Decanters, Separators and Process Lines for Industrial Fish Processing

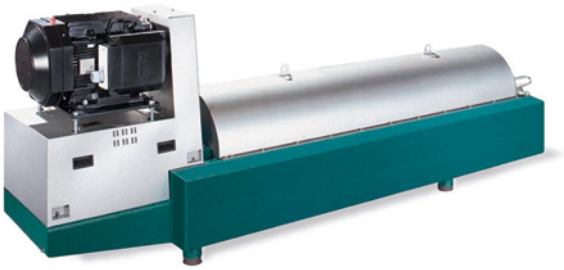
engineering for a better world

GEA Mechanical Equipment

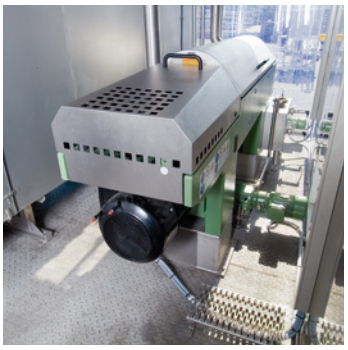
Separators and decanters from GEA Westfalia Separator Group have been used for the recovery of fish meal and fish oil since 1929.

Over the years, the different fish processes in the industry have been adapted to the demands on the product and raw materials. But also the constant development and improvement of decanters and separators have impacted the fish processing industry.

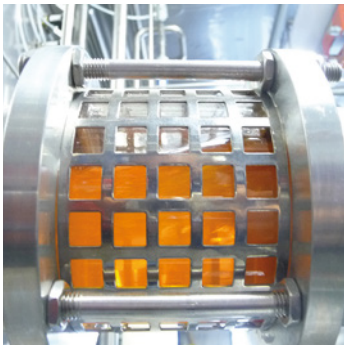
With separators and decanters specifically designed for the different processes as well as the tough demands fish processing makes on centrifugal equipment, GEA Westfalia Separator Group makes for top quality fish meal and fish oil and reliable processes at the same time.



GEA Westfalia Separator Group supports the fish industry with highly efficient and innovative separators and decanters for the



- Conventional process
- 3-phase process
- Whole fish process
- Production of surimi
- Recovery of protein hydrolyzate
- Production of food grade fish oil
- Treatment of canning wash water
- Treatment of fish pump water



We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

GEA Mechanical Equipment

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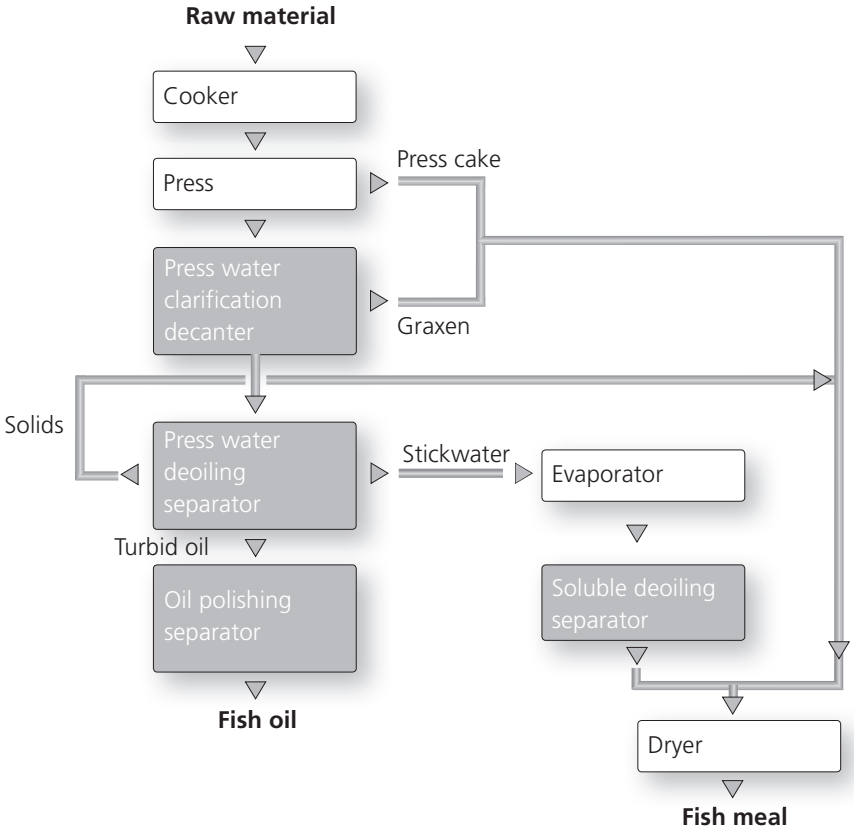
Fish Meal and Fish Oil Recovery – The Conventional Process



