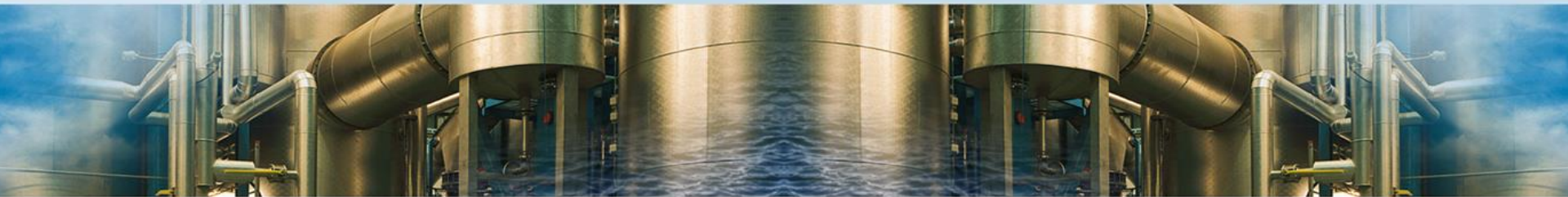




EU Fishmeal Conference 2015, Iceland 26–29 August



ENGINEERING AND PROCESS TECHNOLOGY

Haarslev Industries
Birgir Karl Finnbogason

Who We Are



From Local Manufacturer to Global Market Leader

Established by the Østergaard family, in the village Hårslev in Funen, Denmark in 1973

First delivery of rendering equipment 1978

Merged with Atlas Stord in 2006 (Atlas established 1897)



Who We Are

Facts and Numbers About Us

No. 1

in protein recycling and world class equipment
supplier for drying of sludge, biomass and biofuel

9

production sites worldwide

15

service centers globally

25

offices around the world

65

agents worldwide

120

different countries sold to

800

% in revenue growth from 2000 to today

1.100

employees globally

85.000

m² production area - equivalent to 11 football fields

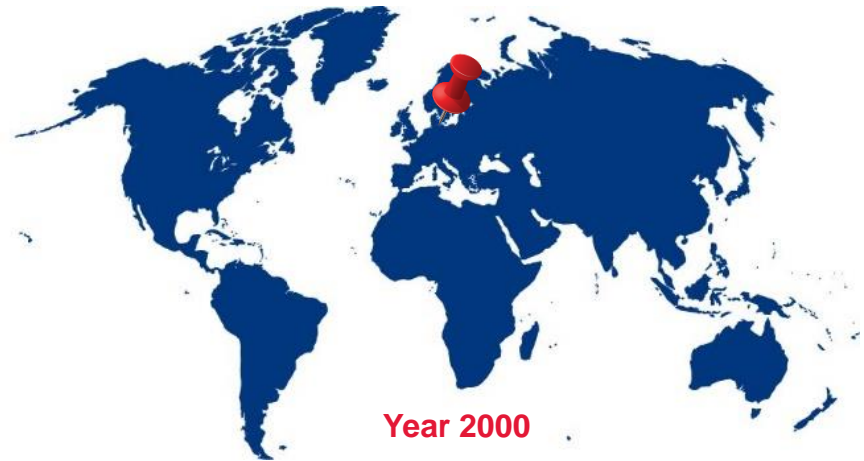


Who We Are



From Local Manufacturer to Global Market Leader

Haarslev Industries have grown from a local machine manufacturer to a global market leader in our industry.



Today, we combine global process knowledge and experience that extends back more than 100 years.



Values

Our Core Values

Haarslev Industries is characterised by a strong degree of **entrepreneurship**, **honesty** and focus on our customers. We work in close **cooperation** in reaching our customers **ambitious** goals.

Our people are our most valuable asset. They have great **competences** in their field of expertise and are **committed** to finding solutions for any operation.

Haarslev Industries is proud of the fact that our employees have developed key technologies and systems meeting industry changes and customer requirements.

