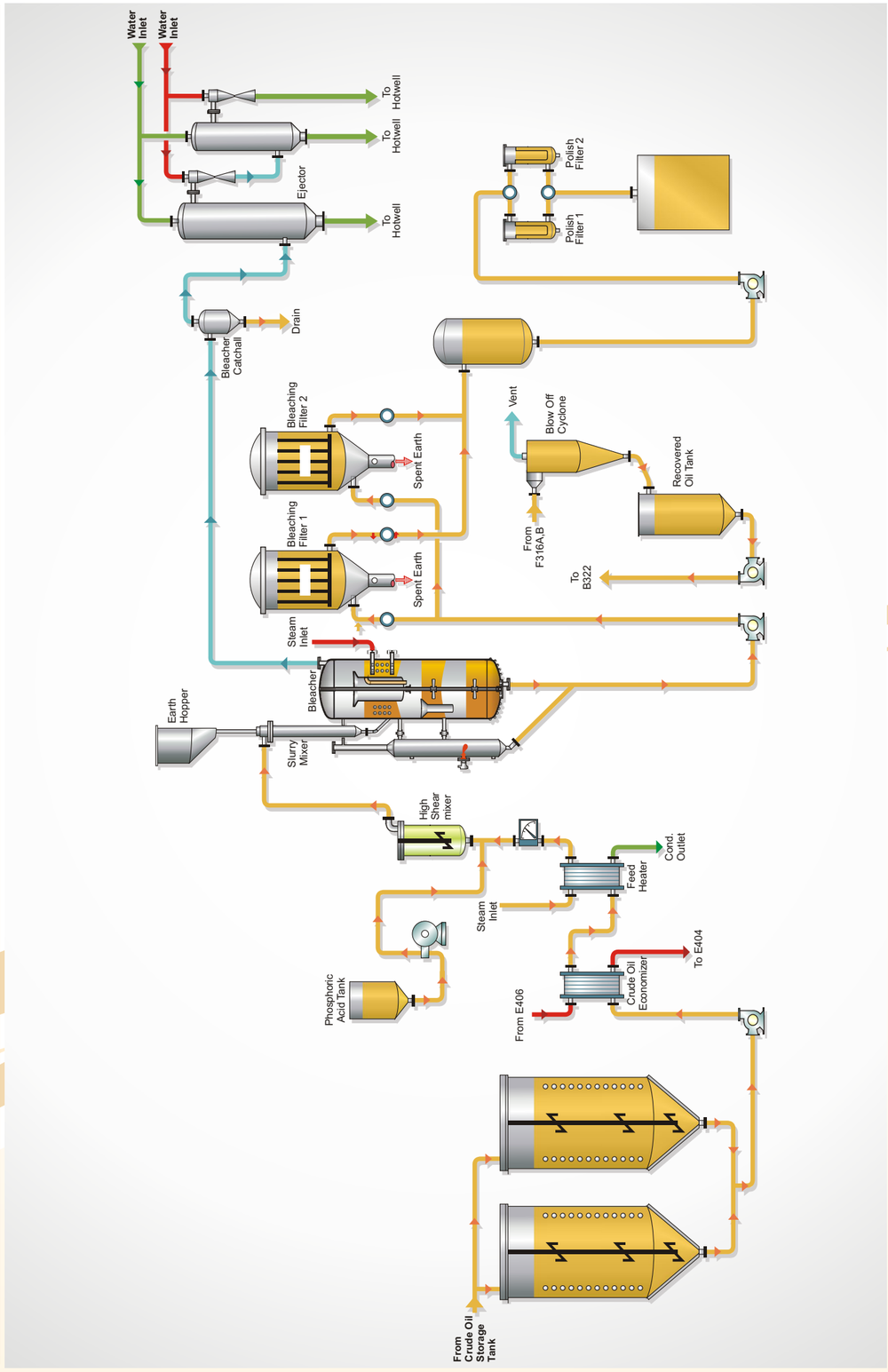


Bleacher

Bleaching Section

Internal View - Bleacher

Continuous Pretreatment and Bleaching Plant



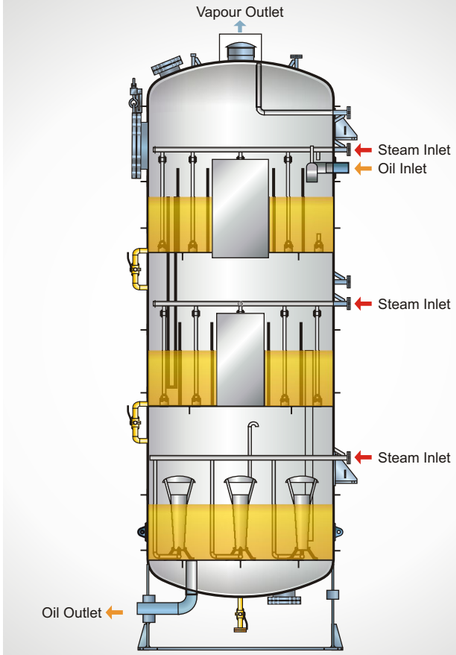
De-acidification / Deodorization

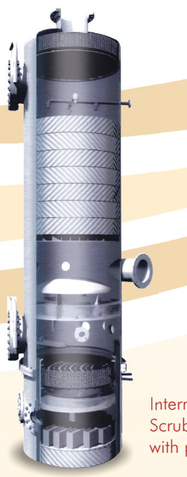
Oil after neutralization, pre treatment and bleaching contains free fatty acid, few coloring bodies and odoriferous substances. These odoriferous substances impart color and foul smell to the oil and to remove these, oil is subjected to De-acidification / Deodorisation. In this process oil is subjected to de-aeration, regeneration and final heating for de-acidification / deodorization using high vacuum, open steam with suitable residence time. This oil is then cooled and antioxidants are added to increase the shelf life of refined oil.

Salient Features :

- Well designed structured packing in the Deaerator, live steam injection and full vacuum to ensure optimum deareation of oil. This reduces polymerization within heat exchangers.
- Maximum heat is recovered from deodorized oil to ensure proper oil temperature for storage for optimum shelf life.
- Our system is designed for lower deodorization temperature and high retention time to ensure enhanced shelf life of refined oil having negligible Trans Fatty Acids.
- Low oil carryover with fatty acid resulting in lower deodorizing process loss.
- Proper designed vacuum system for low motive steam consumption.
- Well designed liquid distributor in vapor scrubber to ensure optimum condensation of free fatty acid vapors.

