



**OLIVE OIL  
EXTRACTION  
EQUIPMENT**

**CROWN**  
MACHINERY

# Technologies for Olive oil Extraction

## Extraction & Clarification Centrifuge

**Olive oil** is one of the oldest of all cultural assets. rich in monounsaturated fatty acids, which are considered a healthy dietary fat, as opposed to saturated fats and trans fats. Olive oil is thought that olive trees were being cultivated as long as 6000 years ago in Asia Minor. Around 1600 B.C. the Phoenicians spread the use of olives through Crete and Egypt to the rest of the Mediterranean region. Populations from that region have longer life expectancies and lower risks of heart disease, high blood pressure and stroke, compared with North Americans and Northern Europeans. By now, The native Extra olive oil is ascribed the best composition of saturated and unsaturated fatty acids, making it the best of all edible oils.

**Crown Machinery** has been closely following the trend of olive oil and developed to combine the advantages of decanter centrifuge and disc stack centrifuge to harvest high quality pure olive oil to create more benefit for the olive oil plants and more healthier edible vegetable oil for terminal customers.



### Virgin Olive Oil



**Virgin olive oil** is the oil obtained from olive fruit by mechanical or physical under certain conditions, especially under heating conditions that do not cause deterioration of the oil. No further treatment except cleaning, decantation, centrifugal separation and filtration.

### Refined Olive Oil

The residual oil in the fruit residue is extracted by solvent, the first pressed oil or residual oil is treated with steam or alkali to reduce the acid value of the oil, and then the chlorophyll, carotenoids, residual fatty acid salts and pesticides are treated with diatomite, and finally the taste is removed by adsorption with activated carbon. Refined olive oil is colorless, tasteless, transparent in appearance, and its acid value is less than 0.5%, which is generally industrial grade.