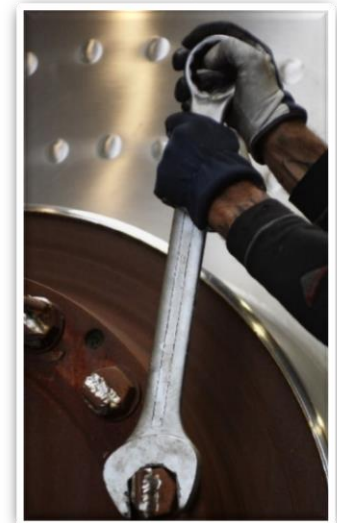


Who We Are

Continuous Improvement

At Haarslev Industries we always strive to continuously improve our process knowledge, equipment and customers end product.

Via innovation we upgrade our products, increase energy savings and enhance environmental protection.



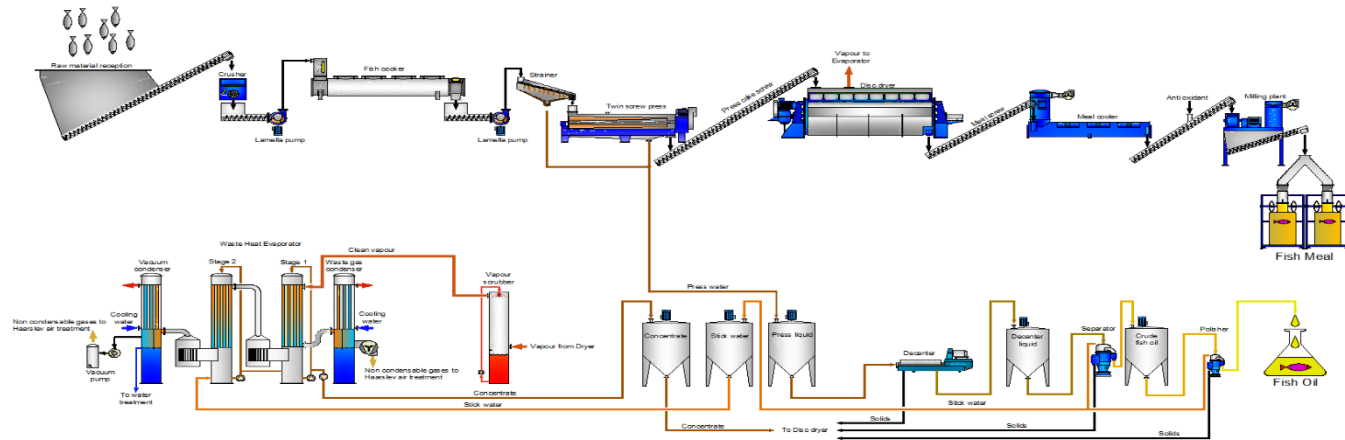
Who We Are



In-Depth Process Knowledge

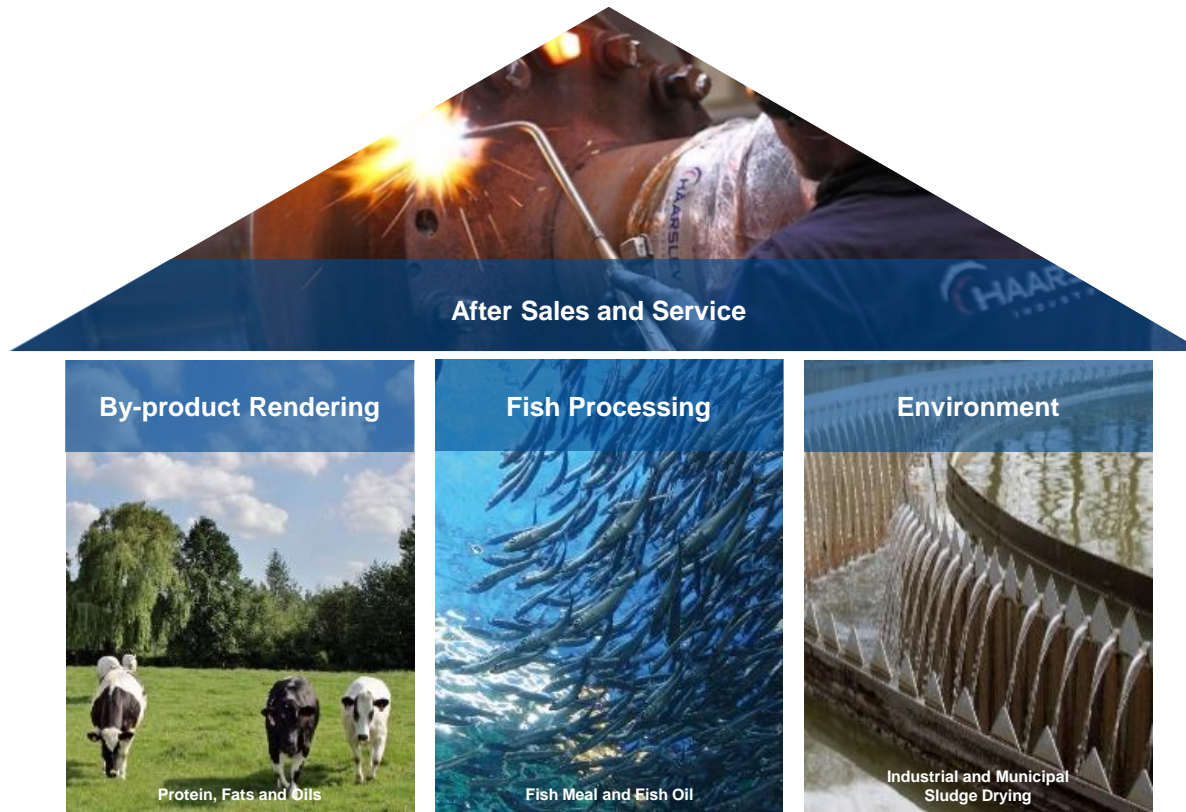
