

Macfuge

SEPARATION SOLUTIONS

Macfuge for Fish Industry

Fish Oil separators: GA serie

FORHANDLER I NORGE

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Macfuge GA separator

The GA separator series, for Fish Oil production



Macfuge separator for fish oil: GA series

Servizi Industriali has designed a series of separator, **Macfuge GA**, dedicated to the Fish Industries for Fish Oil production.

The Macfuge GA separators are aimed to recover and clean this valuable product, whether the fish oil is the main product or the byproduct of fish meal production.

Macfuge GA separators have been designed for working both on the ground or on boat factories.

Servizi industriali manufactures, under the Macfuge brand, separators also for the downstream processes:

Macfuge VO series, for oil refining

Macfuge CH series, for fish oil protein and extracts

Macfuge WW series, for process water cleaning

This document is a brief introduction to Macfuge GA series of separators for the Fish Industry



Macfuge separator for fish oil: GA series

The Macfuge GA separators can be used in different flow processes, depending from type of plant, equipment and product.

The application can be summarized according the following

Intended uses:

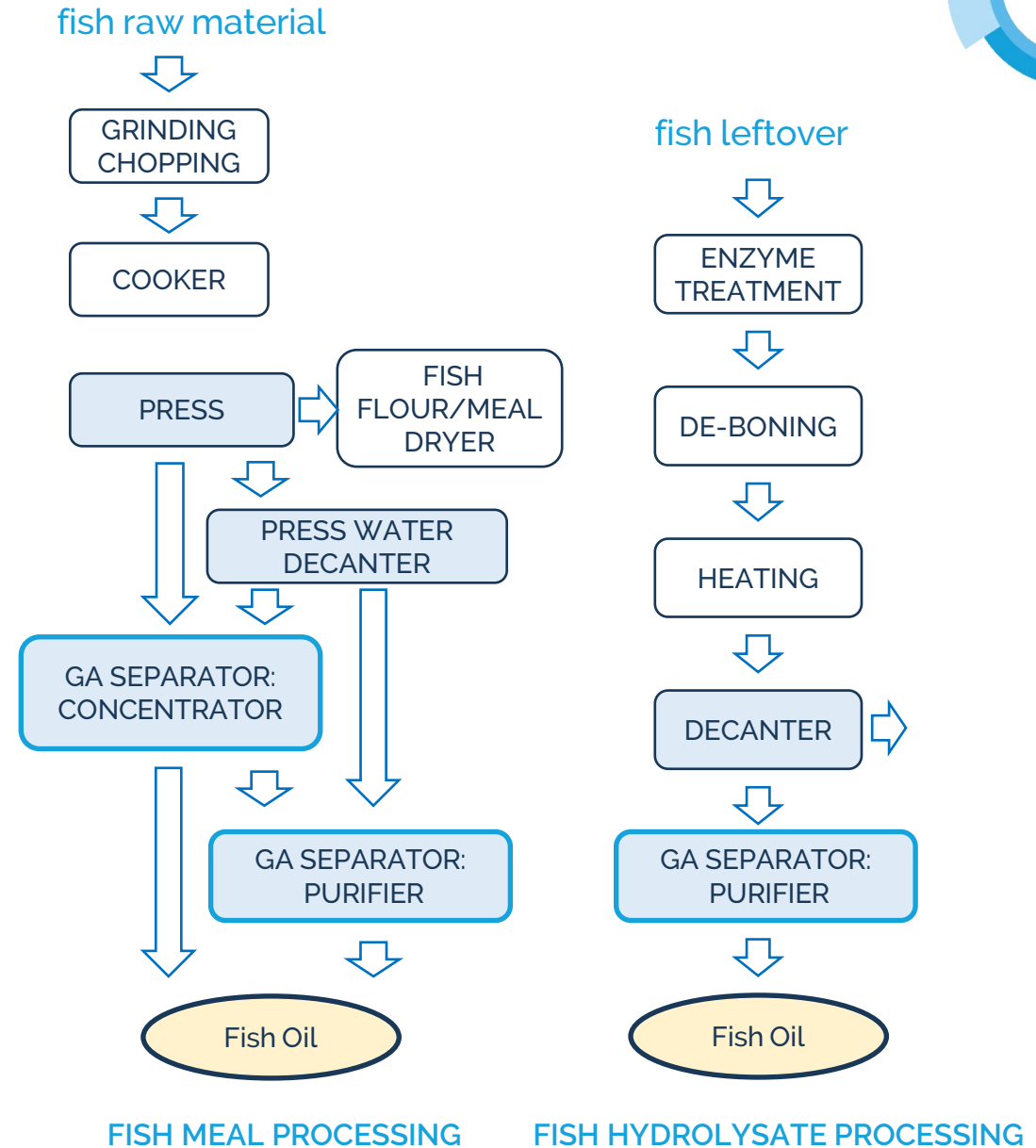
- For the recover/separation of fish oil from press-water
- for the purification/cleaning of fish oil itself

typical processes:

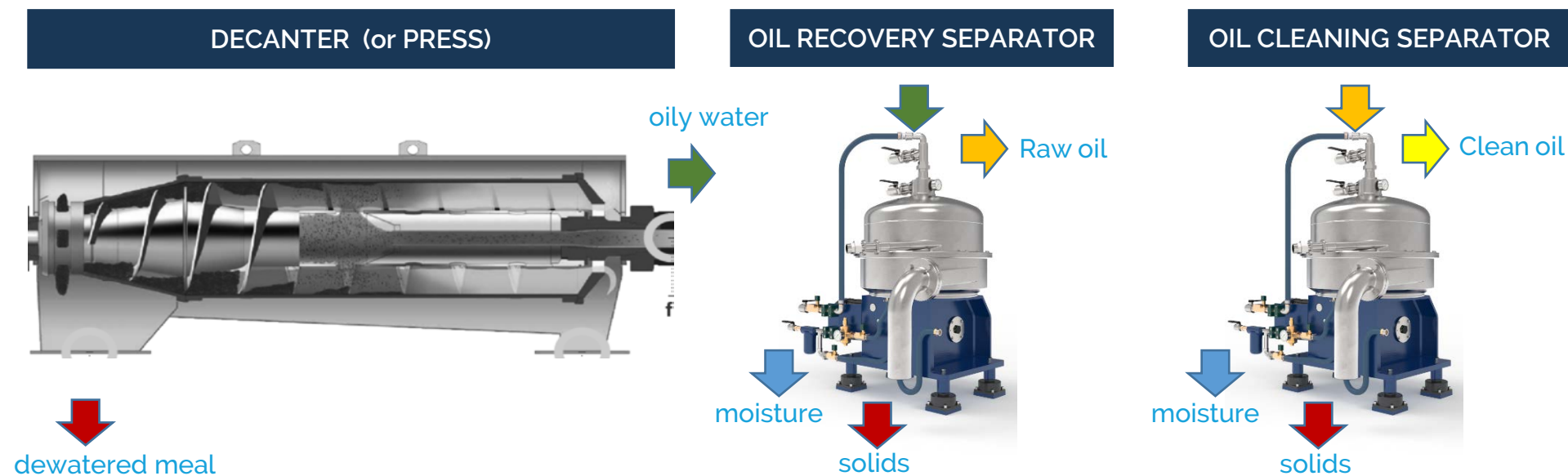
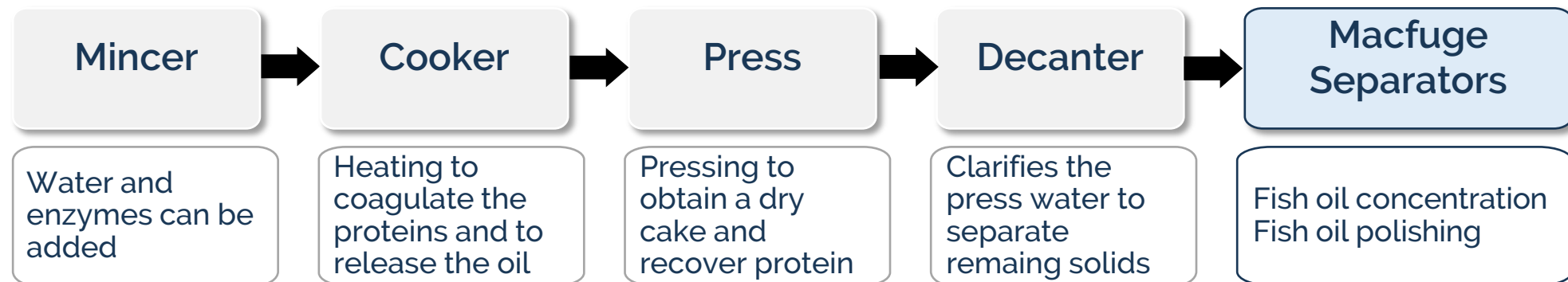
- in the parts/whole fish processing
- in the fish hydrolysate processing

main "contaminant" to remove from the fish oil:

- "stick" water
- "solid particles", often erosive



Macfuge separator for fish oil: GA series



example of fish meal and fish oil process flow, with fish oil separators installed after press water decanter

Macfuge separator for fish oil: GA series

The Macfuge GA design has been optimised in two main configurations

Macfuge GA separator: the concentrator

- to treat the large amount of water which is generated to produce a dry fish meal, either by a press or by a 2-phase decanter
- the aim is to recover the maximum amount of fish oil content in the press-water

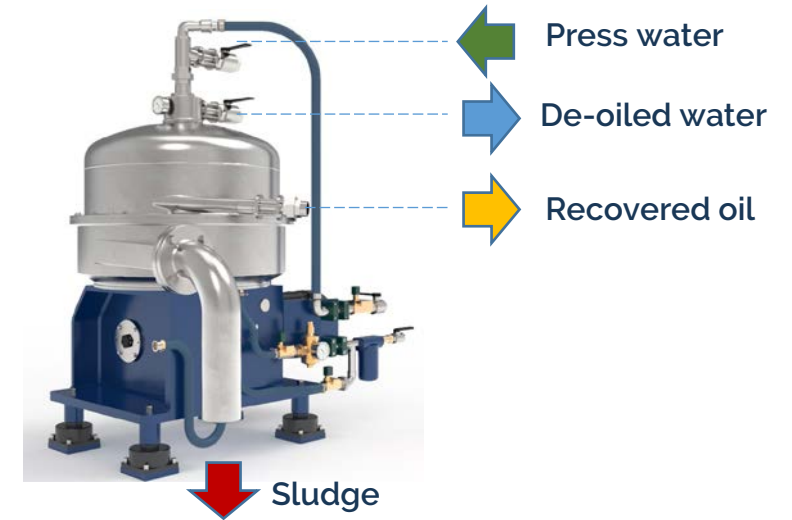
Macfuge GA separator: the purifier

- to clean the fish oil which has been recovered from the concentrator or from a decanter (sometimes directly from press)
- the aim of is to clean the oil by separating the water emulsion and the solid particles still present

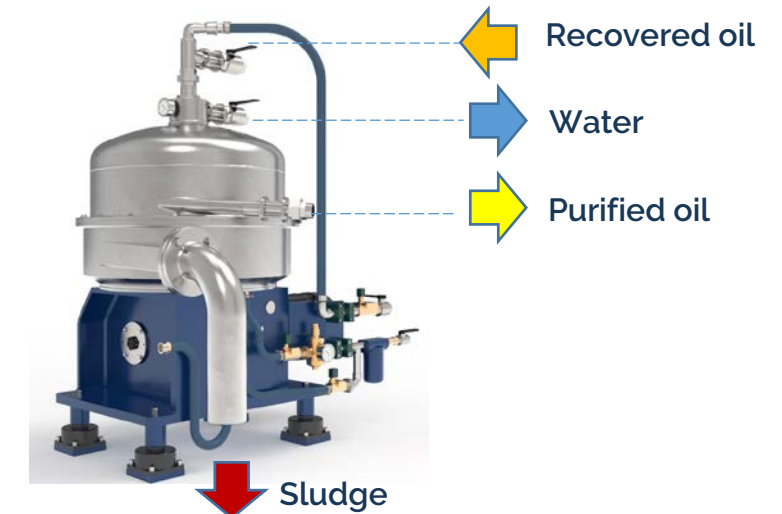
Both the Macfuge GA configurations respond to similar **process challenges**:

- work at high temperature (about 90°C),
- treat viscous liquids (stick-water),
- deal with erosive solid (particles).