In the conventional process, the raw material is heated in a cooker to coagulate the protein whilst the fat-containing cells are gently disintegrated so that the oil will be released. The cooked raw material is fed to a screw press before a 2-phase decanter clarifies the press water and recovers the fine solids from the process. In the following process step the oil, which is part of the liquid phase will be recovered by a 3-phase self-cleaning separator. The separated solids can be conveyed to the dryer along with the press cake from the press and the graxen from the decanter. The stickwater or heavy liquid phase from the press water separator is evaporated before it is dried and processed into fish meal. Optionally, the concentrate phase can be even further deoiled with an additional separator stage. To obtain maximum quality fish oil the turbid oil or light liquid phase has to be subsequently polished by a 3-phase self-cleaning oil polisher.

Decanters for press water clarification

- Complete decanter range from 5 – 60 m³/h
- Customized solutions
- Robust design, particularly designed for hot operation processes
- Sophisticated wear protection for long operation lives
- Special bowl concepts for maximum throughput and clarifying efficiency
- GEA Westfalia Separator **vari**pond® for always optimal separation results even with different feed conditions
- Made in Germany – quality assurance system, CE conformity, DIN EN ISO 9001:2008 and 14001:2004

Separators for press water deoiling

- Complete separator range from 2 – 60 m³/h
- Customized solutions
- Special disc stack for optimized stick water quality
- Robust design for maximum reliability
- Hydrohermetic feed for gentle product treatment
- Sanitary and CIP-capable design
- GEA Westfalia Separator self**thinker** ejection control for maximum solids content of the sludge phase and minimum oil losses
- Made in Germany – quality assurance system, CE conformity, DIN EN ISO 9001:2008 and 14001:2004

Separators for oil polishing

- Complete polisher range from 0.5 – 30 m³/h
- Customized solutions
- Optimized disc stack for top fish oil quality
- Minimum number of parts and seals for minimum wear
- Very service-friendly flat belt drives
- Assembly-friendly design for fast service
- Low vibration machine installation for an easy integration into the process
- Made in Germany – quality assurance system, CE conformity, DIN EN ISO 9001:2008 and 14001:2004

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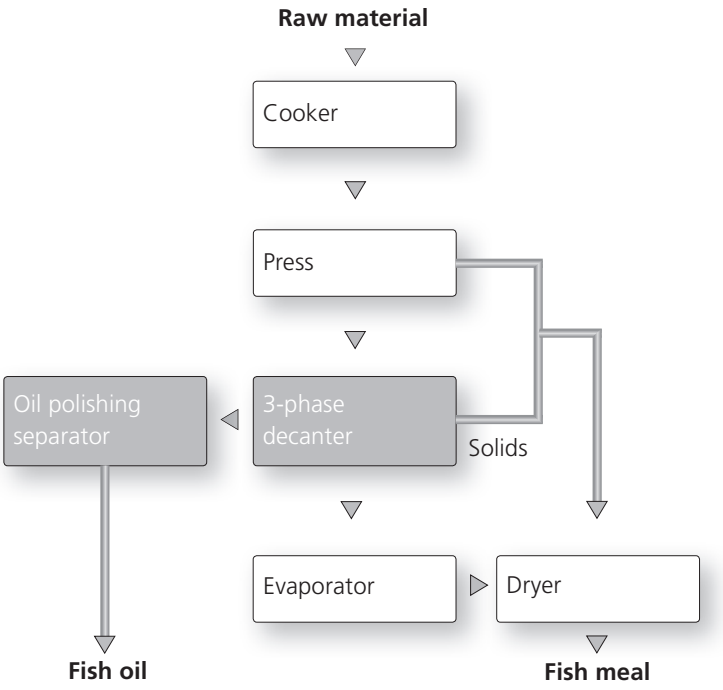
Fish Meal and Fish Oil Recovery – The 3-Phase Process



In the 3-phase process, the raw material is heated in a cooker to coagulate the protein whilst the fat-containing cells are gently disintegrated so that the oil is released. The cooked raw material is fed to a screw press before a 3-phase decanter separates the press water cleanly into solids, water and oil. According to customer preferences GEA Westfalia Separator Group offers several discharge systems for 3-phase decanters. The two liquid phases can either be discharged freely or via tubes. In the second case the paring tube and with it the separation zone in the decanter can be externally adjusted. The separated solids are directly conveyed to the dryer along with the press cake from the press. The stickwater or heavy liquid phase from the decanter is evaporated before it is dried and processed into fish meal. As the oil phase from the decanter may still contain small residues of free water and solids, a polishing separator is recommended downstream to remove even those tiny impurities. The result is purest fish oil.