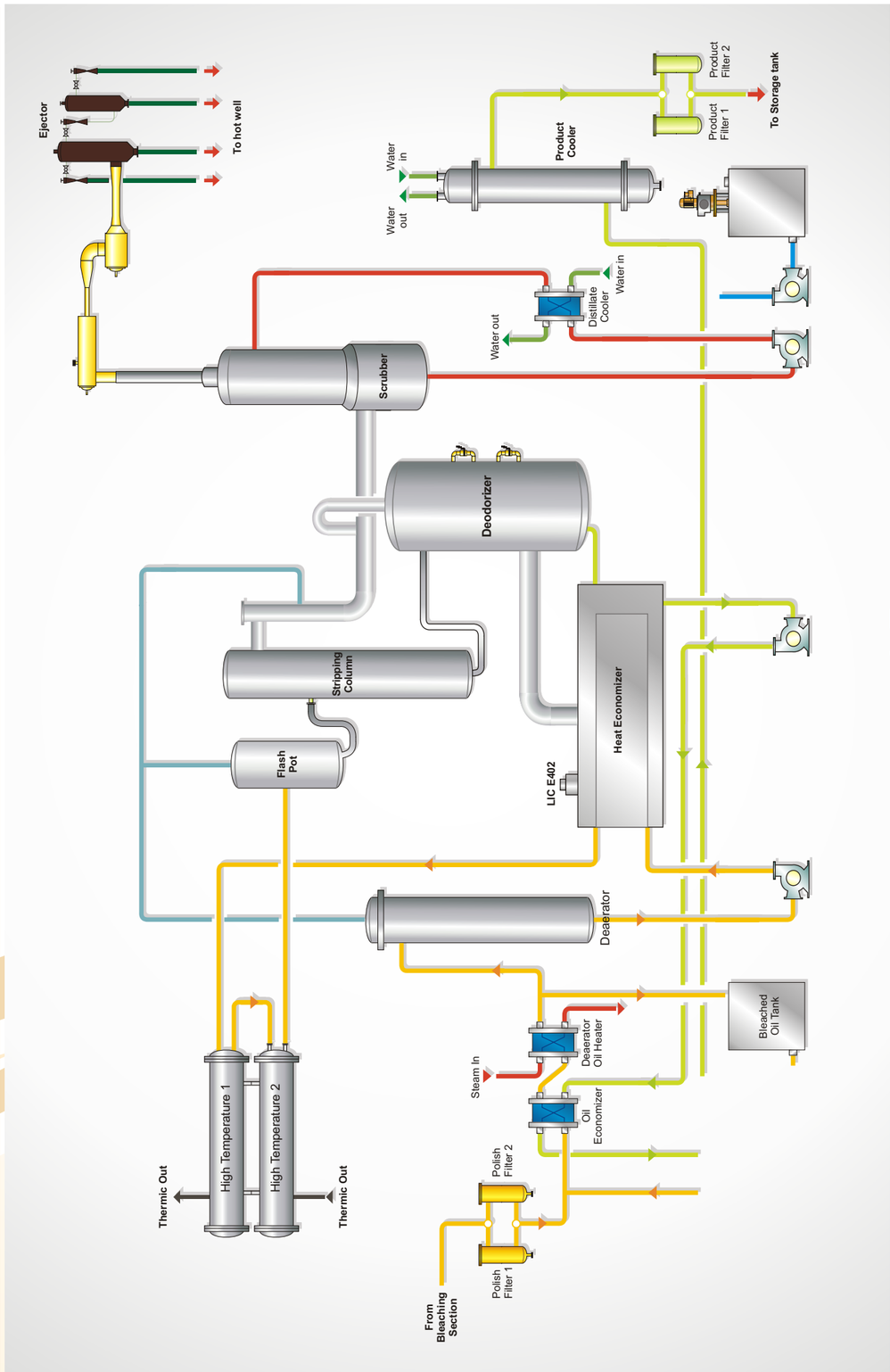
Deodorizer





Internal view of Scrubber with packing

Continuous Deodorization Section



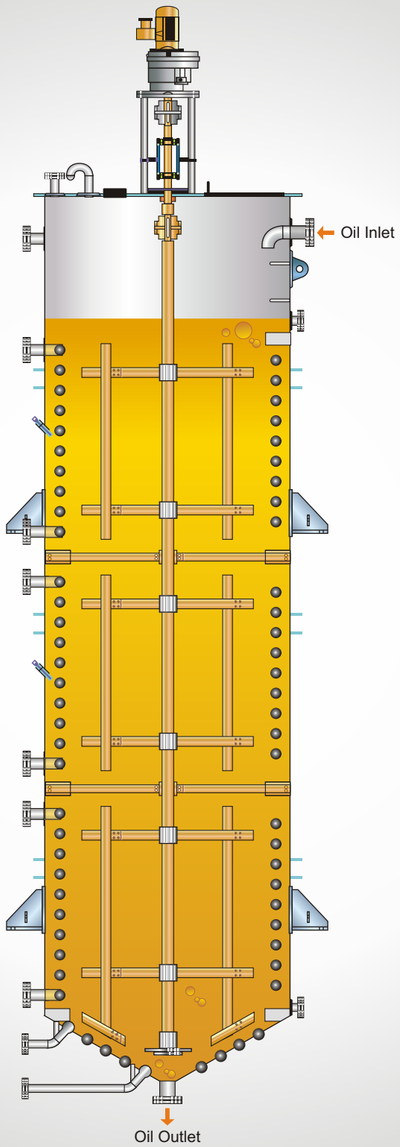
Dewaxing

Oils like sunflower, corn and rice bran contain waxes (which are esters of long chain fatty acid and alcohol) in the oil. These waxes impart haziness to the oil at lower temperature. To remove this haziness, the oil is subjected to the de-waxing process. In this process oil is cooled to de-waxing temperature and proper retention time is provided in the crystallizer to form crystals. Filtration of the oil removes the waxes.

