ASTW

Highest Quality Fishmeal Plants

ASTW – A & S Thai Works

A & S Thai Works Co., Ltd. (ASTW) is the largest manufacturer of high quality fishmeal plants in Asia, based in Bangkok, Thailand.

The company operates a sophisticated production facility producing complete fishmeal processing plants.

With more than 30 years of experience, ASTW has manufactured more than 260 plants for installation in Asia Pacific, Africa and The Middle East.

We deliver turnkey solutions including design, manufacturing, installation and commissioning.

- 1 year warranty ASTW Rotary Disc Driers come with 1 years warranty for drier body, gear, bearings and even the motor.
- Inspection Certificate ASTW Rotary Disc Driers are inspected and certified to British Standard BS (PD) 5500, European Standard PED and Australian Standard AS 1210. International approval, inspection and certification is provided by Lloyd's Register International (Thailand) Limited.
- Complete installation and commissioning is available using our highly experienced service teams, along with full operating documentation for each plant.
- Spare Parts original spare parts are carried in stock for all ASTW manufactured plants. Contact our sales and marketing team for assistance.

LFP – Lean Fish Plants

- Developed and manufactured for operation in Asia by A & S Thai Works.
- For trawler fish and fish waste with less than 3% oil content. The plant can process almost all kind of raw materials.
- The heavy duty version can withstand wear from sand, shell and stone in the fish.
- Simple design and very easy operation using a "Rotary Disc" drier and accessories including feeding unit, meal cooler, hammer mill, bagging unit and deodorizer.

OFP – Oily Fish Plants

- For fish, fish waste and tuna waste with more than 3% oil content.
- The OFP plant uses the same components as the LFP plant but with addition of a cooker, press, solid/liquid decanter separator, oil separator, plus pumps and tanks.
- A simplified version is available with less automation and more reliance on unskilled labor. Automation can be added later if required.
- A Waste Heat Evaporator (WHE) can be included or added later to save 40% steam.

Technical specification

More than 2,000 units of this famous European designed Rotary Disc, steam heated drier have been delivered worldwide. ASTW research and development continues to make enhancements to the driers, presses, pre-heaters, and ancillary equipment.

The enhancements in design continue to improve efficiency, reliability and lifetime cost of the plants.

Technical Specification: ASTW Lean Fish Plants (LFP)

Plants Size	Capacity tons input per 24 hr	Steam consumption ton/hr	Recommended boiler size ton/hr at 10 bar	Electric consumption in kW Installed/load 70%
LFP 24	**24-30**	**0.9**	**1.2**	**60/42**
LFP 55	**55-60**	**2.0**	**2.5**	**107/75**
LFP 90	**90-100**	**3.4**	**4.0**	**142/99**
LFP 120	**120-140**	**4.5**	**6.0**	**180/126**
LFP 160	**160-180**	**6.0**	**8.5**	**235/165**

Technical Specification: ASTW Oily Fish Plants (OFP)

Plants Size	Capacity tons input per 24 hr	Steam Consumption ton/hr with stick water in drier	Steam Consumption tons/hr with WHE waste heat evaporator	Electric Consumption in kW Installed/load 70%
OFP 24	24-30	0.9	0.4	160/112
OFP 55	55-60	2.0	1.2	195/136
OFP 90	90-100	3.4	2.0	260/182
OFP 120	120-140	4.5	2.7	275/192
OFP 160	160-180	6.0	3.6	300/210

* All figures are approximate.

What we need to know from you:

- Describe type and size of fish or fish waste, oil content and time from catch to processing.
- To estimate the plant size, multiply with 1.4 your daily average catch in tons input per 24 hours.
- Describe the location, near city, sea or river.
- Describe supply of boiler, electric power available, voltage and frequency.
- A & S Thai Works will supply engineering, layout, installation, commissioning and service.

A & S Thai Works also supply single components:

- Cookers
- Meal coolers
- Shell and tube condenser
- Repairs
- Rotary Disc Driers
- Scrubber deodorizer
- Hammer mill
- Replacement of disc rotors
- Air cooled condensers
- Screw presses
- Waste heat evaporator
- Spare Parts
- Screw conveyors
- Fish hogger
- Refurbishment

Plant Equipment, OFP

Cooker/Preheater

The cooker is indirect steam heated in the rotor screw and jacket to cook/preheat the raw material to 95°C. Variable speed gear motor by frequency inverter and variable steam pressure control the cooking /preheating process.