# Virgin Olive Oil Process Overview

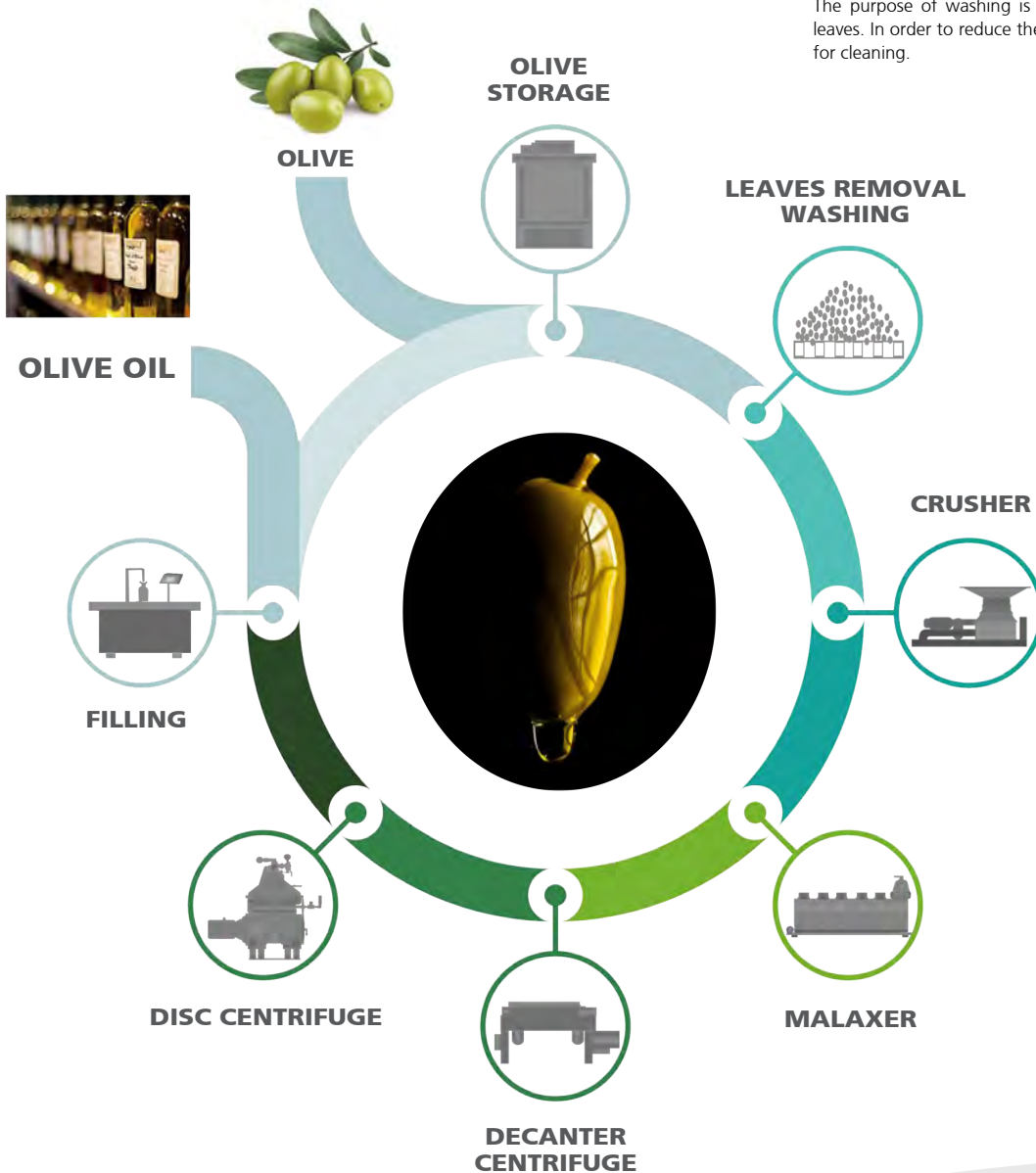
## Fresh Olive Collection

Green olive have low oil content with high polyphenol compounds, while black olive have high oil content with low antioxidant content, therefore, in order to ensure the oil quality and oil yield, the optimal ratio of green fruits and black fruits is 75:25, and the ratio is controlled to be about 50:50 in actual production. Fresh olive transported to the processing plant, and laid in a ventilated storage room to avoid overpressure, overheating and bruise of the fresh fruits, otherwise it is easy to oxidize and ferment.

## Remove Leaves & Branches

Belt conveyor and air classifier are adopted, to remove the branches and leaves by fans. Separation process required that there are no leaves in the fruit, because the leaves contain more chlorophyll. In the process of crushing and fusion, high temperature and chlorophyll is easy to oxidize, which affects the quality of oil products.

The purpose of washing is to remove dust and small amount of leaves. In order to reduce the waste water, circulating water is used for cleaning.



## Crusher

Hammer crusher is used for crushing, the size of sieve hole and the hammering speed are the key to obtain the good result the oil acidity, peroxide UV value, total phenols and sterols.

## Malaxer

The crushed olive fruit pulp is transferred to the malaxer and mixed uniformly by the screw rod movement, which is conducive to heat dissipation on the one hand; On the other hand, it is conducive to the formation of oil droplets and avoids emulsification.

## Storage & Bottling

The centrifuged oil is stored in a large stainless steel storage tank to avoid light and heat. If necessary, it can be filled with nitrogen for protection, and then packaged into small bottles regularly.

## Separation via DECANTER CENTRIFUGE & DISC CENTRIFUGE

At this stage, adopt two-phase **decanter centrifuge** with three phase **disc centrifuge**, olive pulp needs to add and mix with 40% ~ 50% water, of which the fruit residue accounts for about 45%, the residual oil rate is 4% ~ 6%, and the oil yield is about 25%.



# Equipment range for Olive oil extraction process

## Oil separation selection

### DECANTER CENTRIFUGE

The essential part of the Crown Machinery's **Decanter Centrifuge** is the rotating part, consisting of a cylindrical/conical bowl with a conveyor scroll inside which rotates at a differential speed. The rotating part is driven by electric motors via belt transmission. Feed enters the bowl through a central feed pipe. Through ports in the scroll body, the feed passes into the bowl where separation by centrifugal force takes place.

