CROWN

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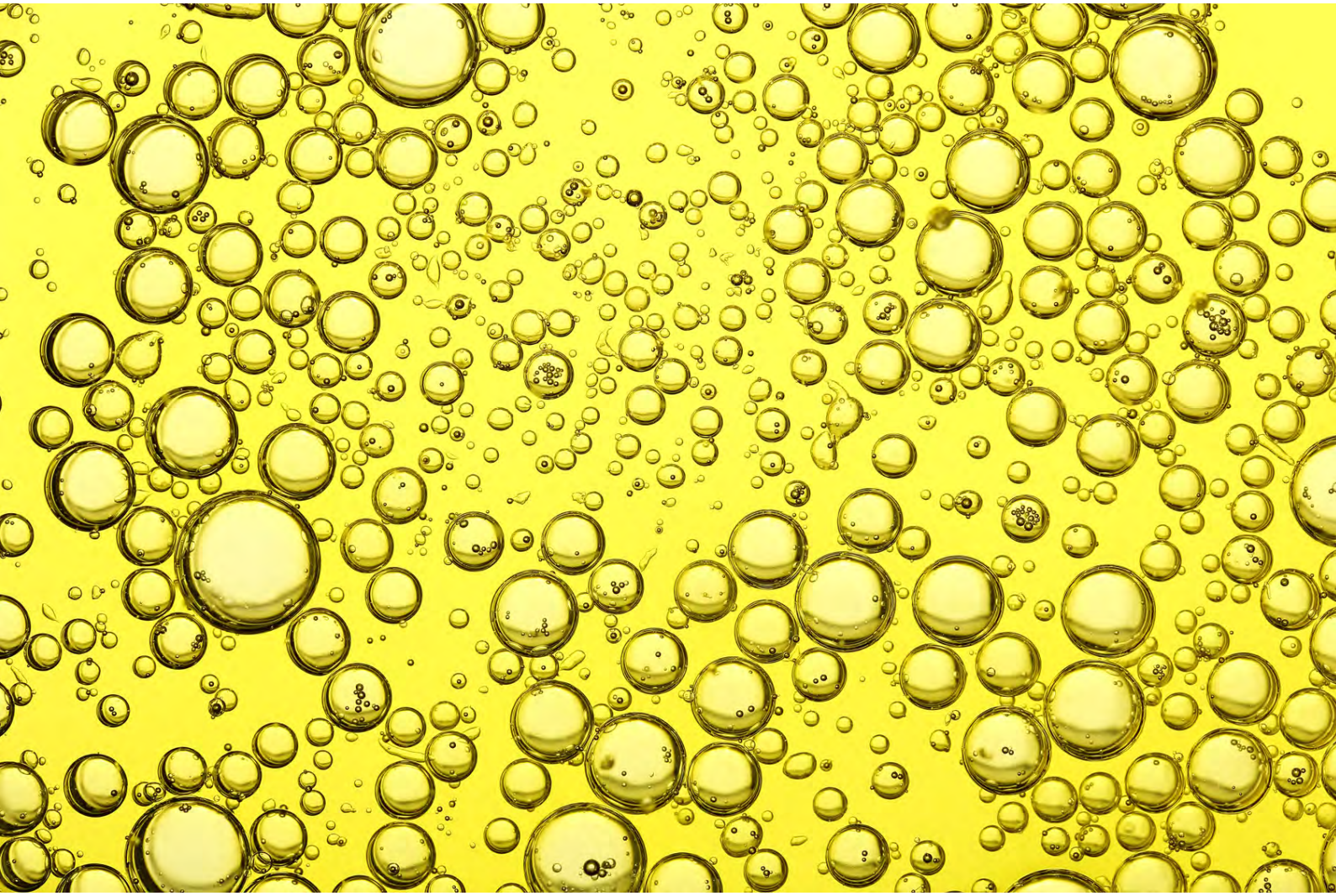

New Innovation Technology for Vegetable Oil Industry from Crown Machinery

Crown Machinery Enterprise Introduction

Crown Machinery Inc. is a modern innovative high-tech centrifuge R&D and manufacture enterprise with four main branches in global work located in USA , South Korea, Philippine and China. Adhering to the concept of quality is the enterprise life, innovation is the driving force for the development, Conform to the trend of the development of modern industry, Fusion concept of global economic integration, Creative thinking, Integrate liquid separation processing industry leading enterprise in the upstream and downstream resources; Gather technical force; Together with the power of the global enterprise for business purposes; Dedicated to supply the clients complete separation solution.

Our company assemble a number of skillful, talented professionals, introduction advanced of international centrifuge technology with 30 years experiences of the development and design, through adopting international advanced management method, we have developed very professional separator and centrifuge for edible oil , pharmaceutical , chemical , waste project and various liquid industry. Until now we have accumulated more than 500 clients in global world market and get wide good feedback for our products and service, as our enterprise name "Crown Machinery" described we would like to supply the products like the crown quality and service.

Nowadays, our USA branch mainly forwards the waste-water market; Manila branch mainly prompts the coconut products machinery in Asia-Pacific market; Our Korean branch also named the Hanil Science Medical Co.,Ltd. is focusing on the Bio-tech and Bio-pharmaceutical market; And Liaoyang Co.,Ltd. in China works as the hea branches to serve the machiner technology support and after-service

Up to now, we have successfully intro many clients' final products suc coconut oil into Chinese market to a a mutually beneficial win-win situatic do hope serving the client not on products but also the wonderful expe to cooperate with us.

Welcome to contact and visit us

Track Records

Model : DL-1P2S

Flange : DN50 x 4

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Vegetable Oil Processing line

CHINA
No.13093-06-02 Victory Community
Baita District Liaoyang
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Vegetable oil is one of the most important primary foods and therefore requires maximum quality. The quality of the final product depends on the refining method and the nature of the crude oil. Crown Machinery offers a wide range of solutions designed to boost value in this respect.

The practical production processes and technologies must be as varied as the different types of oil. Crown Machinery designs and manufactures a “customized” solution which is tailored to meet the requirements of the specific application. The centrifuge is always to be found at the heart of the installation. every client is able to find the best solution in economic and technological terms for his specific production tasks. We do not only supply the mechanical separation facility; we of course also supply all other components and systems necessary for an efficient and reliable production line. Satisfied clients throughout the world have placed their trust in this know-how and technological potential, developed together with the clients in the course of demanding day-to-day operations.

