

**MACFUGE<sup>®</sup> by**  
**SERVIZI INDUSTRIALI**  
SEPARATION TECHNOLOGY



MACFUGE SEPARATORS  
VEGETABLE OIL INDUSTRY



# OILS AND FATS PROCESSING

Vegetable oil is one of the most important primary foods for humans, and therefore requires maximum quality.

Oils and fats are used also in a variety of other applications since prehistoric times.

The quality of the final product depends on the refining method and the nature of the crude oil.

Macfuge separators offer a wide range of solutions designed to boost value in this respect, ranging from a separator with a daily capacity of 50 tons for small oil mills to separators with capacities of more than 500 tons per day for large refineries.

The production processes and technologies are as varied as the different types of oil.

The centrifuge is always to be found at the heart of the installation. Whether a self-cleaning separator with a maximum level of automation or a manual operating for high efficiency and batch processing, every customer is able to find the best solution in economic and technological terms for his specific production tasks



# MACFUGE SEPARATORS FOR EDIBLE OIL AND FAT

Crude fats and oils always contain impurities that have to be removed – and there is a growing focus on the environmental parameters for how you do it. Crude fats and oils contain substances that must be removed during the various steps of the processing:

- Solid particles (metal)
- Gums
- Free fatty acids
- Waxes, soap, water, moisture.

The one single technology that plays the most important role in removing such impurities from both animal and vegetable fats and oils is Centrifugal Separation.

Separation is crucial in ensuring the desired product quality, while comply with increasingly stringent environmental regulations throughout the world.

Macfuge separators are designed to ensure maximum flexibility in fats and oils processing and refining operations. An extensive range of high-efficiency disc stack centrifuges, specially developed for use in refining fats and oils, available either as stand-alone items, as modular installations or as part of a complete processing system.

Macfuge Separators are designed to work with different types of fats and oils, being an efficient and flexible solution to purify them, minimizing process loss and maximizing quality.

A highly competitive market in combination with rising energy and feedstock costs, require refineries to increase production while decreasing operating costs. The Macfuge separator, represents a well-proven and straightforward solution to this seemingly impossible equation.

Macfuge delivers a high technology equipment in all the applications requiring separation

MACFUGE 450



MACFUGE 590



MACFUGE 710



DYNAMIC MIXER

# VARIOUS PROCESSES WITH VARIOUS RAW MATERIALS - ONE SOLUTION

The two major refining processing methods are:

- **Chemical refining**
- **Physical refining**

Each approach has its own specific advantages, and choice depends heavily on the oil quality and type.

Today they are finalized not only for food industry but also for other important applications such as Oleo-chemical and Biodiesel.

## Refining of various oil as follows

Soybean oil  
Rapeseed oil  
Sunflower oil  
Cottonseed oil  
Corn oil  
Fish oil  
Animal fat

## Core application in vegetable oil refining

Degumming  
Neutralization  
Dewaxing/Winterization

## Application in Oleo-Chemical applications

Esterification  
Trans-Esterification  
Biodiesel  
Used oil conditioning  
Fatty acids processing  
Glycerin purification  
Soap making



# PHYSICAL REFINING PROCESS

# CHEMICAL REFINING PROCESS

oil seeds

pressing or extraction

crude oil

special degumming

dewaxing / winterization

bleaching

deodorization

refined oil

water/acid degumming

alkali neutralization

dewaxing / winterization

bleaching

deodorization

refined oil

SEPARATORS

SEPARATORS

# MAKE THE RIGHT CONNECTIONS – MACFUGE SEPARATORS

Macfuge separators have been developed for the vegetable oil industry with capacity from 50 Ton/day to 500 Ton/day.

They are suitable for Degumming, Neutralization, Washing and Winterization phases in both Chemical and Physical Refining processes.

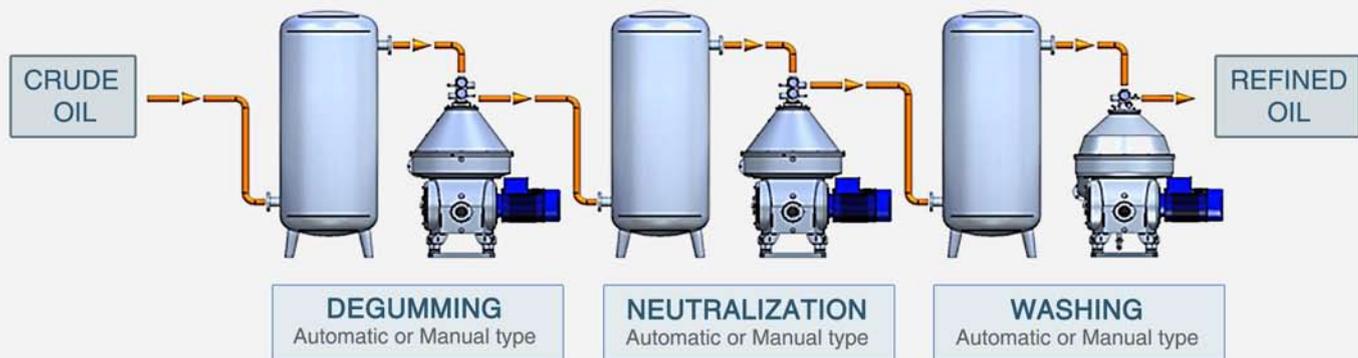
Are available both Solid Bowl Separator (Manual Cleaning) and Self Cleaning Discharge Separator (Automatic De-sludging).