In two-phase decanter, the product is separated into a liquid phase (oil and water mixture) and a solid phase (stone debris, pulp etc). In a three-phase decanter, the product is separated into a light liquid phase (oil), a heavy liquid phase (water), and a solid phase (stone debris and pulp).

The separated oil is discharged by gravity in both cases, while in addition in a three-phase decanter, the separated water phase is discharged by an impeller under pressure or by gravity. The separated solids are conveyed by the scroll to the conical end of the bowl and are discharged.

### DISC CENTRIFUGE

**Disc stack centrifuges** with a self cleaning bowl are used for the separation of oil, water, and solids. Via a fixed feed pipe, the product to be separated enters the inside of the bowl which is rotating at high speed. The product flow is divided into multiple thin layers by the disc stack and a large surface area is created. From the disc stack, the separated liquids flow to the upper part of the bowl where the oil is discharged under pressure via an impeller. The separated water leaves the bowl by gravity over a ring dam. Due to high centrifugal force, the separated solids are packed tightly against the bowl wall. The separated solids are ejected at full speed by means of a hydraulic system in the bowl bottom.

The hydraulic system of the Crown Centrifuges enables total and partial bowl discharges. The opening/closing procedure is released by a pulse of operation water directly before the discharge. Solenoid valves provide an exact proportioning of the operation water.

DECANTER CENTRIFUGE



DISC CENTRIFUGE



TUBULAR SEPARATOR



FILTER CENTRIFUGE

# Decanter Centrifuge Specification

Series **HDC**

Parm/Model	250*1000	355*1460	450*1800	500*2000	550*2200	650*2800
<b>Bowl Dia. (mm)</b>	250	355	450	500	550	450
<b>Bowl Length (mm)</b>	1000	1460	1800	2000	2200	2800
<b>L&amp;D Ratio</b>	1:4.0	1:4.1	1:4.0	1:4.0	1:4.0	1:4.3
<b>Bowl Speed (r/rim)</b>	4800	3800	3500	2500	2400	2400
<b>Throughput (m<sup>3</sup>/h)</b>	1~5	1~20	3~35	5~35	5~40	20~110
<b>Motor power (kW)</b>	Main motor 11 Vice motor 4	Main motor 15 Vice motor 7.5	Main motor 37 Vice motor 11	Main motor 45 Vice motor 15	Main motor 55 Vice motor 22	Main motor 75 Vice motor 22
<b>Weight (kg)</b>	1500	2500	3200	3500	3500	8500
<b>Dimension L*W*H (mm)</b>	2400*750*960	2790*1300*880	3300*1600*920	3469*1600*1120	4395*1370*1655	4300*1900*1350

\* Throughput indicate the water output and it may change depending on the dealing material and configuration

HDC : Two Phase

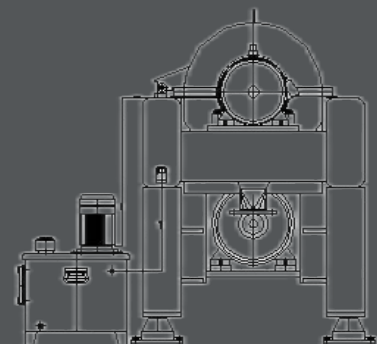
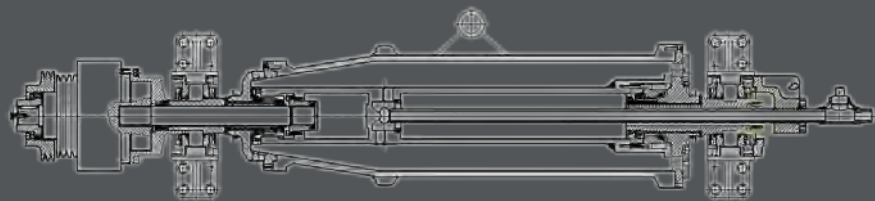
## Scroll discharge Decanter Centrifuge