The cooker rotates very slowly to avoid breaking up the fish to a “soup” before pressing. The raw material must have 95°c temperatures for good pressing.

Cooker/Preheater

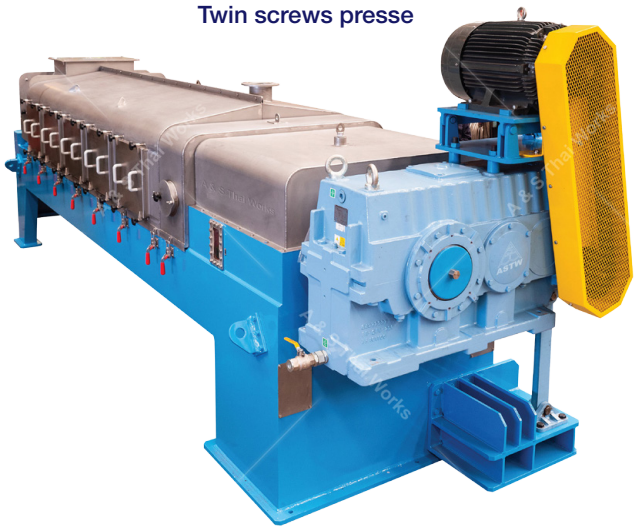
Type	Capacity (tons/hr)	Inner Dia.	Length (Fl./Fl.)	Drive (kW)	RPM	Remark: Component to use for Oily Plant type (OFP)
PH 55	3.0	700	3000	3.7	2-4	OFP 24/ OFP 55
PH 90	4.0	700	6000	5.5	0.8-4.8	OFP 90
SS 25/8	7.0	700	8000	5.5	0.8-4.8	OFP 120
SS 45/9	12	796	9000	7.5	0.8-4.8	OFP 160
SS 75/12	18	900	12000	15	0.8-4.8	
SS 100/15	25	1000	15000	22	0.8-4.8	
SS 130/14	40	1300	14000	30	0.8-4.8	

Presses

In oily fish plants the raw fish must be properly cooked to 95°C and pressed to separate: solids (press cake) which goes to the drier and liquids (press water) which must be further separated in a 2 or 3-phase decanter.

Note that the fish or fish waste must go through a fish hogger (pre–breaker) before cooking to ensure that no large pieces of fish can get stuck and block the press.

Twin screws presse



There are two types of presses:

Twin screw presses have two counter rotating screws that prevent rotation of the raw material. Invented by Stord Bartz of Norway 50 years ago, this is the world reknown ultimate press for fishmeal production with a very sturdy design that lasts 30 years or more.

The “negative” side of the press is that it is has a complex (but very reliable) design that gives a relatively high price.

The other type is the single screw press that has one screw, a much simpler design and therefore a lower price.

The problem with only a single screw is a higher risk that the material “rotates” and don’t move forward, “blocking” the press.

However, ASTW has modified the design so that the single screw presses perform almost as good, and often just as good as the twin screw presses.

All presses are of solid stainless steel design and come with a variable speed gear motor controlled by a frequency inverter (included).

Sizes of presses for fishmeal production:

Operating capacity should be about 50 – 75% of maximum capacity.

Single Screw Presses:

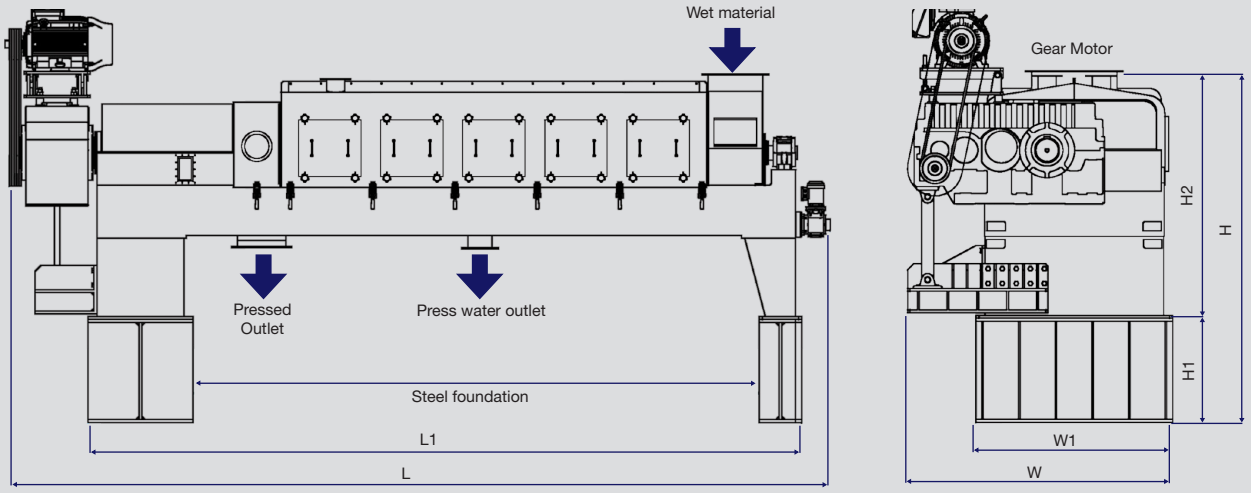
Max. capacity in tons input/hr: 1.5 – 3.0 – 4.0 – 7.0