Key words for Haarslev deliveries are **process knowledge**, **experience** and **durability**, that combined generates the largest value for our customers

Haarslev Industries works in close cooperation with the customer to develop and optimise tailored solutions according to customers requirements



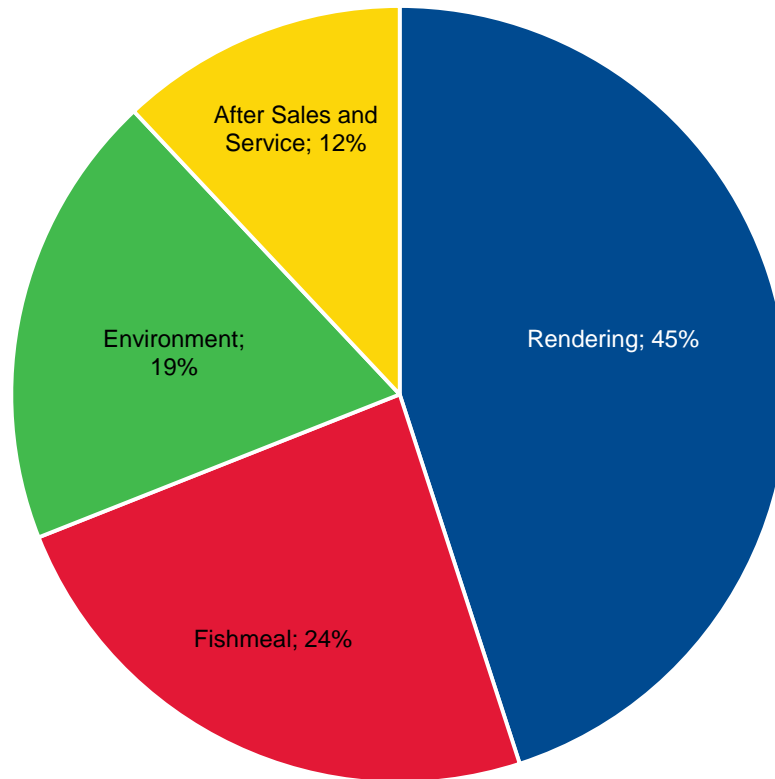
What We Do

Our commercial foundation is the three business pillars we operate in.
After Sales and Service covers and protects our customers' investments.