Front



## Scroll discharge Decanter Centrifuge

Bowl



# Oil centrifuge Specification

Series **DGS**

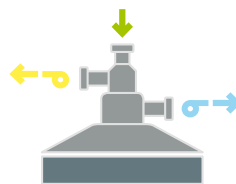
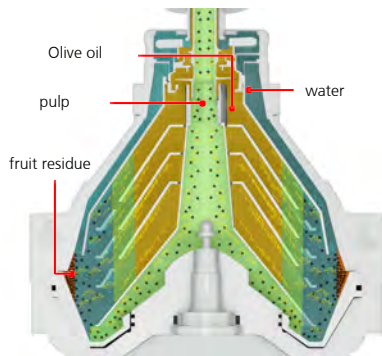
Parm/Model	300	400	500	550
<b>Bowl Dia.</b> (mm)	270	360	470	550
<b>Bowl Speed</b> (r/min)	7302	7070	6600	5800
<b>Capacity</b> (T/D)	10~12	30~50	100~150	200~350
<b>Motor power</b> (kW)	4 (Y112M-4-B5)	4 (Y132M-4-5B)	15 (Y160L-4-B5)	22 (Y180M-4-B5)
<b>Weight</b> (kg)	550	1200	1600	2300
<b>Dimension L*W*H</b> (mm)	950*950*1250	1530*1150*1500	1800*1200*1750	1965*1550*2045

\* Capacity indicate the water output and it may change depending on the dealing material and configuration

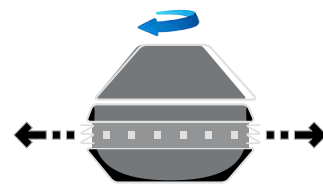
DGS : Three Phase

## Oil Separation centrifuge - oil-water-residue

The oil centrifuge is used to separate liquid and solid mixtures with different densities, such as olive oil products, separate the mixture into water, oil and residue.



DGS



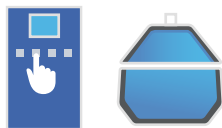
Automatic discharge

● Pulp

● Olive oil / light phase

● Water / Heavy phase

## Accessory equipment



### Electric Cabinet

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



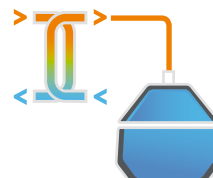
### CIP System

Control the system clean the separation components automatically.



### Counter pressure valve

Controls the pressure of the liquid phase outlet and of separation interphase.



### Heating System

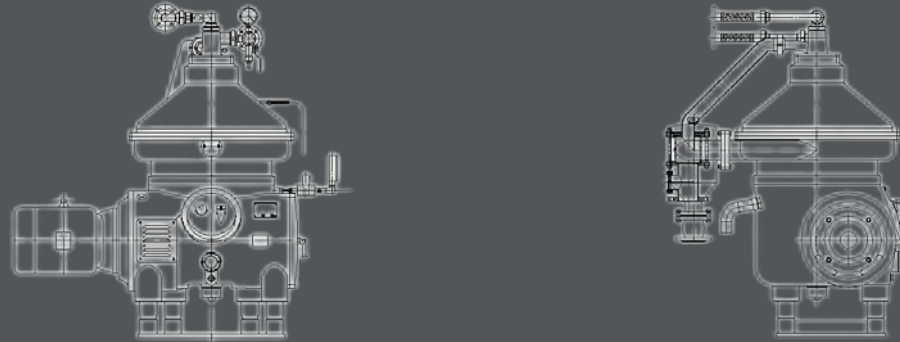
Regulates the temperature of inlet product.

# Figure

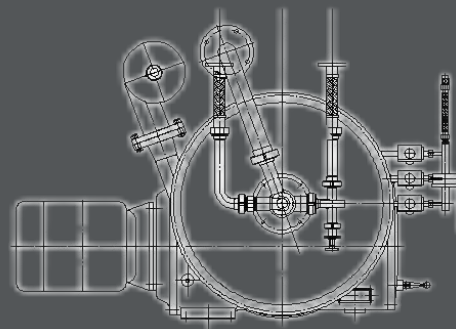
## Oil Centrifuge

Type DHS 500 Oil clarification type

Front

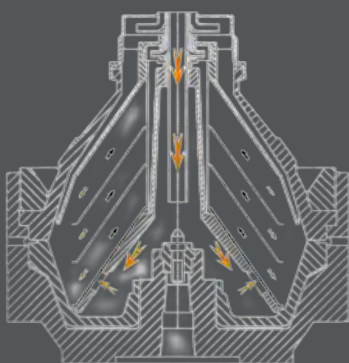


Overhead



## Oil Centrifuge

Bowl



### Working Principle

- Disc centrifuge 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.