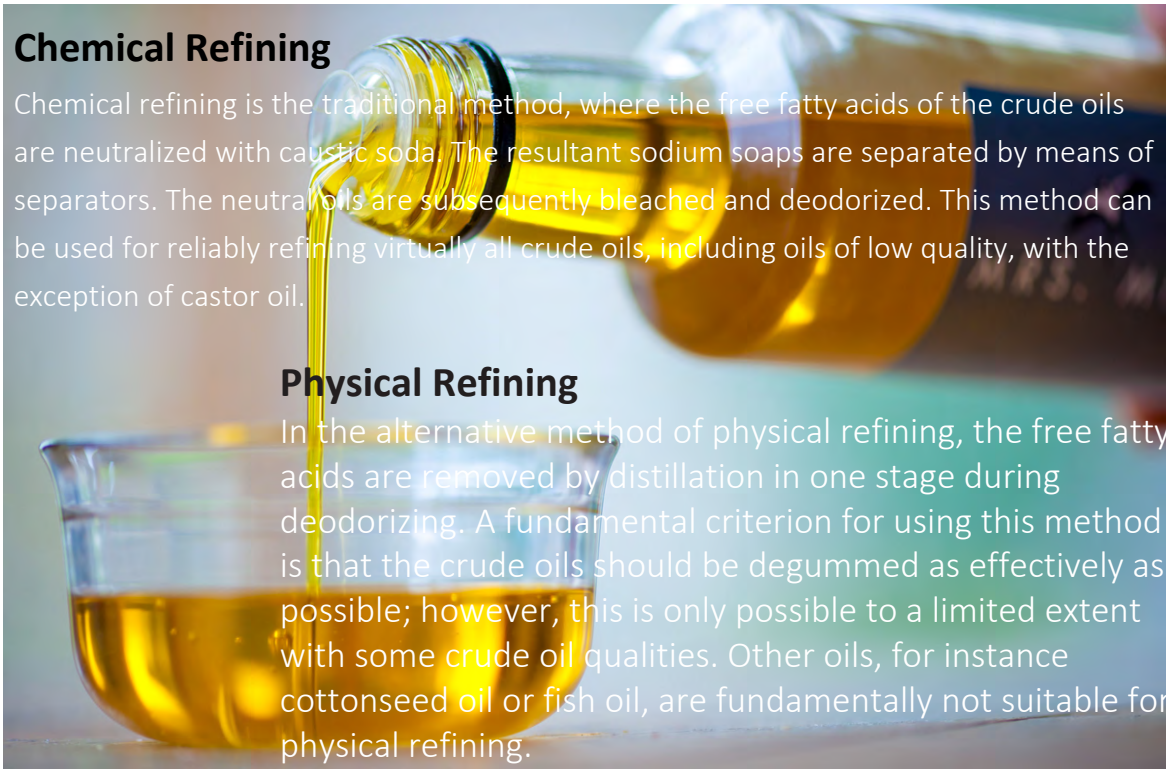
Industrial Vegetable Oil Processing

The vegetable oil processing industry involves the extraction and processing of oils from vegetable sources. Vegetable oils are principally used for human consumption but are also used in animal feed, for medicinal purposes, and for certain technical applications. The oils and fats are extracted from a variety of fruits, seeds, and nuts. The preparation of raw materials includes husking, cleaning, crushing, and conditioning. The extraction processes are generally mechanical (boiling for fruits, pressing for seeds and nuts) or involve the use of solvent such as hexane. After boiling, the liquid oil is skimmed; after pressing, the oil is filtered; and after solvent extraction, the crude oil is separated and the solvent is evaporated and recovered. Residues are conditioned (for example, dried) and are reprocessed to yield by-products such as animal feed. Crude oil refining includes degumming, neutralization,bleaching, deodorization, and further Refining.

Processing of e.g.

- Soybean oil
- Rapeseed oil
- Sunflower oil
- Cottonseed oil
- Corn oil
- Peanut oil
- Sesame oil
- Rice brain oil
- Barley oil
- Oat oil
- Sorghum oil
- Coconut oil
- Palm oil
- Avocado oil
- Olive oil

Refining



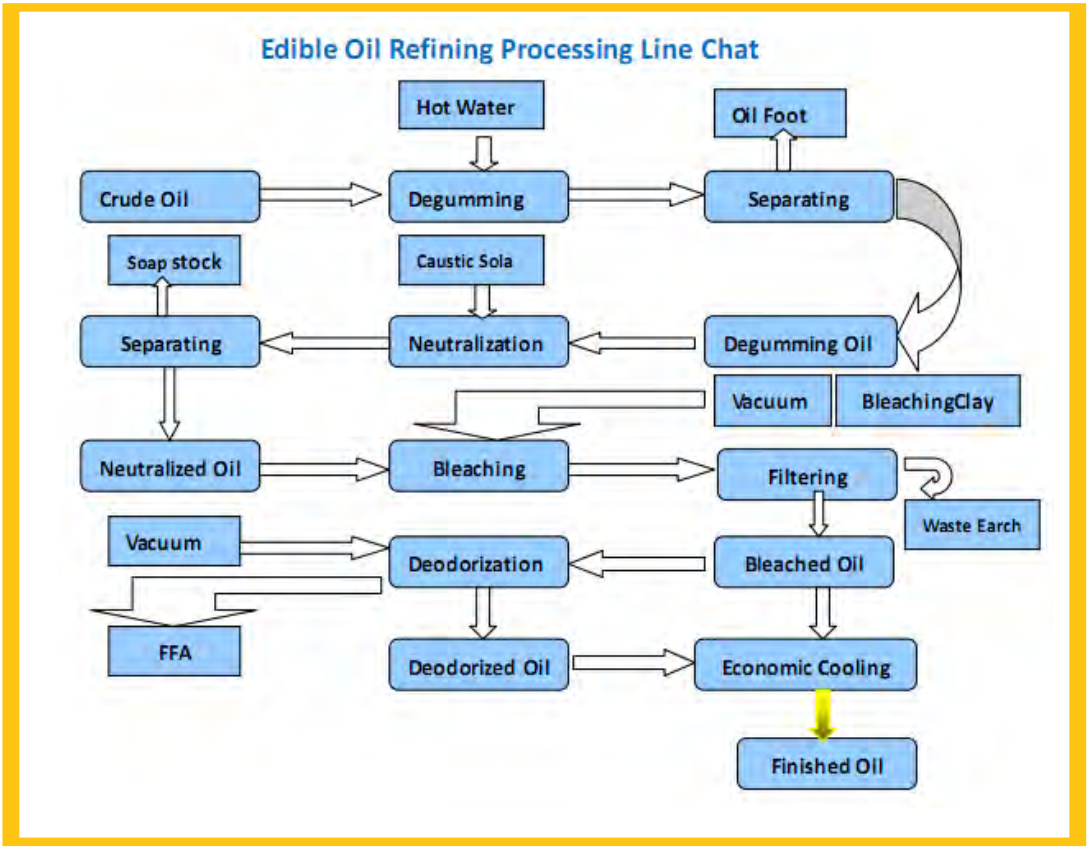
Chemical Refining

Chemical refining is the traditional method, where the free fatty acids of the crude oils are neutralized with caustic soda. The resultant sodium soaps are separated by means of separators. The neutral oils are subsequently bleached and deodorized. This method can be used for reliably refining virtually all crude oils, including oils of low quality, with the exception of castor oil.

Physical Refining

In the alternative method of physical refining, the free fatty acids are removed by distillation in one stage during deodorizing. A fundamental criterion for using this method is that the crude oils should be degummed as effectively as possible; however, this is only possible to a limited extent with some crude oil qualities. Other oils, for instance cottonseed oil or fish oil, are fundamentally not suitable for physical refining.

Two processes have been developed for refining edible oils and fats; the decision as to which process is to be used depends on the types and qualities of crude oil to be processed.