The Haarslev House

Business Areas



■ Rendering ■ Fishmeal ■ Environment ■ After Sales and Service

What We Do



Haarslev Industries is a full-service partner that creates value for our customers by developing, designing and supplying separation processes and technology
– anywhere in the world

What We Do

After-Sales and Service

We offer our customers the expertise they need to protect their investment and optimise profit.

We do this by offering:

- A full range of service programs
- Consultation
- Original spare and wear parts
- Refurbishment of machinery



What We Do

Haarslev Industries offers a full product program

Our first class equipment meets the requirements of the worlds leading meal and oil producers

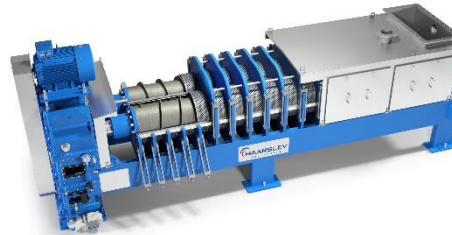
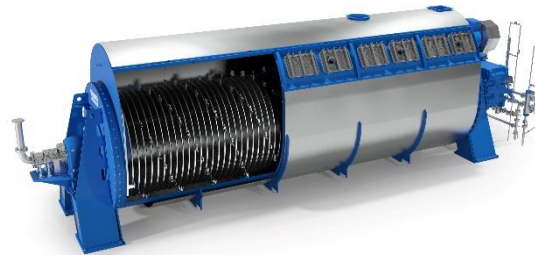


- | | | | | | | | |
|-------------------------------|--|--|---|--|---|--|---|
| <input type="checkbox"/> Silo | <input type="checkbox"/> Screw conveyors | <input type="checkbox"/> Pre-breakers & crushers | <input type="checkbox"/> Batch cookers | <input type="checkbox"/> Indirect steam dryers | <input type="checkbox"/> Screw presses | <input type="checkbox"/> Drum screens | <input type="checkbox"/> Condensers |
| | <input type="checkbox"/> Pumps | <input type="checkbox"/> Mills | <input type="checkbox"/> Continuous cookers | <input type="checkbox"/> Hot air dryers | <input type="checkbox"/> Hair & feather presses | <input type="checkbox"/> Screw screens | <input type="checkbox"/> Chemical scrubbers |
| | | | <input type="checkbox"/> Hydrolysers | <input type="checkbox"/> Evaporators | | <input type="checkbox"/> Drain screens | <input type="checkbox"/> Bio filters |
| | | | | <input type="checkbox"/> Belt dryers | | <input type="checkbox"/> Decanters | <input type="checkbox"/> Thermal oxidisers |
| | | | | <input type="checkbox"/> Drum dryers | | <input type="checkbox"/> Separators | |

- Technology produced by Haarslev Industries
- Technology not produced by Haarslev Industries