Macfuge GA concentrator



Macfuge GA purifier



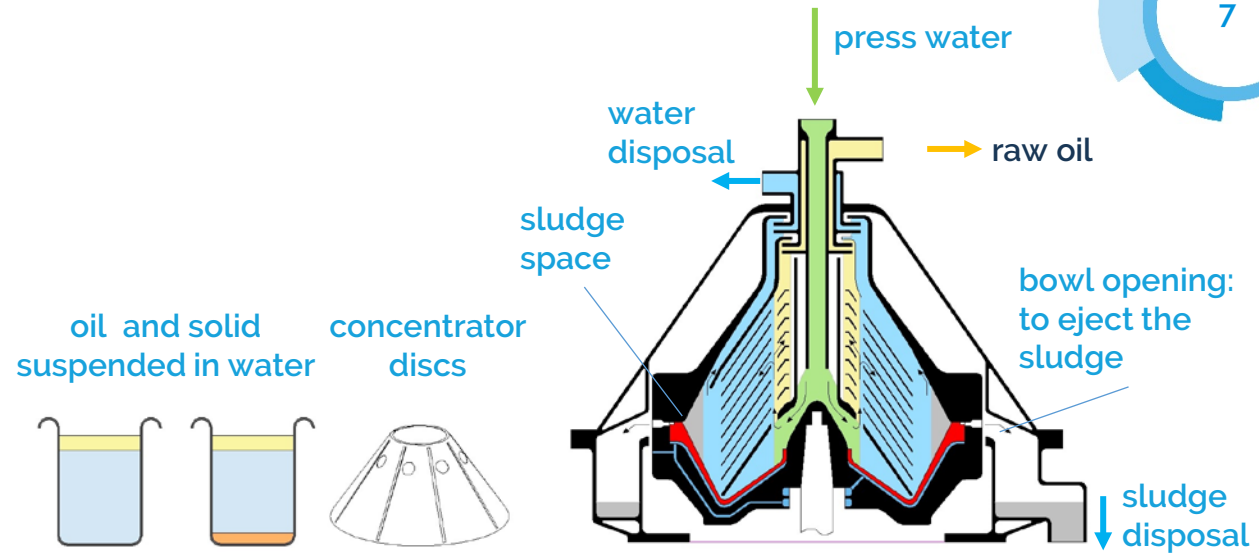
Macfuge separator for fish oil: GA series

Working principle:

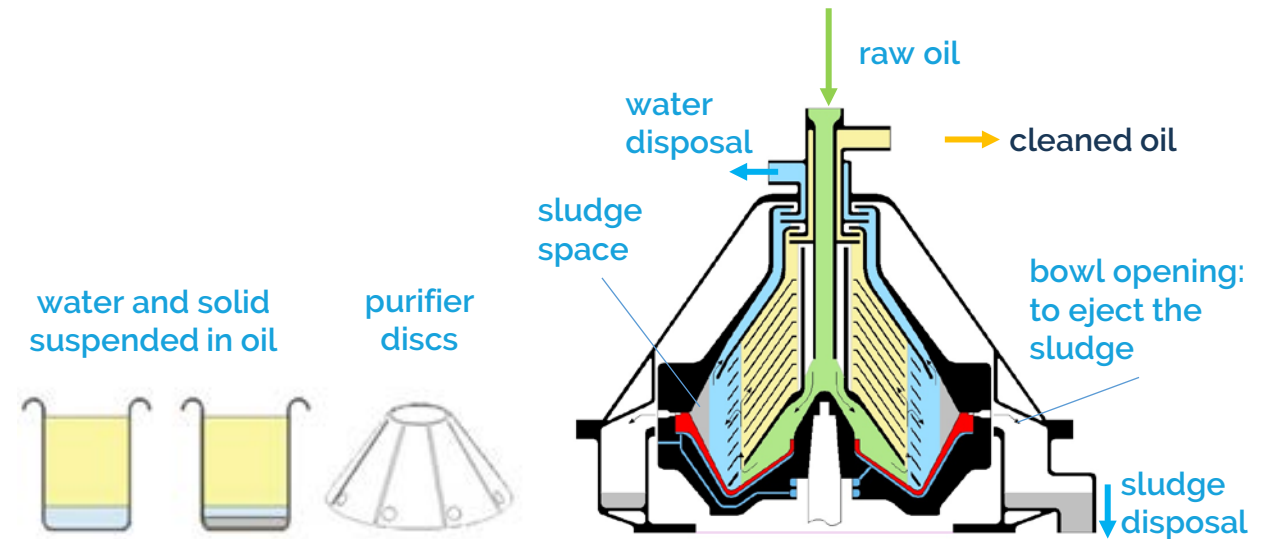
- The separation takes place in the bowl (see schematics) rotating at very high speed, and generating a strong centrifugal field;
- The high centrifugal forces act as enhanced gravity forces;
- The difference in densities of water/oil grants a net separation;
- The solid particles "settle" on the periphery of the bowl, in the area called Sludge Space, ready to be ejected;
- The sludge space is emptied at programmed intervals (so-called automatic discharges);
- The discharges are programmed through a PLC, and can be partial (no need to stop the feeding) or total;