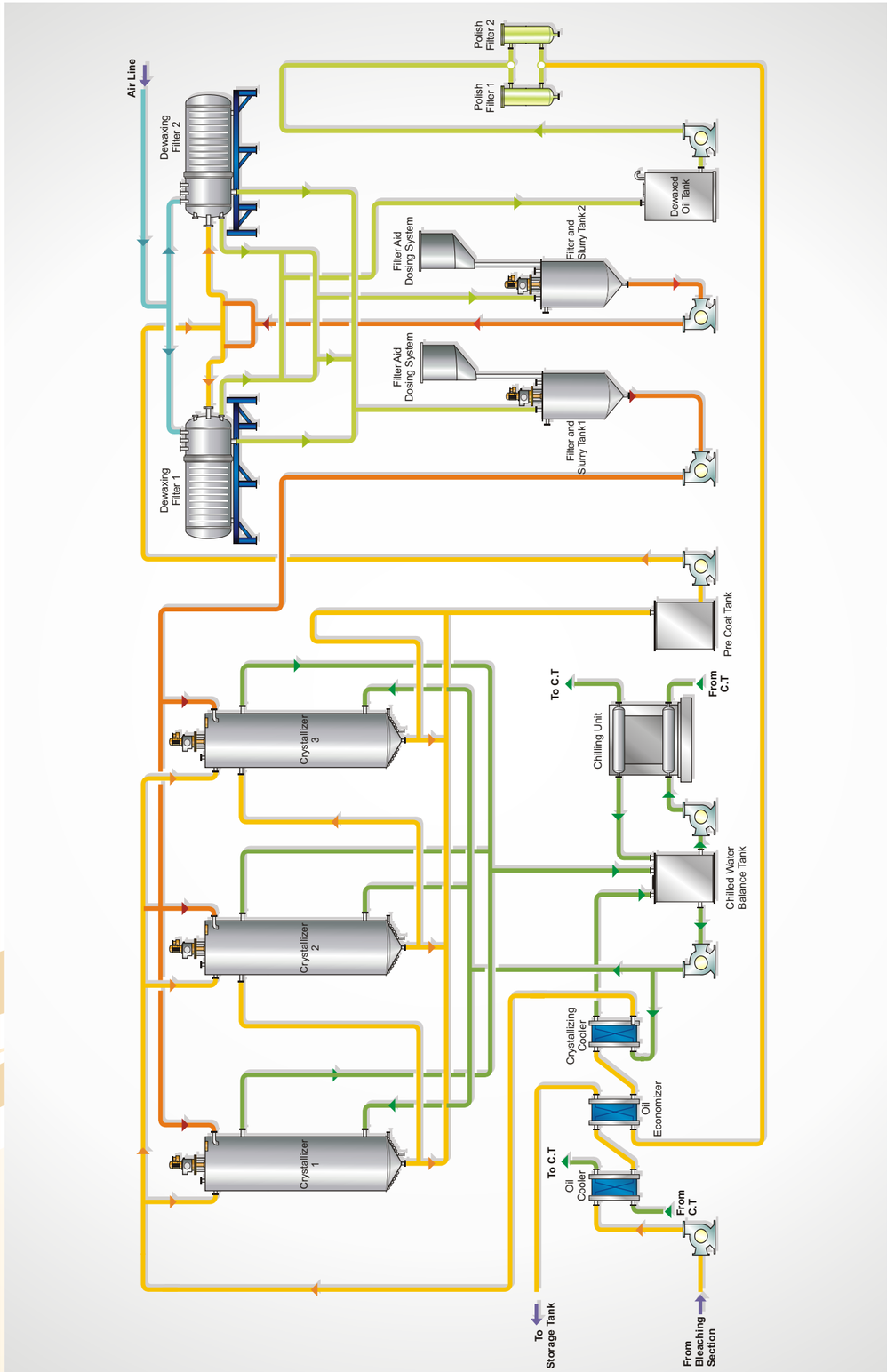
Salient Features :

- Gentle cooling of oil to de-waxing temperature ensuring proper crystallization.
- Adequate retention/ maturation time in crystallizers enables formation of bigger crystals.
- Lesser oil losses with waxes due to adequate filtration cycle.
- Gentle transfer of crystallized oil to filters ensures that crystals are not damaged.
- Proper filtration to remove waxes.
- Proper recovery of waxes.