The separator is used to clean Oil from liquid heavy phase produced during the various steps:

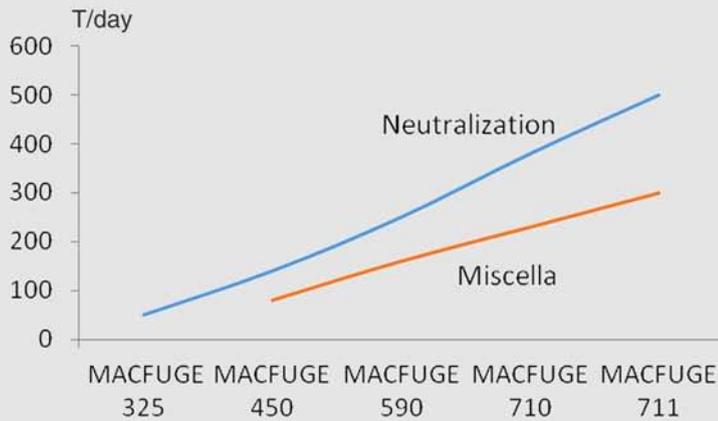
- Water or acid containing precipitated gums in the **Degumming**.
- Soap stock created by water plus caustic/phosphoric acid in the **Neutralization**.
- Remaining soap stock diluted in washing water in the **Washing** stage.
- Waxes or triglycerides diluted in water in **De-waxing** and **Winterization**.

During centrifugation, the Macfuge Separator removes the solid particles which can either be automatically discharged or accumulated in the bowl periphery to be manually expelled.

The Macfuge range of centrifuges for vegetable oil and animal fat refining, benefits from the continuous research in materials, mechanical design and fluid dynamics.



MACFUGE 325  
MACFUGE 450  
MACFUGE 590  
MACFUGE 710  
MACFUGE 711



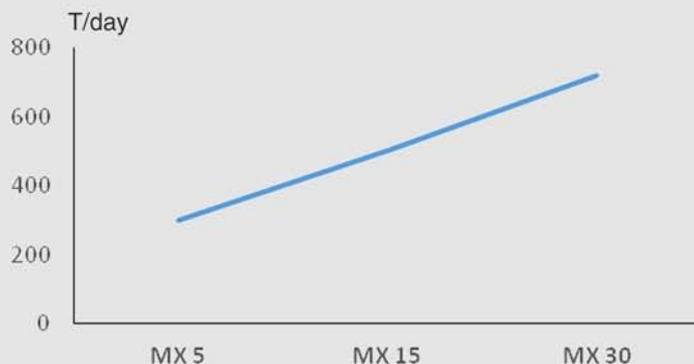
SOLID  
EJECTING

MACFUGE 053  
MACFUGE 105  
MACFUGE 106



SOLID  
RETAINING

MX 5  
MX 15  
MX 30



DYNAMIC  
MIXER

# DESIGN FEATURES

## High quality material construction:

- Basin in “heavy” cast iron to absorb vibrations
- Upper parts in contact with the product in high grade stainless steel
- Bowl shell in duplex, high resistant stainless steel

## High efficiency driving:

- Motor directly assembled on the basin
- Motor attached to the gear without use of clutch
- Motor driven by frequency converter
- Fine mechanical tolerance
- Less power loss

## Less number of spare parts:

- No use of clutch
- Compact discharging system with electronic management

## High efficiency:

- Special design of separation discs
- Special design of product acceleration
- Bowl shaped for easy soapstock discharge

## Other peculiarities:

- Regulation of separation interface while operating
- Flushing of soap paste
- Water cooling and cleaning injection points
- PLC for parameters regulation
- Motor driven and controlled by frequency converter
- Water flushing to clean solid collector

# ADVANTAGES

## Performance

- Reliable discharge system
- Lower power consumptions
- High speed drive

## Separation efficiency

- Lower oil losses
- Low soap content in oil
- Ability to discharge viscous gums and soaps

## Quality

- High quality manufacturing
- Reduced maintenance
- Continuous material research

## Flexibility

- Easier handling during start up
- High throughput capacities
- Adjustable process parameters settings
- System for fine adjustment of the separation at full speed

# KEY BENEFITS

- Customized solution
- Quick return of investment
- Prompt service assistance
- Value along the time

# MACFUGE CAPITAL CARE

WE BELIEVE, LIVE AND PURSUE OUR VALUES

EXCELLENCE • PASSION • INTEGRITY • RESPONSIBILITY • EXPERTISE  
RESEARCH AND HIGH TECHNOLOGY • SAFETY • TRAINING • FLEXIBILITY  
EFFICIENCY • PERFORMANCE • RELIABILITY

A high-speed photograph of a water splash, with numerous droplets suspended in the air. The splash is centered in the lower half of the frame. Overlaid on the splash is a stylized logo consisting of three curved, overlapping shapes that resemble a stylized 'M' or a series of waves. The background is a gradient of blue, with a darker blue at the bottom and a lighter blue at the top. The overall aesthetic is clean, modern, and professional.

AN ANSWER TO CUSTOMER'S SEPARATION REQUIREMENT

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