The bowl design of GA separators is optimized for the two mentioned configurations:

- **Concentrator bowl:** to handle a large water and solid content
- **Purifier bowl:** to improve the polishing efficiency



GA CONCENTRATOR: larger space for water and solid



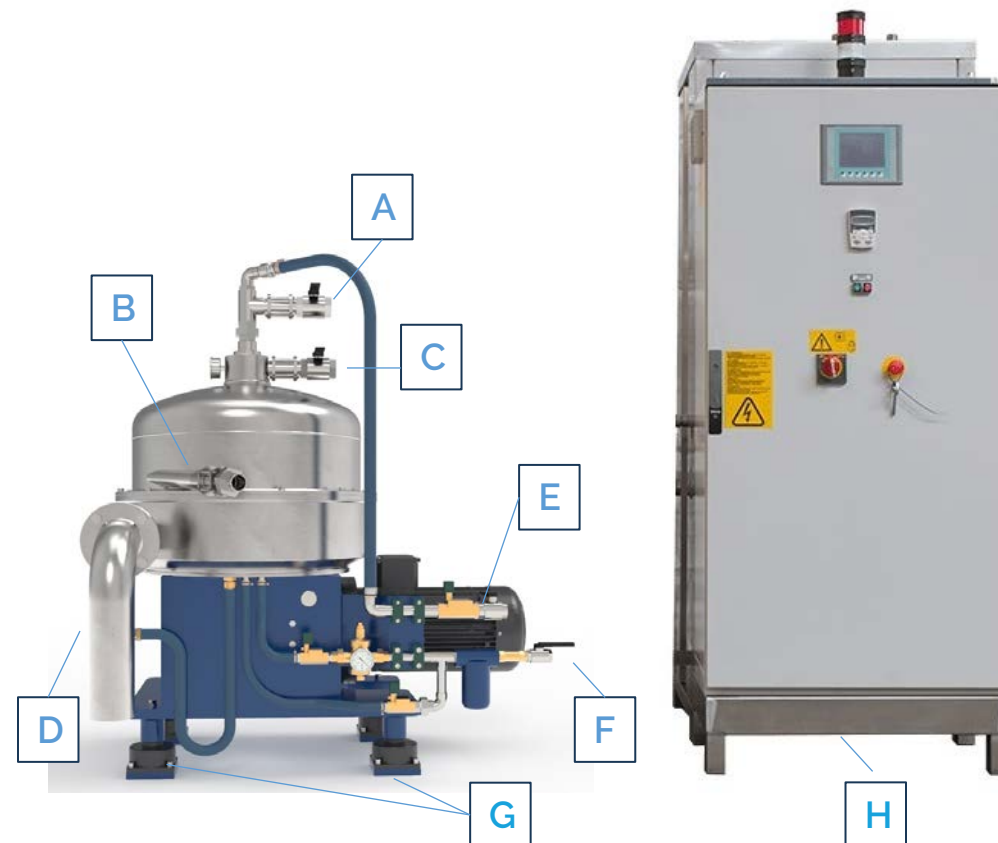
GA PURIFIER: larger space for oil

Macfuge separator for fish oil: GA series

Implementation:

- Self standing separator for floor mounting, with separate self standing cabinet
- Cabling on place with max flexibility for in line installation
- A single entry point for main power to the cabinet, with general emergency button
- all the instruction for installation, connection, servicing and operating the unit are provided with detailed drawings
- execution according to International Standards (e.g. NEMA, TRCU, EAC ...);
- optional turn-key skid assembly, pre-assembled, and pre-cabled on steel platform

NOTE: all the hard connection can be provided according to local standards (flanged, threaded..)



Main connections:

A – feed inlet

B – oil outlet

C – water outlet

D – sludge outlet

E – dilution/cleaning water

F – maneuvering water

G – dampers feet for grounding

H – stand alone cabinet

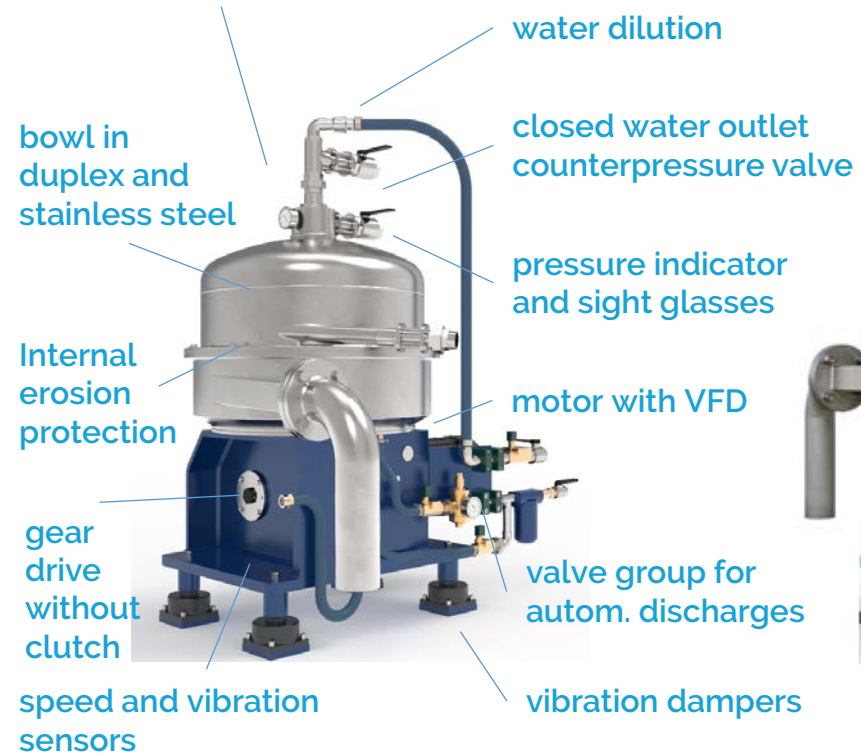
Macfuge separator for fish oil: GA series

Featuring:

- Choice of oil outlet:
 - Open Oil Outlet with large de-aeration cover
 - Closed Oil Outlet with counterpressure valve
- Closed water outlet with counterpressure valve
- Choice of high quality material for bowl:
 - Duplex
 - Stainless steel
- Bowl erosion protection system
- Motor with Variable Frequency Driver
- Gear drive, direct without clutch
- Start/stop by frequency converter
- Vibration dampers
- Speed and vibration safety sensors with monitor
- solenoid valve group for total and partial discharges
- Dilution/washing water (or CIP media inlet)
- skid assembly available on request, customizable with choice of additional accessories

opt 1: open oil outlet with large de-aeration casing

opt 2: closed oil outlet with counterpressure valve



GA Separators: open or closed oil outlet options

Macfuge separator for fish oil: GA series

Control Panel:

Self standing cabinet in aluminum (optionally AISI304)

For safe area

PLC with Touch Screen HMI

VFD Variable Frequency Drive

Emergency button

Push buttons (start/stop, production..)

Lamp alarms

Speed sensor monitor

Vibration sensor monitor

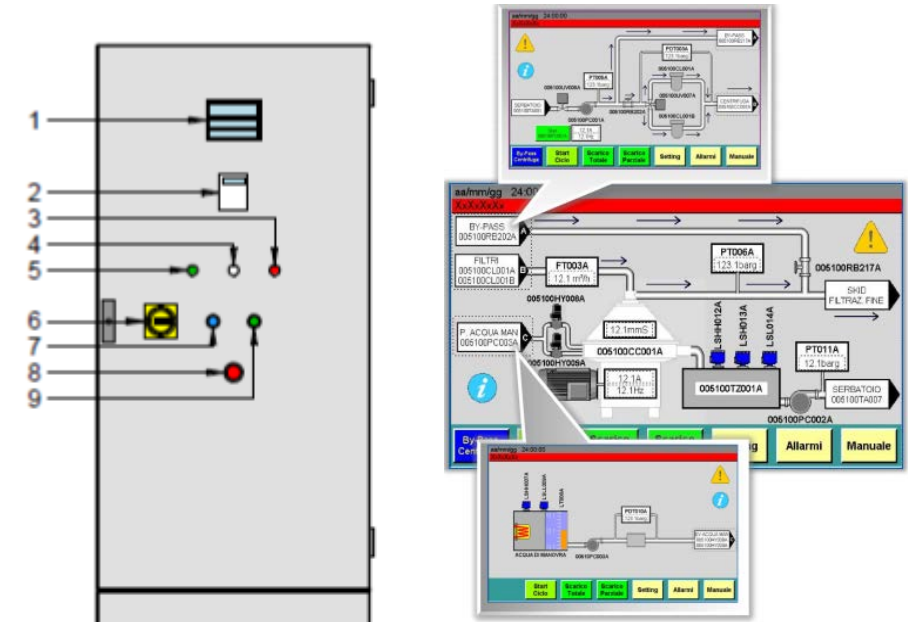
Flushing Valves control

Discharging mechanism control (partial, total, sequence)