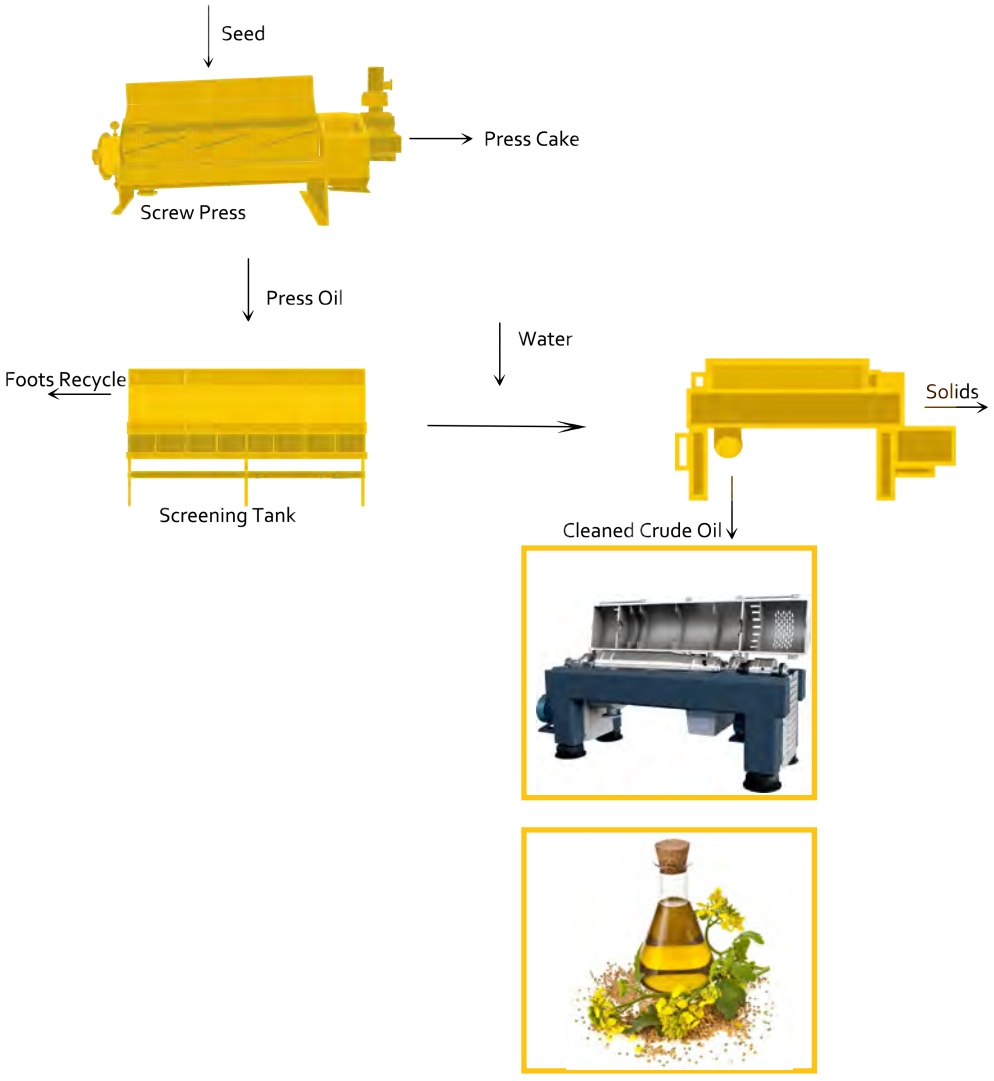
Clarification of Press Oil

The oil which is discharged from expeller presses has various solid content levels depending on the oil seed type and the condition of the press. In order to remove particularly large solid particles, the oil is usually fed into a settling tank, which is also used simultaneously as a buffer tank. In some installations, a vibrating screen is used for precleaning, or the oil is taken directly from the press to the press oil clari-fication unit.

In order to support the separation process, the solids are wetted with hot water. A water quantity of 1 percent in relation to the oil quantity is normally adequate in this respect. The water is mixed with the oil in the feed pump to the decanter. The decanter – which is a horizontal scroll-type centrifuge – continu-ously separates the solids from the oil.

As a side effect of adding water, any phosphatides which are present are hydrated; these are then removed together with the solids.

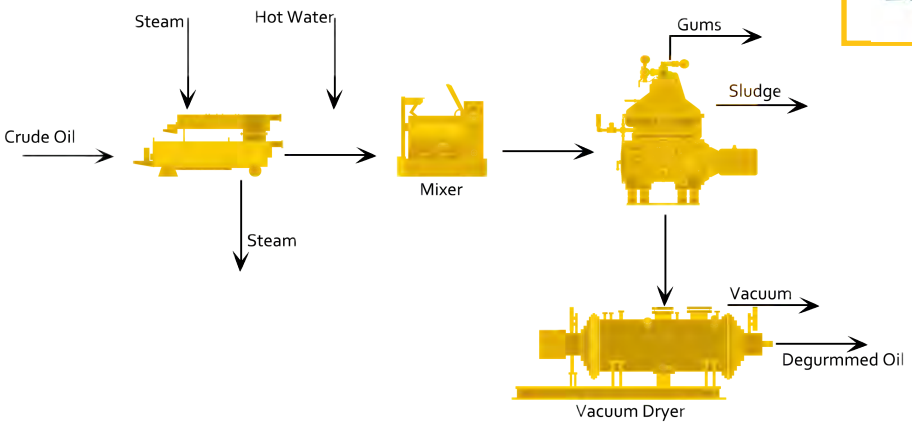
In order to avoid oil losses, the solids are returned to the press. The purified oil is either processed directly or, if it is stored or sold, it should be dried in a vacuum.



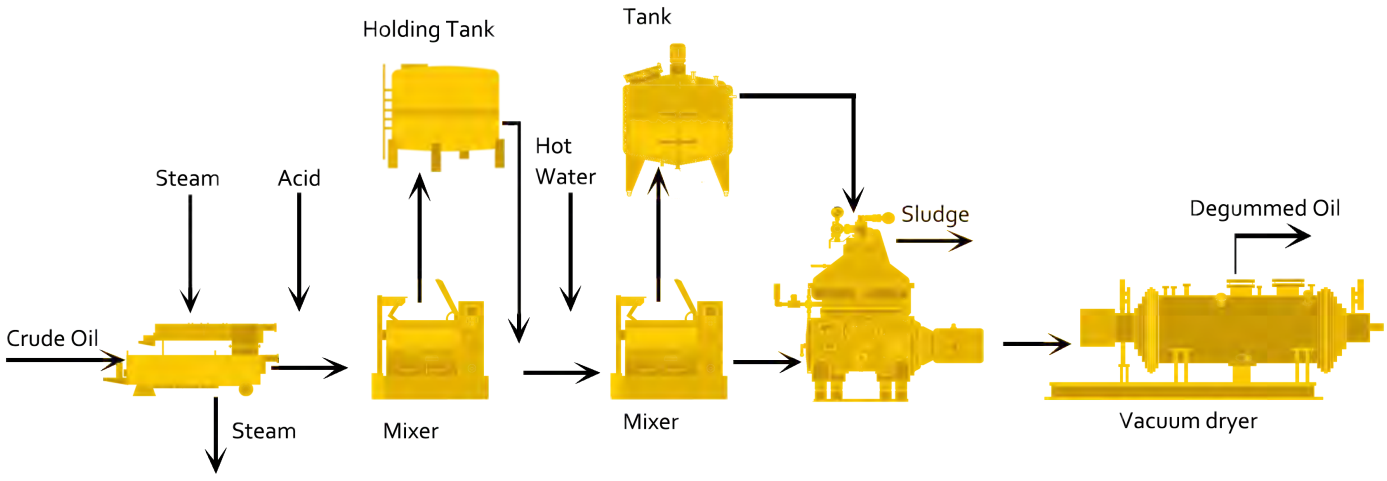
Degumming

The first step of chemical refining is degumming. Its purpose is to remove seed particles, impurities, and most of the phosphatides, carbohydrates, proteins and traces of metals. The crude oil is treated with foodgrade processing aids and/or water at a temperature around 100℃, which leads to hydration of most of the phosphatides, proteins, carbohydrates and traces of metals. The hydrated material precipitates from the oil and is removed.