3-phase decanters for press water separation

- Complete decanter range from 2 – 20 m³/h
- Customized solutions
- Robust design, particularly designed for hot operation processes
- Sophisticated wear protection for long operation lives
- Special bowl concepts for maximum throughput and clarifying efficiency
- GEA Westfalia Separator **vari**pond® for always optimal separation results even with different feed conditions
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Separators for oil polishing

- Complete polisher range from 0.5 – 30 m³/h
- Customized solutions
- Optimized disc stack for top fish oil quality
- Minimum number of parts and seals for minimum wear
- Very service-friendly flat belt drives
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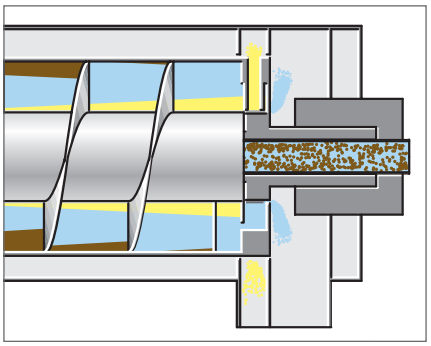
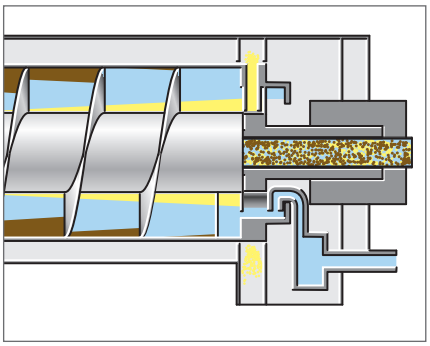
Optional oil discharge for 3-phase decanter



Gravity discharge of both phases



Adjustable separation zone diameter by Paring Tube

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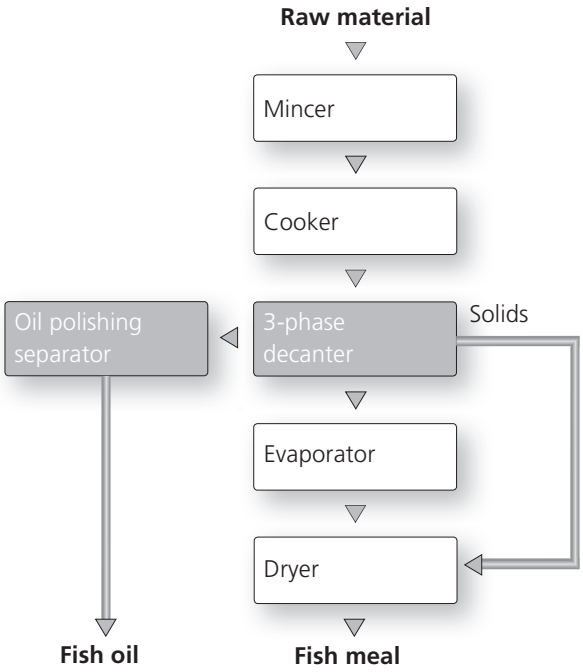
Fish Meal and Fish Oil Recovery – The Whole Fish Process for Small Capacities



The processing of very small capacities requires an adaption of the traditional whole fish process. GEA Westfalia Separator Group has modified the process accordingly to ensure an economic production. Historically, this process has been developed especially for raw materials which are difficult to process in expeller presses. For small capacities the raw material is at first carefully minced. The subsequent cooker coagulates the protein whilst the fatcontaining cells are gently disintegrated so that the oil is released. The cooked raw material is then directly fed to the decanter. For small capacities the cooked raw material is fed to a 3-phase decanter which separates the suspension cleanly into solids, water and oil. The separated solids are directly conveyed to the dryer. The stick-water from the decanter is evaporated before it is dried and processed into fish meal. As the oil phase may still contain small residues of free water and solids, a polishing separator is recommended downstream to remove even those tiny impurities. The result is purest fish oil. For bigger capacities the cooked raw material is fed to a 2-phase decanter. The recovered press water is then de-oiled by a 3-phase self-cleaning separator before it is evaporated and dried.