Batch Crystalliser



Dewaxing Section



Dry Fractionation

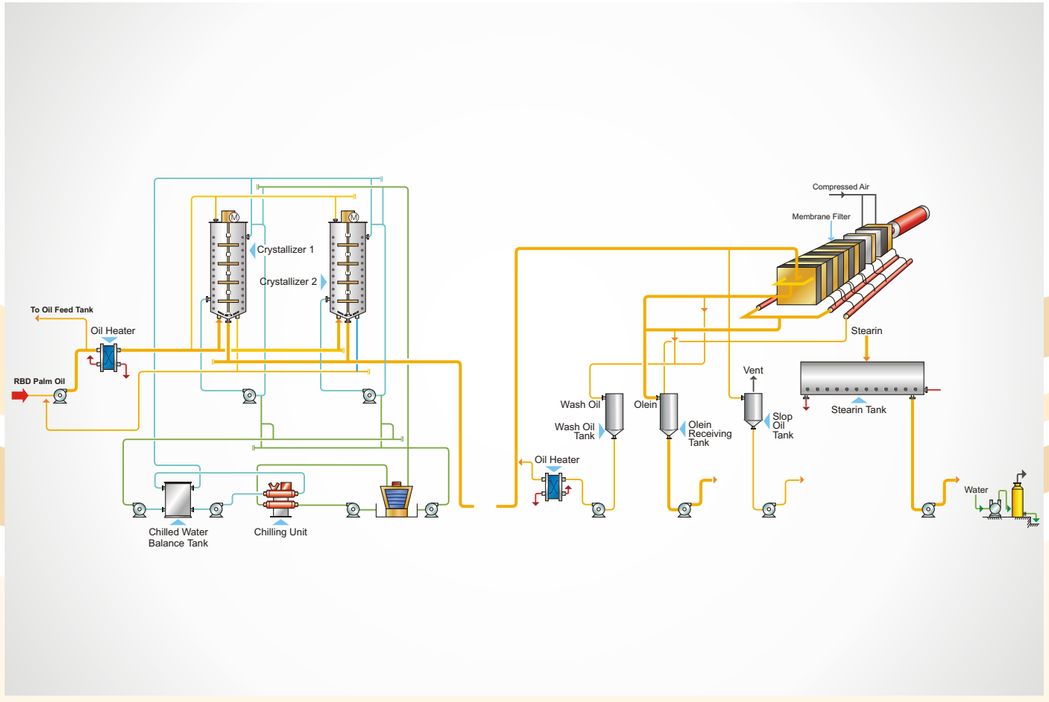
Fractionation:

Refined palm oil contains palm olein and palm stearin. Separation of palm olein and palm stearin is done by the membrane filter. In the fractionation process, oil is first heated to give it the homogenous texture. This oil is then cooled by the cooling tower and chilled water in the crystallizer. This crystallized oil is then filtered by a membrane filter where the palm olein gets filtered and palm stearin remains on the membrane chamber.

Salient Features :

- Appropriate recipe for crystallization results in excellent olein recovery.
- Correct temperature control.
- Suitable selection of filter size
- Apt cooling system selection leads to less power consumption.
- Excellent Palm Olein quality.

Dry Fractionation Filtration Section



A Complete Package

Kumar is a global company. Not only do we serve customers around the world, we also use the best technology and supply resources to ensure that only the best is delivered to our customers. We have installed and commissioned several oil mills, solvent extraction plants and refineries around the world. Our vast experience and expertise to design, engineer and install complete process plants on turnkey basis has given us the competitive edge. We have our presence in over 30 countries and serve more than 500 clients.

Process Control: The control, operation and supervision of the plant can be handled by minimal staff. All main process parameters for example flow rates, temperatures, liquid levels etc. are automatically maintained from a control panel or, as an option, with the help of PID/PC based controls.

Our services also include:

- Installation design in compliance with international standards
- Complete process automation
- Skilled manpower for supervision of installation and commissioning
- Technical and manpower assistance to bring your new installation on line in minimum possible time
- We provide skilled operational staff and also train the local staff

Your Partner In The Oil Industry

Seed Preparation	Pressing	Extraction	Refining	Engineering
Cleaning	Pre Pressing	Solvent Extraction	Degumming Neutralizing	Process Technology
Breaking	Final Pressing	Desolventising Toasting	Pre treatment Bleaching	Project Management
Conditioning	Full Pressing	Drying Cooling	Deacidification Deodorisation	Process Automation
Flaking	Cold Pressing	Solvent Recovery	Crystallization Fractionation	Installation & Commissioning
Processed Seed	Crude Oil Press Cake	Crude Oil Meals	Edible Oil Edible fats Fatty Acids	After Sales Service