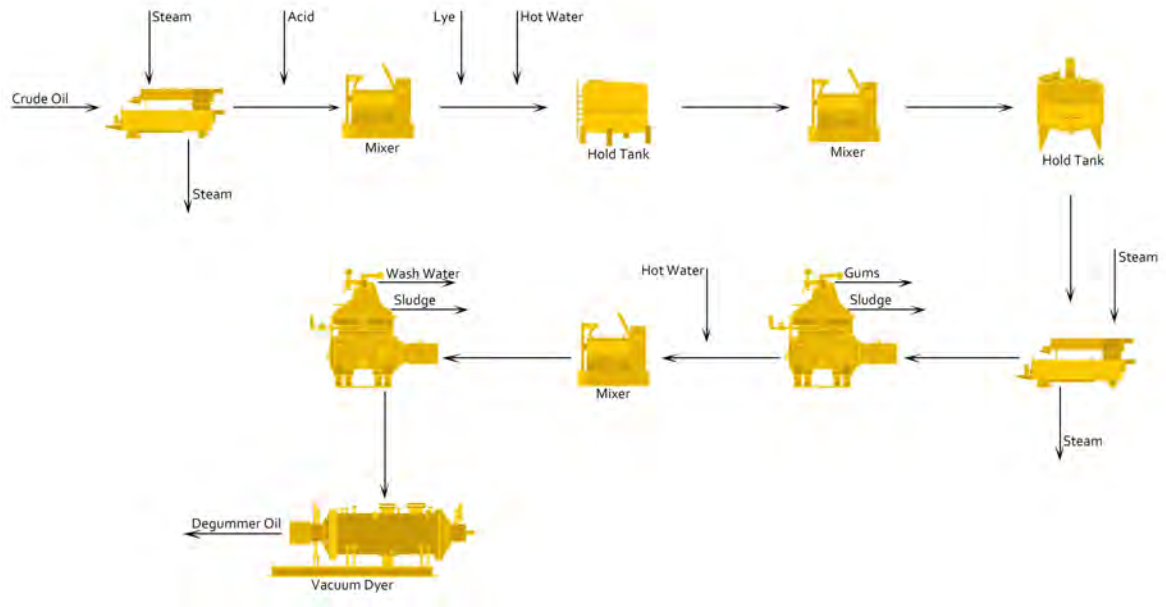
- Water Degumming
- Acid Degumming
- Special Degumming
- Enzymatic Degumming



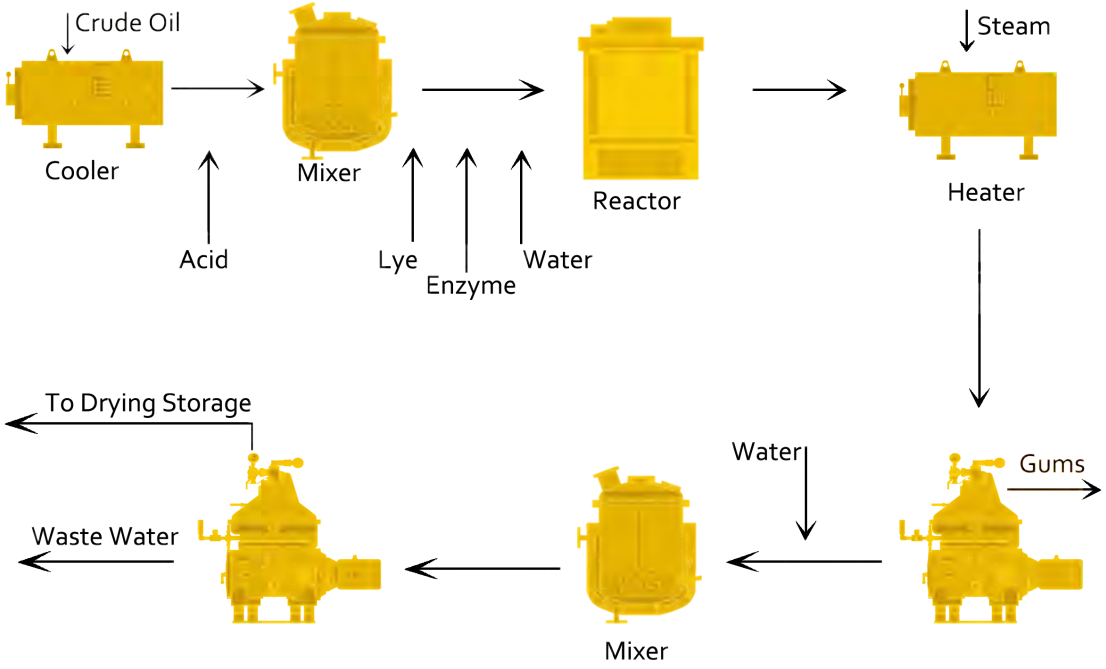
Water Degumming



Acid Degumming



Special Degumming



Enzymatic Degumming

Sunflower oil

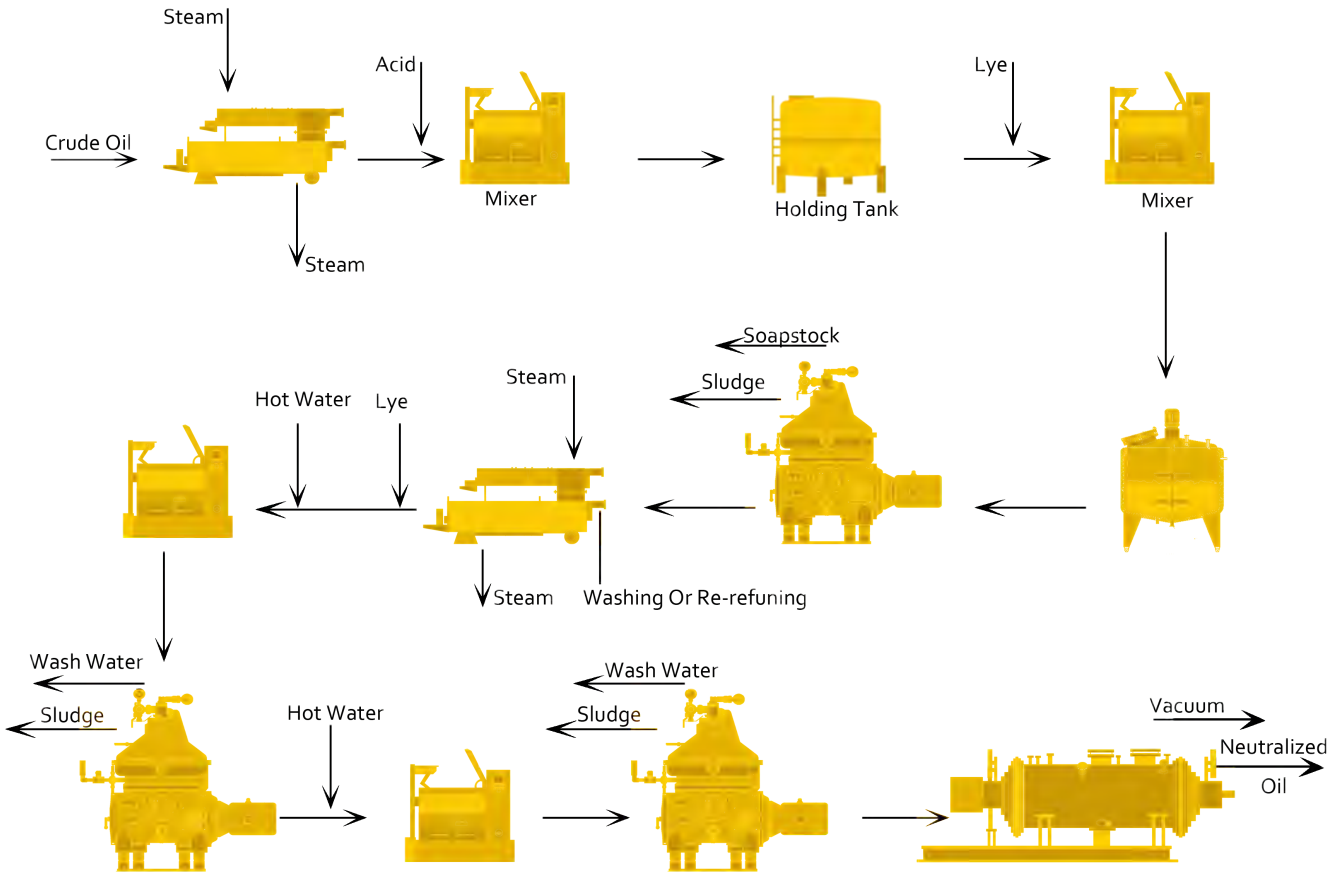
Helps Improve Overall Health and Treat Diseases

Neutralisation

Alkali neutralisation reduces the content of the following components: free fatty acids, oxidation products of free fatty acids, residual proteins, phosphatides, carbohydrates, traces of metals and a part of the pigments.