What We Do

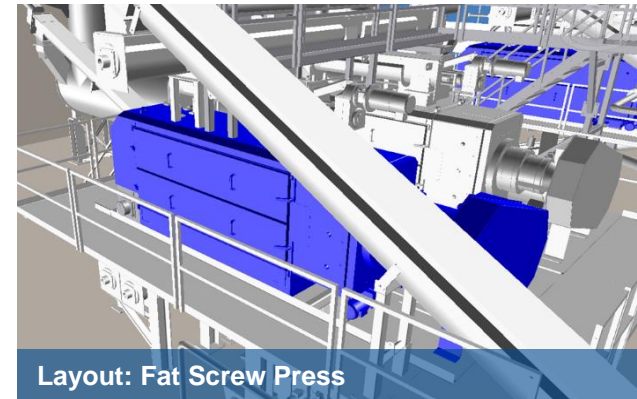
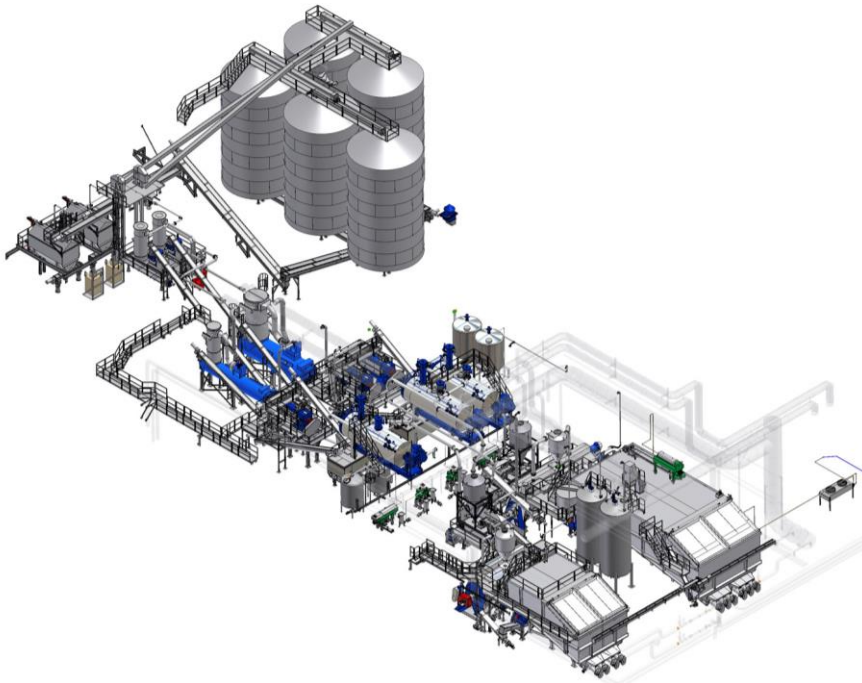
From Raw Material Reception to Odour and Vapour Control, Installation and MCC Control



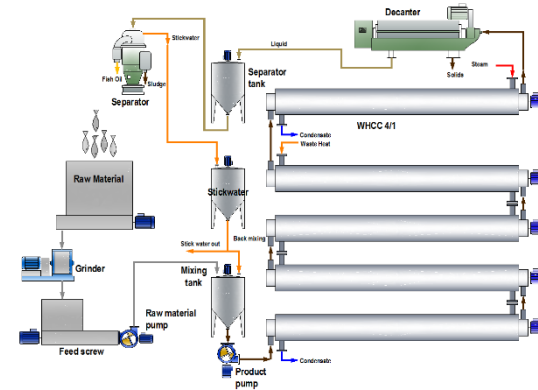
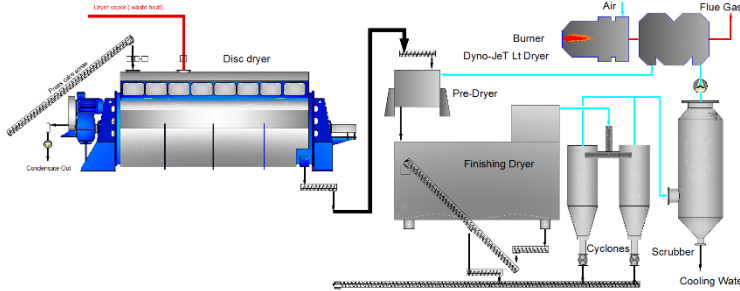
What We Do

From Single Machines to Turn-Key Solutions

Haarslev Industries has the proven competences to design, engineer, manufacture, automate and install complete turn-key solutions or individual equipment.



Fish Meal Processes



Conventional process

Based on:

- Indirect screw Fish Cooker
- Atmospheric steam drying
- Waste Heat Evaporation

Pros & Cons

- Investment low
- Operational costs low
- Product quality fair

LT meal Production

Based on:

- Indirect Screw Fish Cooker or CC Compact Coagulator
- Low temperature drying
- WHE or MVR evaporator

Pros & Cons

- Investment high
- Operational costs high or fair
- Product quality high

High grade production

Based on:

- CC Compact Coagulator
- Decanting
- LT or conventional drying

Pros & Cons

- Investment medium
- Operational costs high or medium
- Product quality high

Compact Plant

Based on:

- Compact Plant, build as one unit
- Conventional process with or without Evaporator

Pros & Cons

- Investment low
- Space requirement low
- Meal quality low (Presscake meal)
- Mainly off-shore

Mini Production Plant

HB Grandi Plant Akranes

50 TPD plant capacity

Turning by-products into quality meal
and oil

Purchased 2013 from Haarslev Industries
Installed 2014 by Hamar ehf.