3-phase decanters for separation

- Complete decanter range from 0.2 – 15 m³/h
- Customized solutions
- Robust design, particularly designed for hot operation processes
- Sophisticated wear protection for long operation lives
- Special bowl concepts for maximum throughput and clarifying efficiency
- GEA Westfalia Separator **vari**pond® for always optimal separation results even with different feed conditions
- Made in Germany – quality assurance system, CE conformity, DIN EN ISO 9001:2008 and 14001:2004

2-phase decanters for clarification

- Complete decanter range from 0.5 – 30 m³/h
- Customized solutions
- Robust design, particularly designed for hot operation processes
- Sophisticated wear protection for long operation lives
- Special bowl concepts for maximum throughput and clarifying efficiency
- GEA Westfalia Separator **vari**pond® for always optimal separation results even with different feed conditions
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Separators for oil polishing

- Complete polisher range from 0.5 – 30 m³/h
- Customized solutions
- Optimized disc stack for top fish oil quality
- Minimum number of parts and seals for minimum wear
- Very service-friendly flat belt drives
- Assembly-friendly design for fast service
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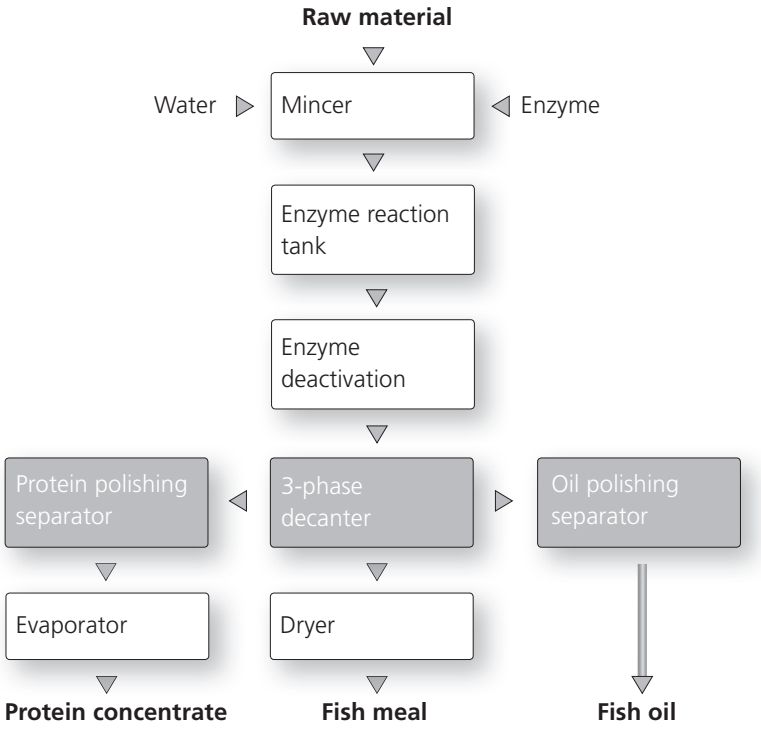
Fish Meal and Fish Oil Recovery – Fish Protein Hydrolyzate



In the protein hydrolyzate process the raw material is at first carefully minced. In the next step the mince is conditioned to give optimal results in the following enzymatic reaction tank. The enzymatic reaction can take place in a continuous reactor or in a batch system. The enzymatic process breaks the long-chain protein molecules down into smaller components. This also changes the properties of the proteins, insoluble proteins become water-soluble. A second effect is their improvement of digestibility. Moreover, targeted selection of enzymes and process conditions allow properties such as taste and consistency to be precisely defined. To stop the enzymatic reaction the protein broth is heated which deactivates the enzymes. The protein broth is then fed to the 3-phase decanter which separates the suspension into an oil phase, insoluble solids and the main phase of the water soluble proteins. Subsequently, the oil and the soluble water phases can each be polished by separators. On the one hand, this allows the solubility of the proteins to be increased by removing fine dispersed solids, whilst on the other hand it also separates even the finest fat droplets and thus obtains a protein hydrolyzate with less than one percent fat in dry mass.

Decanters for separation

- Complete decanter range from 1 – 10 m³/h
- Customized solutions
- Robust design, particularly designed for hot operation processes
- Sophisticated wear protection for long operation lives
- Special bowl concepts for maximum throughput and clarifying efficiency
- GEA Westfalia Separator **vari**pond® for always optimal separation results even with different feed conditions
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Separators for protein polishing

- Complete separator range from 1 – 10 m³/h
- Customized solutions
- Very large clarifying area for an optimum polishing of the protein-containing phase and thus very pure protein hydrolyzate
- Robust design for maximum reliability
- Hydrohermetic feed for gentle product treatment
- Sanitary and CIP-capable design
- Made in Germany – quality assurance system, CE conformity, DIN EN ISO 9001:2008 and 14001:2004

Separators for oil polishing

- Complete polisher range from 0.5 – 30 m³/h
- Customized solutions
- Optimized disc stack for top fish oil quality
- Minimum number of parts and seals for minimum wear
- Very service-friendly flat belt drives
- Assembly-friendly design for fast service
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