The oil is treated with an alkali solution (caustic soda) that reacts with the free fatty acids present and converts them into soap stock. The mixture allows then to separate the oil phase freed from fatty acid that floats on top from a layer phase of soap, alkali solution and other impurities, which is drawn off. The oil is then washed with water to remove the soap, alkali solution and other impurities, when it is ready for the decolorizing or deodorising process.

The under layer of soap and other impurities, which is drawn from the oil, it is a solid material mixed with some water. A large proportion of it is soap stock, which may be sold to soap manufacturers or it may be treated with an acid treatment (sulphuric acid) to set free the fatty acids contained in it. These are used for feed purposes but also for soap or candle manufacturing.

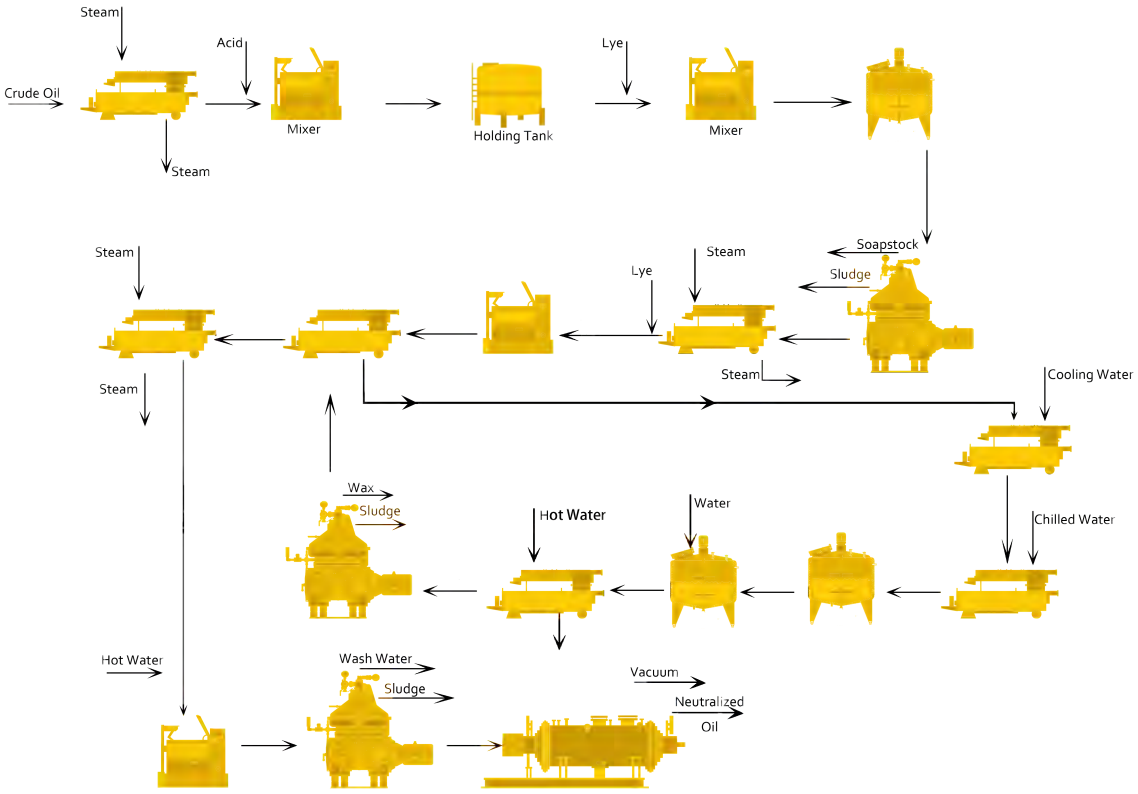


Three-stage neutralisation process

Winterisation

Winterization is a process whereby waxes are crystallised and removed in a filtering process to avoid clouding of the liquid fraction at cooler temperatures. Kieselguhr, normally used as a filter aid, (is a biogenic sedimentation mineral from which the organic components are removed by thermal treatment. The filter cake that remains after the filtering process consists of oil, waxes and filter aid. The filter cake can be recycled to the toaster and added to the meal (integrated crushing/refining plant) or sold as such as a feed ingredient (refining stand alone).

The term winterization was originally applied decades ago when cottonseed oil was subjected to winter temperatures to accomplish this process. Winterization processes using temperature to control crystallization are carried out on sunflower and maize oil. A similar process called dewaxing is utilized to clarify oils containing trace amounts of clouding constituents.



Winterisation

Bleaching

The purpose of bleaching (or decolorizing) is to reduce the levels of pigments such as carotenoids and chlorophyll, but it also further removes residues of phosphatides, soaps, traces of metals, oxidation products, and proteins. These trace components interfere further processing. They reduce the quality of the final product and are removed by adsorption with activated clay and silica.

In integrated crushing / refining plants the used bleaching earth is brought back into the meal. Bleaching earth originating from pure refining plants and / or hardening plants, which can contain nickel is excluded from recycling into the feed materials and is disposed of outside the feed sector.

If vegetable oils contain unacceptable levels of PAH's (polycyclic aromatic hydrocarbons), activated carbon is added to absorb and eliminate the PAH's. The used activated carbon is separated by filtration and disposed of in a suitable way outside of the food and feed sector.

Deodorisation

Deodorization is simply a vacuum steam distillation process that removes the relatively volatile components that give rise to undesirable flavours, colours and odours in fats and oils. This is feasible because of the great differences in volatility between these undesirable substances and the triglycerides.