Input: Redfish by-products

Output: Standard fishmeal and oil



Mini Production Plant

Raw Material Section

Stainless steel raw material silo

Hydraulic operated door

To be tipped in from a truck

Silo with load cells



Drain conveyor to raw material grinder

Closed raw material pumping system



Cooking Pressing and Drying

Traditional screw cooker

Pump to strainer screw conveyor

Twin screw press, slowly rotating
(0,9 rpm)

Three-phase Decanter

Disc Dryer

Meal Cooling



Mini Production Plant

WHE Evaporator and Milling

Two stage Waste Heat Evaporator plant

Hammer mill

Bagging in existing bagging unit



Plant Throughput

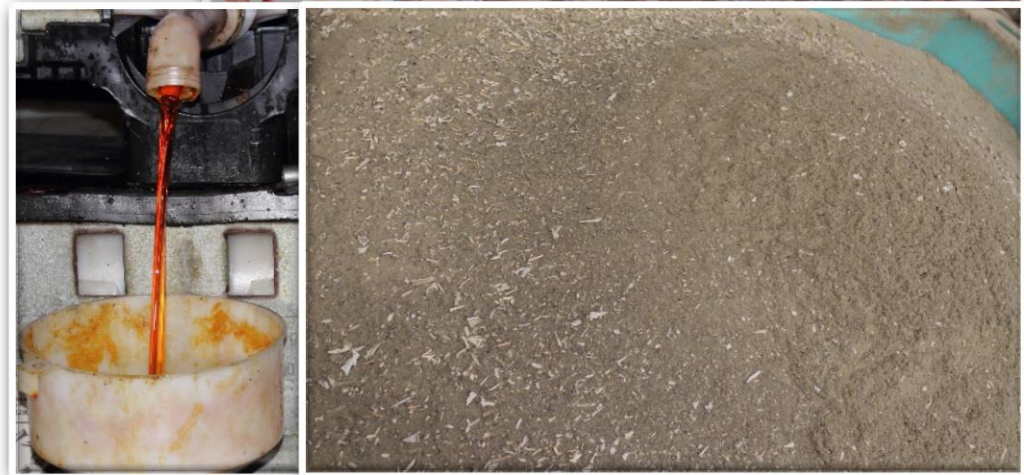
Installed motor power	235 kW
Electrical consumption	125 kW
Specific steam consumption	514 kg/t
Boiler consumption	860 kW
Total consumption	985 kW
Specific electrical consumption	394 kW