# Tubular Separator Series

Series **TS**

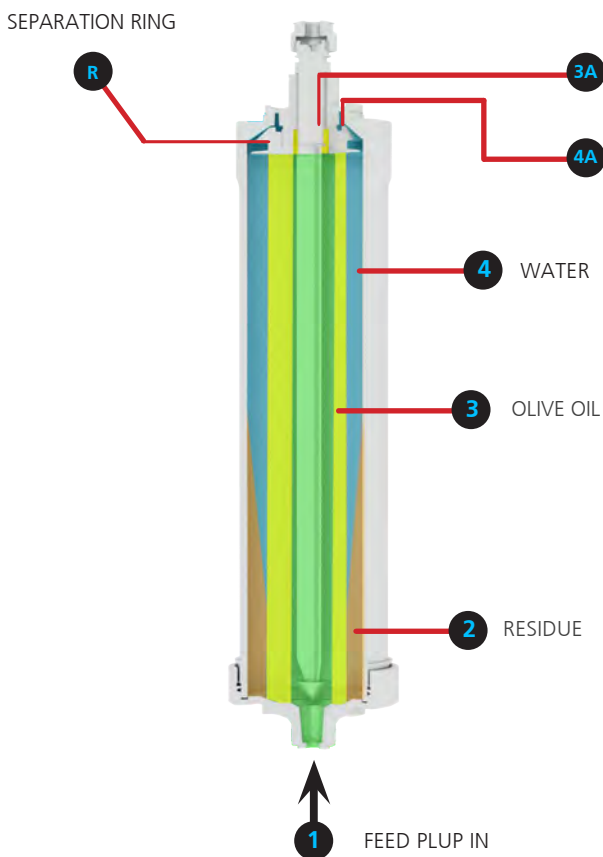
Parm/Model	75	105	125	150
<b>Bowl Dia.</b> (mm)	75	105	125	150
<b>Bowl Volume</b> (L)	2.2	6	8	10
<b>Bowl Speed</b> (r/rim)	19000	16300	15000	13400
<b>Motor power</b> (kW)	1.5	2.2	3	3
<b>Weight</b> (kg)	300	500	530	550
<b>Dimension L*W*H</b> (mm)	450*760*1120	600*900*1600	600*900*1600	600*900*1600

\* TS: Three Phase

## Functional category

### SEPARATION TYPE

The Crown Machinery's TS series tubular separator can be configured as a three phase solutions (Liquid-Liquid-Solid). If any solids are present, they will collect on the wall of the centrifuge tube while the two separated liquids are discharged at the top of the tube by the dedicated outlets.



### Separation principle

The feed mixture enters the bottom of the bowl (1) and sediment collects on the walls of the bowl (2). Liquids separate rapidly by specific gravity, and separating ting (R) directs liquids into OIL & WATER streams (3) and (4) which exit bowl in separate trays at (3A) and (4A).





## C A T A L O G U E

# OLIVE OIL EXTRACTION EQUIPMENT



### **CHINA**

No.13093-06-02 Victory Community,  
Baita District Liaoyang

TEL: +86 186-4192-8887



### **PHILIPPINES**

Suite 310 Intramuros Corporate Plaza,  
Recoletos St., Intramuros, Manila

TEL(Danny): +63 969-3230-115



### **KOREA**

5-4,Songnim-Ro 48beon-Gil yuseong-  
Gu, Daejeon

TEL: +82 54-933-6286



### **AMERICA**

6900 46th Street Kenosha,  
WI 53144

TEL: +1-262-656-7680



[sales@crown-machinery.com](mailto:sales@crown-machinery.com)



[www.crown-machinery.com](http://www.crown-machinery.com)