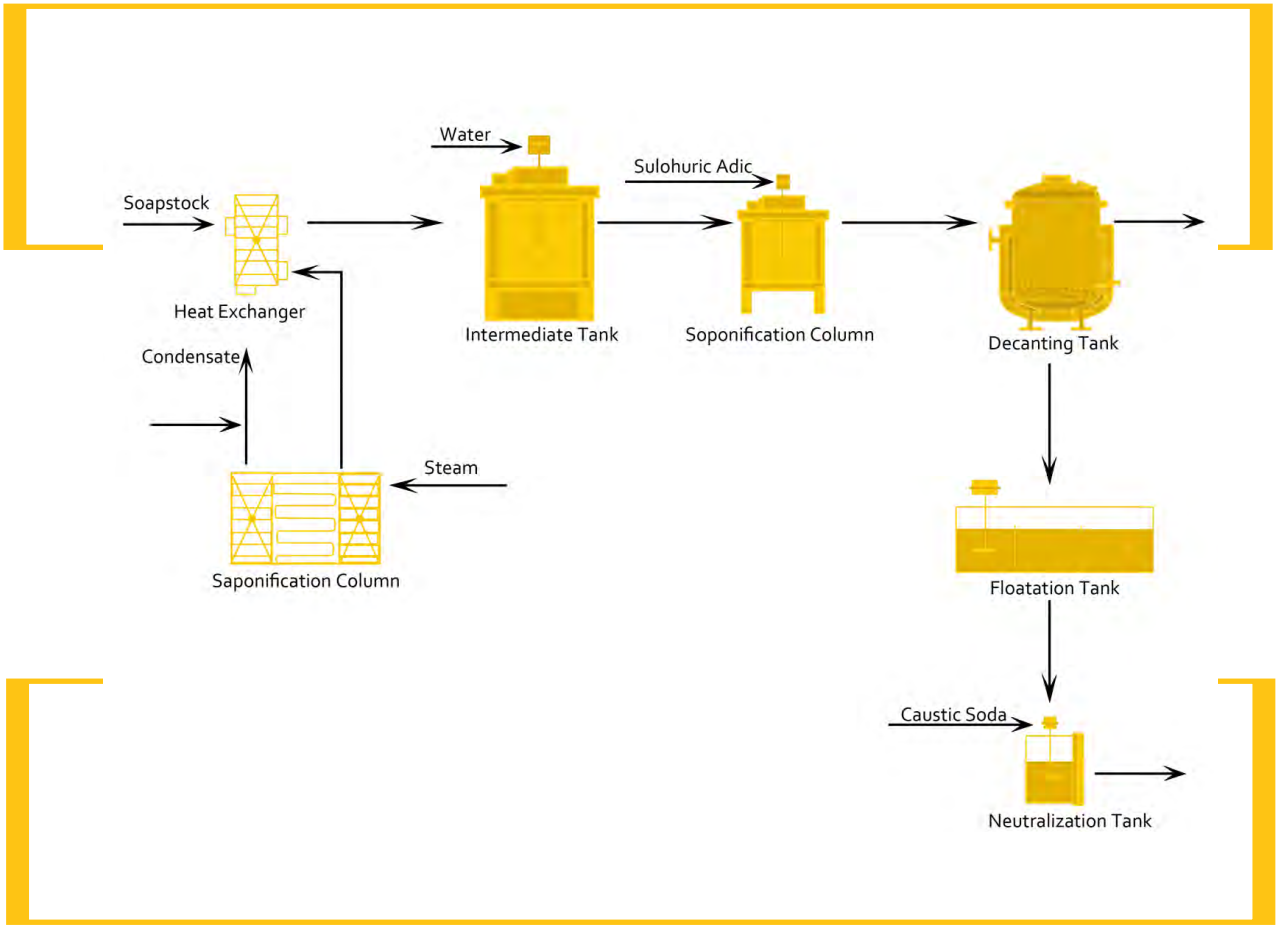
The purpose of deodorisation, in case of no previous chemical refining step, is to reduce the level of free fatty acids and to remove odours, off-flavours and other volatile components such as pesticides and light polycyclic aromatic hydrocarbons by a stripping media. Careful execution of this process will also improve the stability and the colour of the oil, whilst preserving the nutritional value.

Depending on the residence time in the deodoriser, the process is carried out under vacuum (0.5 – 8 mbar) and at temperatures between 180° - 270°C, and using a stripping media, such as steam or nitrogen, since the substances responsible for odours and flavours are usually volatile. Conditions are adapted within these ranges as appropriate to ensure the removal of specific substances. Further removal of the proteins is achieved at this step.

Soapstock Splitting (Processing of by-products)

During the chemical neutralization of oils and fats, so-called soapstock (sodium soaps of the free fatty acids) is obtained as a by-product. This can be split into fatty acids and water by means of acidification with strong acids (sulphuric or hydrochloric acid). Fatty acids are a valuable product in the animal feed, soap and oleochemical industries.

The phosphatides, separated together with the sodium soaps during the neutralization process, frequently have a significant effect on the splitting process during the formation of stable emulsions during phase separation. This can be prevented to a large extent by means of secondary saponification. For this purpose, the soapstock is exposed to higher temperatures and pressures. During a reaction time under these conditions, part of the phosphatides and the neutral oil in the soapstock saponify. After saponification, dilution water can be added in an intermediate tank before the soapstock is conveyed to the actual splitting process. In the splitting tank, the pH value is reduced by adding a strong acid. The soapstock breaks down into fatty acid and water, which are then separated continuously in a static decanting vessel. The split fatty acid can be directly processed. The acid water is conveyed to a fat separator with an upstream flotation chamber. The de-fatted water is subsequently neutralized with caustic soda.



Centrifuge Machine Standard Design

The machine has a main frame that consist a horizontal drive shaft with clutch and brake, worm gear, lubricating oil bath and vertical bowl spindle in the lower position.

The bowl is mounted on top of the spindle, fixed by the upper parts, the gasket, the collecting parts, and frame hood. The material feed into the bowl, by the effects of centrifugal force the liquid phase pumped out of machine through outlet pipe, meanwhile the solid phase adhere on the bowl wall, then were discharged automatically by operation water. The electric motor is of the variable frequency drive type or of controlled-torque type. All parts in contact with material are made of stainless steel.

Basic Equipment

Concentrator or purifier parts, inlet and outlet devices, revolution counter, set of erosion-protective parts, illuminated sight glass for liquid phase outlet, vibration sensor, vibration-isolating base plate, flange motor, set of tools and set of standard spare parts.

Optional Extras

Electric cabinet, frequency converter, discharge control panel, standard set of fittings, set of CIP valves and fittings and serviceability package for on-line viewing of separator status

Material Data

Bowl body, hood and locking ring S.S304 Solids cover and frame hood S.S304 Frame bottom parts green casting iron Inlet and outlet parts S.S304 Gasket and O-ring Nitrile rubber

Disc Centrifuge Main Parameter

Model	Bowl Speed (rpm)	Through-put Capacity (L/H)	Running Load (kw)	Dimensions (mm)		
				Width	Front-to-Back	Height
300	7302	300-500	4	950	950	1250
400	7070	1000-2000	7.5	1555	1130	1640
480	6600	3000	15	1780	1500	1900
500	6600	5000	18.5	1780	1500	1900
550	6000	10000	22	1800	1850	1900

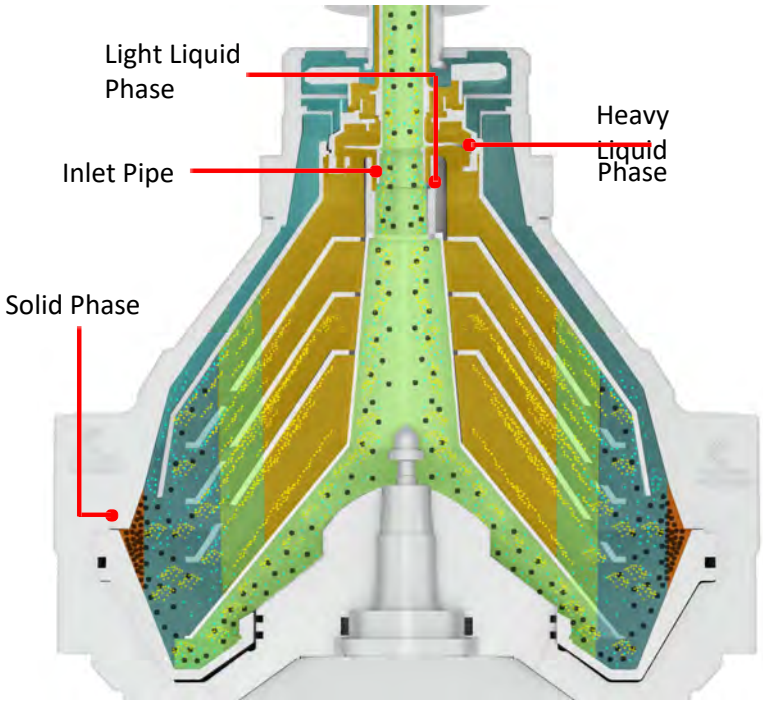
*Actual production capacity base on the raw materials.