Raw material throughput
About 10.000 ton pr year

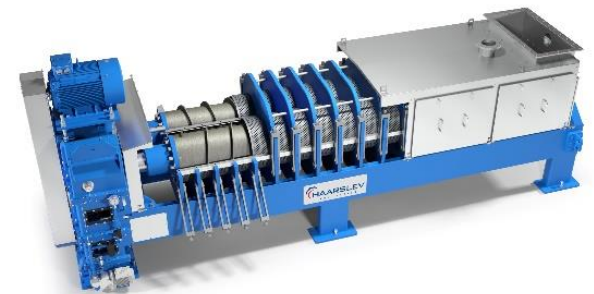
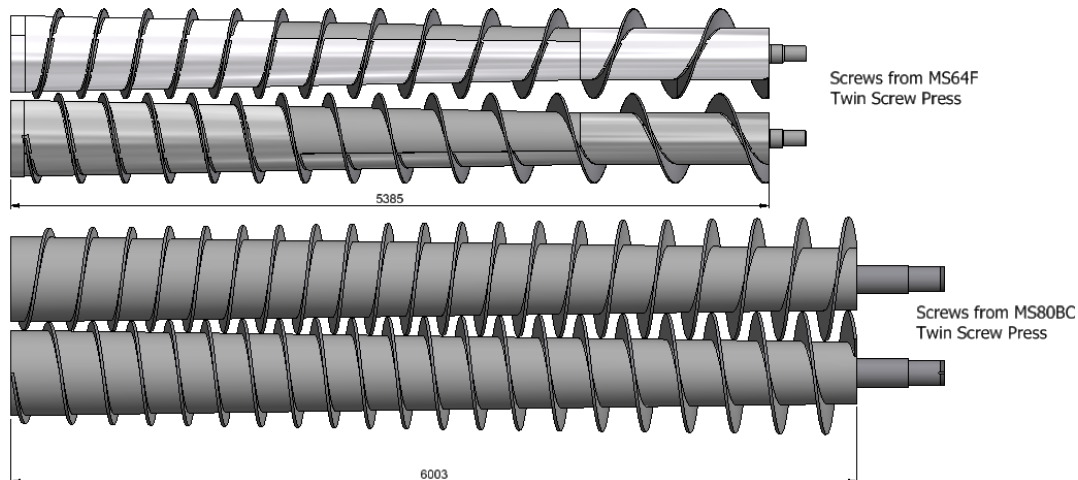
Meal yield 20 – 21 %
Oil yield 4 – 4,5 %

Output:
Meal app. 2.000 – 2.100 t/year
Oil app. 400 – 450 t/year



Bi-Conical Twin Screw Press

- 2-5% lower moisture content in press cake at same capacity
- 30% higher capacity at same rotation speed
- Equal moisture content at same rotation speed
- 30% longer retention time at same capacity
- Equal specific power consumption at same rotation speed
- More stable performance



Meal Quality – Drying Process

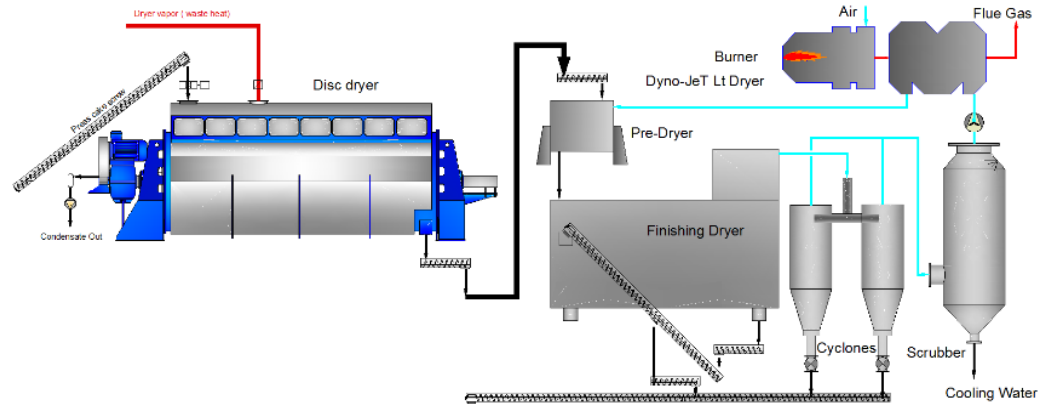
Atmospheric Steam Dryer

Vacuum Steam Dryer

Hot Air HLT Dryer

Hot Air Dyno-JeT Dryer

Fluid Bed Dryer



	Investment	Energy	Product Q
Steam Atm	Low	Low	Low
Steam Vacuum	Low	Low	High
Hot Air	High	High	High
Combined	High	Medium	High

Product Yield and Quality

Oil Quality - Cooking

- Short heating time up to 70 °C reduces TOTOX and FFA in the fish oil
- Short retention time gives 1 – 2 % higher mink digestability
- Back mixing of stick water reduces oil content in meal about 2-3 %
- Possible waste heat utilisation
- Edible oil potential
- Self-cleaning
- Retention time app. 3,5 min.



More Information

Find Out More

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Call: +45 63 83 11 00