Consensus to operate

Accessorie's controls

NOTE: the Status Signal can be remoted, on request



Ref.	Description
1	Control panel and PLC display
2	Control panel and PLC display of the frequency converter
3	Alarm signal
4	Indicator of voltage presence
5	Indicator centrifuge in operation
6	General switch
7	Start button
8	Emergency stop button
9	Stop button

Macfuge separator for fish oil: GA series

Macfuge User Interface:

Macfuge proprietary interface for the input and visualization of runtime parameters.

“Macfuge Expert” software for optimal routine is included

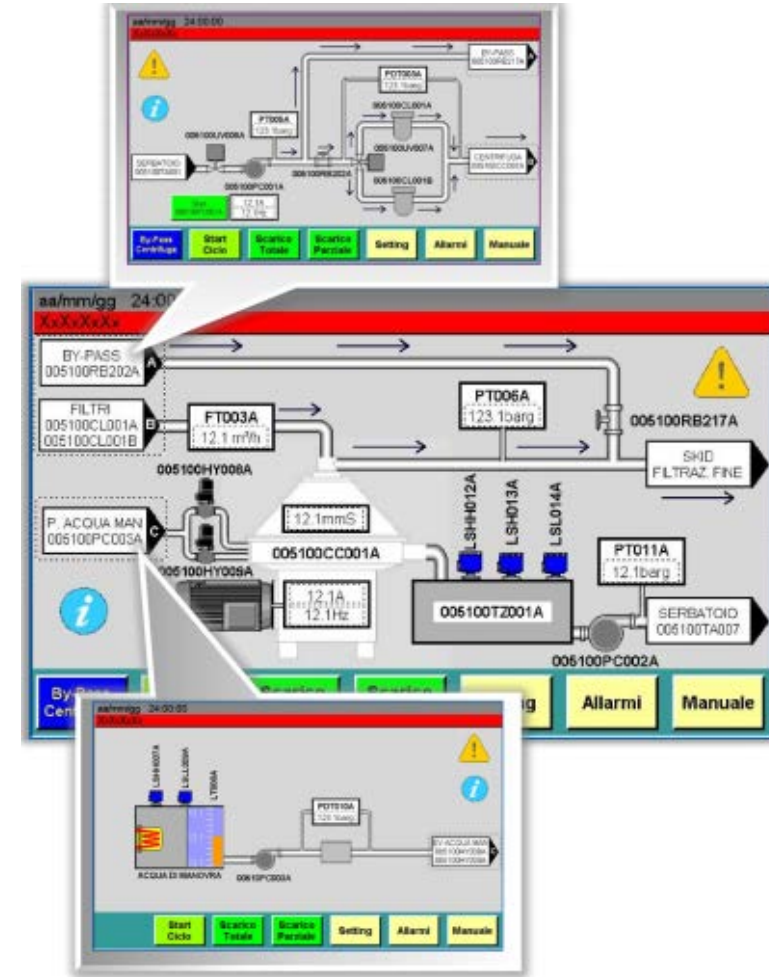
Interface is running on a touch panel connected with the PLC

The PLC actively runs the separator, executes the controls, records the data, activates the alarms, read the sensors signals and communicates with external accessories.

“Production mode” and “CIP mode” pre-loaded but customizable

Password protection

NOTE: The data are saved on internal memory and can be remoted on request (optional Remoting Unit)



Macfuge separator for fish oil: GA series

Availability:

- After the start up, the system works in automatic
- Designed to work continuously (24/7), excluding periodical stops for cleaning and maintenance
- The stops for cleaning are minimized thanks to the self discharging routines and CIP availability
- Erosion protection for delayed maintenance
- No wearing parts due to clutch
- Oil replacement only once per year
- Planned yearly check of driving parts
- Gear replacement once every two years on average
- Clear instruction and special tools make the maintenance intervention smooth and easy

lubricant oil

Macfuge maintenance plan:

lubricant oil change:

- first 500 hours
- every 2000 hours

gaskets

gasket check:

- first 50 hour, first 200 hour
- every 8000 hour/ once an year
- available: gasket kit

gear and bearings

driving part (gear, bearings) check:
every 8000 hour/ once an year
available: mechanical kit

tools

Macfuge maintenance kits:

Special tool for easy bowl lift-up
Set of tools
Set of parts for start-up
Gasket kit
Mechanical kit

Macfuge separator for fish oil: GA series

Process - oil recovery from press water

Feed	Stick water with oil and solid
Oil content	From a low % up to 30%
Solid	Up to 5%
Temperature	Up to 90°C
Environment	Fish industry – fish vessel



Performances

GA series capacity	up to 45.000 lt/h
Sizes (motor)	6 sizes (from 5kW to 45kW)
Oil recovery	up to 98% (depending on process)
Water residual	below 1%
Solids residual	below 0,5%

Process - oil polishing/purification

Feed	oil with emulsion and solid
Water content	From a low % up to 5%
Solid	Average 0,5%- 2%
Temperature	Up to 90°C
Environment	fish industry – fish vessel



Performances

GA series capacity	up to 25.000 lt/h
Sizes (motor)	6 sizes (from 5kW to 45kW)
Water residual	below 0,5%
Solids residual	below 0,1%

Macfuge separator for fish oil: GA series

MACFUGE™ 325



MACFUGE™ 450



MACFUGE™ 530



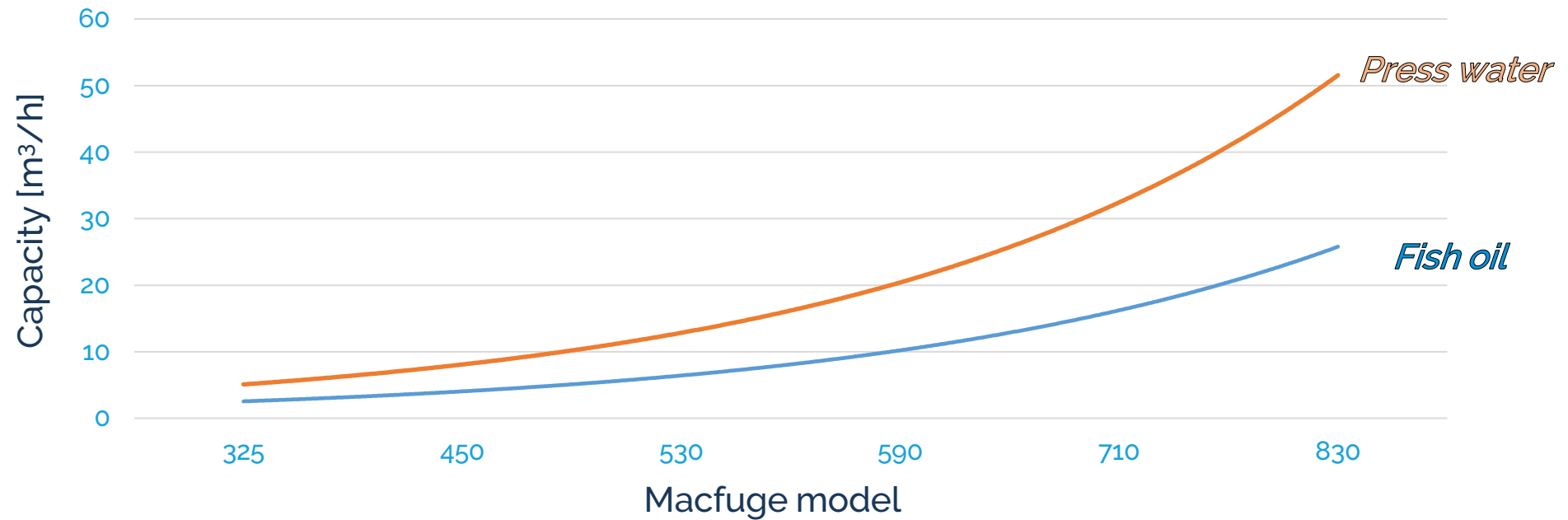
MACFUGE™ 590



MACFUGE™ 710



MACFUGE™ 830



Macfuge as "machine centrifuges", are disc separators designed and built to offer

- customized solutions
- on time delivery
- excellent quality-price ratio
- worldwide reference
- full commitment
- traceability of operation and materials
- made in Italy

Macfuge is a brand of Servizi Industriali, a company founded in 1987, today part of Interpump Group Spa.

Servizi Industriali is located in the heart of Emilia Romagna (ITALY), between Packaging Valley and Motor Valley.

All Macfuge machines are designed and built in our facility in Italy.

Servizi Industriali does not accept any kind of material or service from countries with governments and policies that do not guarantee human rights and the protection of people and of the environment.

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