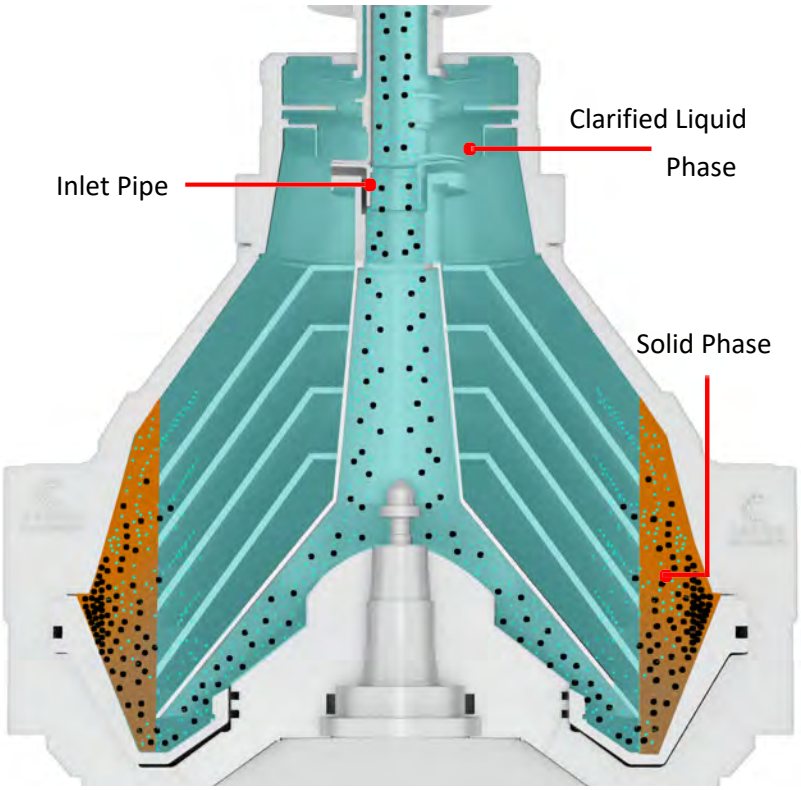
DGS series Disc Centrifuge Operating principles

Whole separation process of a disc centrifuge accomplished through a rotating bowl, which is mounted on the top of the vertical axis driven by the motor at high-speed rotation. The bowl consist a paring of discs that are nestled together, and a small space between the disc.

Emulsion is added by a inlet pipe located in the center of the bowl. When the emulsion flows through the gap between the discs, the liquid phase of emulsion layered under the centrifugal force and form on the surface of the disc, then light liquid phase flow upward through disc, and heavy liquid phase upward flows close to the wall of bowl, and the separated liquids discharge from the outlet pipe. The solids particles automatically discharge for each batches.

* An emulsion is a mixture of two or more liquids that are immiscible indeed, possible with a certain amount of solid particles





DGC series Disc Centrifuge Operating principles

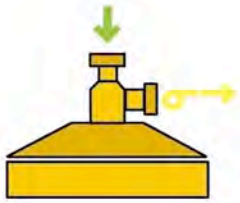
Whole separation process of a disc centrifuge accomplished through a rotating bowl, which is mounted on the top of the vertical axis driven by the motor at high-speed rotation. The bowl consist a paring of discs that are nestled together, and a small space between the disc.

Suspension is added by a inlet pipe located in the center of the bowl. When the suspension flows through the gap between the discs, the solid particles settle under the centrifugal force on the disc to form a sediment, then it slides out of the disc surface and accumulates in the largest diameter of the bowl, and the separated liquid discharges from the outlet of bowl. The solids phase will automatically discharged for batches.

* A suspension is a heterogeneous mixture containing solid particles that are sufficiently large for sedimentation.

Liquid Feeding/Discharging Configuration

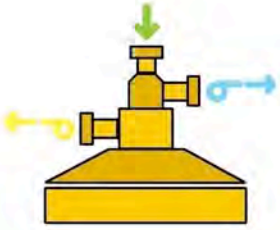
DGC series
One liquid Phase



Feeding Material

Liquid Phase

Flow with Pressure



DGS series
Two liquid Phase

Feeding Material

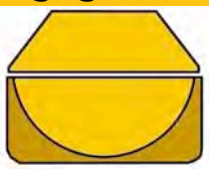
Light Phase

Flow with Pressure

Heavy Phase

Flow with Pressure

Discharging Method



Manual Discharging

Shut down and open the bowl, manually remove the inside sediment by labor.

Automatic Discharging

Through Intermittent open lower parts of the bowl, sludge discharged automatically.

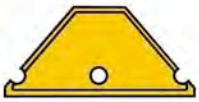
Continuous Discharging

Sludge discharging achieve by the nozzles around the pericline.

Disc Separation

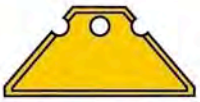
Clarification

Separate the solid particles form the liquid



Separation

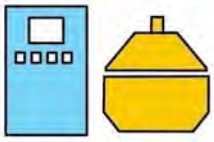
Separate a heavy liquid phase from major light liquid phase, meanwhile the suspended solid particles be separated as well. Maximum level of purified the light liquid phase.



Concentration

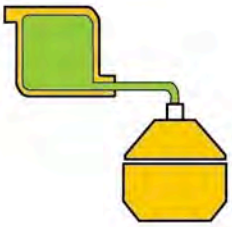
Separate a light liquid phase from major heavy liquid phase, meanwhile the suspended solid particles be separated as well. Maximum level of purified the heavy liquid phase.

Optional Components and Systems



Electric Cabinet

Monitoring and adjustment of power , parameters setting and safety devices.

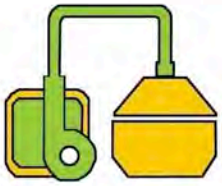


Gravity Feeding System

Ensure the material contnous and stable feeding to centrifuge.

CIP Cleaning System

Control the system clean the separation components automatically.



Feeding Pump

Ensure the flow of material to the centrifuge is stable and adjusted automatically.

HDS & HDC series Decanter Centrifuge General Description

Based on the more 30 years separator technics experience, we have developed and advanced the previous centrifuge and separator.

When separator operation is no longer feasible due to high proportions of solids in the suspension to be processed, decanter centrifuge is used, a horizontal, solids-oriented, solid-wall scroll centrifuges.

The solid bowl decanter centrifuge consists of two horizontal concentric rotating elements contained in a stationary casing. The outer rotating bowl element is tapered so that the solids discharge from a smaller radius than the liquor. The inner element is a hollow hub screw conveyor with blade tips shaped to fit closely to the contour of the bowl.

Advantage and Benefits to Choice Decanter Centrifuge

- ✓ Low Cake Moisture
- ✓ Compact design and requires
- ✓ low space Low operation cost
- ✓ High dewatering and filtration
- ✓ Capacity Low required space

Decanter Centrifuge Main Parameter

Model	300 x 1350	355 x 1600	450 x 1800	520 x 2200	650 x 2600
Bowl Dia. (mm)	300	350	450	520	650
Through-put Capacity (L/H)	1000-3000	3000-5000	50000-100000	100000-200000	200000-500000
Bowl Length Dia.(mm)	1350	1600	1800	2200	2600
L&D Ratio	1:4.5	1:4.5	1:4.0	1:4.2	1:4.0
Bowl Speed (r/min)	4200	3800	3200	3000	2800
Separation Factor	3000G	2868G	2575G	2620G	2850G
Screw Differential (r/min)	5-30 Stepless Ajustable	2-20 Stepless Adjustable	4-28 Stepless Adjustable	5-25 Stepless Adjustable	5-25 Stepless Adjustable
Motor (kw)	Main Motor11 Vice4	Main Motor15 Vice7.5	Main Motor30 Vice11	Main Motor45 Vice15	Main Motor75 Vice22
Noise db(A)	≤85	≤85	≤85	≤85	≤85

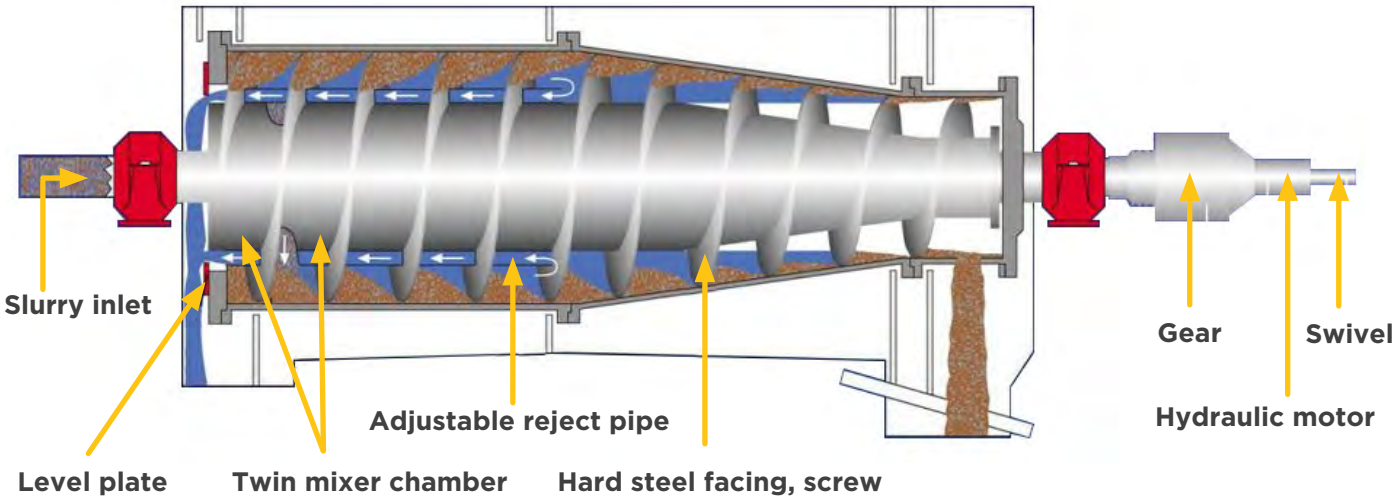
*Actual production capacity base on the raw materials.

Decanter Centrifuge Separation Theorem

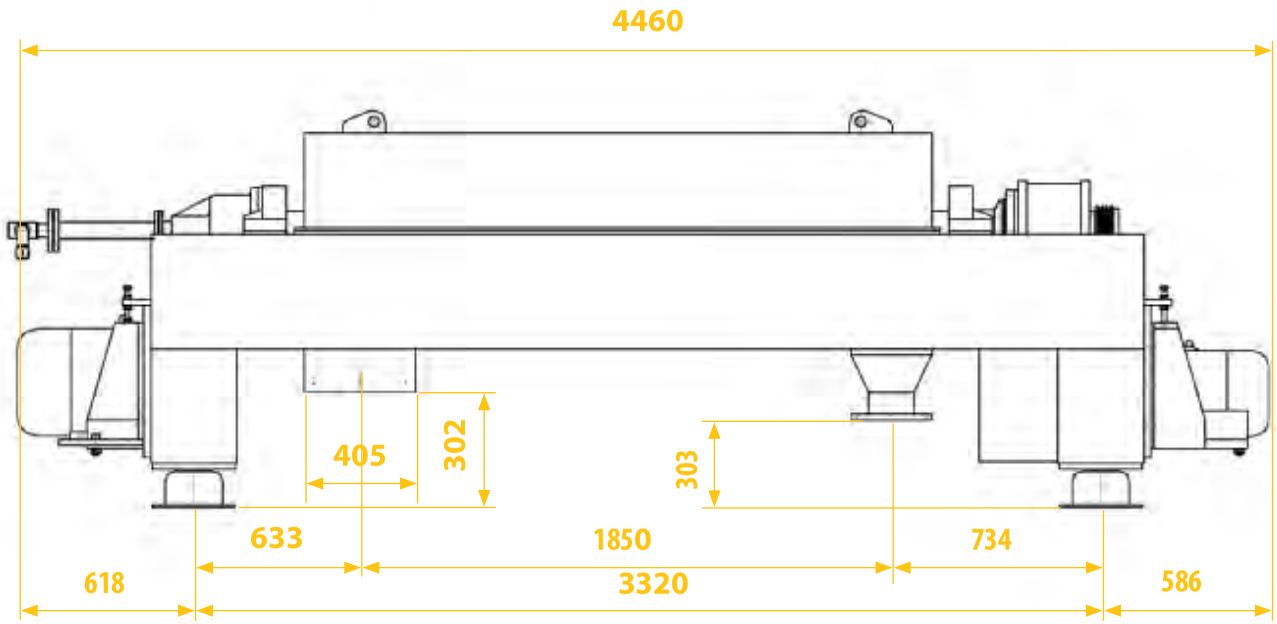
1. Feed slurry is introduced into the conveyor hub. As the feed accelerates to the machine speed, the slurry is delivered by centrifugal force into the rotating bowl by way of ports in the conveyor hub.

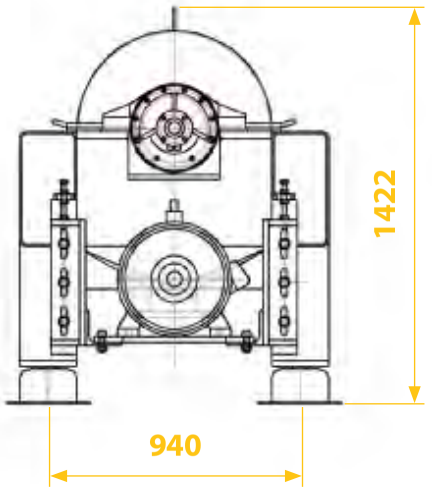
2. The solids settle through the liquid pool formed on the wall of the bowl. The solids are then conveyed, due to a slight differential between the screw conveyor and bowl, up the drying beach to the solids discharge ports.

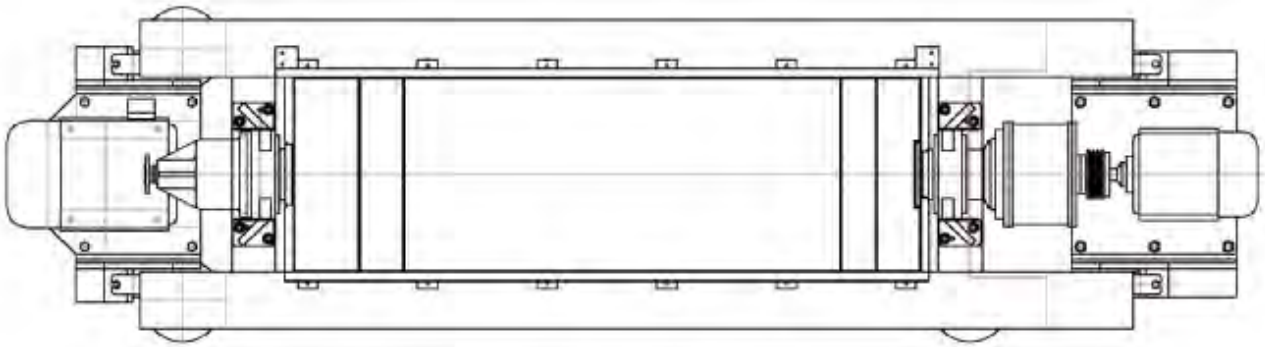
3. The clarified liquors are discharge in the opposite direction from adjustable overflow ports.



Decanter Centrifuge Out-shape







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2017 CATALOGUE

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