Twin Screws Presses:

Max. capacity in tons input/hr: 3 – 7 – 10 – 18 – 25

Plant Equipment:

Twin screws press

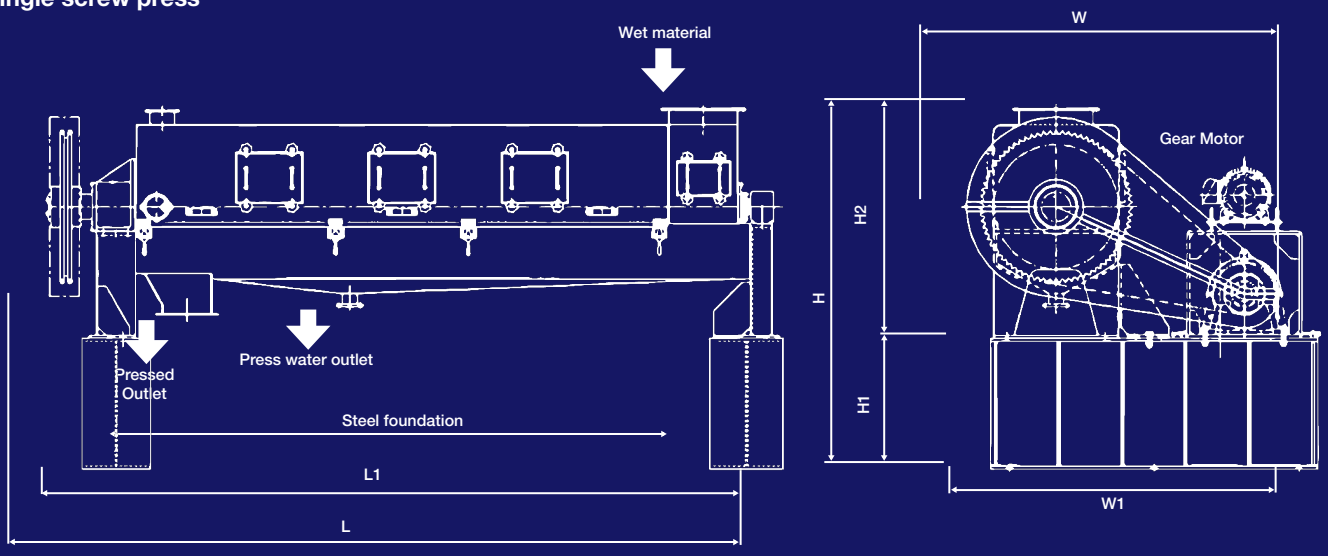


Dimensions: mm.

Type	Nominal capacity raw material tons/hour	H	H1*	H2	W	W1	L	L1	Net weight/kg
AST/BS 24	3.5	1850	850	1000	2000	1850	3500	3300	5500
AST/BS 35	7.0	3215	850	2365	1635	1650	5290	4300	7000
AST/BS 41	10	2760	850	1910	2300	2200	5500	4780	10000
AST/BS 49	18	3060	850	2210	2950	2600	6000	5660	18000
AST/BS 56	25	3280	850	2430	2700	2665	8500	7000	24000

*H1 – Depend on layout

Single screw press



Dimensions: mm.

Type	Nominal capacity raw material tons /hour	H	H1*	H2	W	W1	L	L1	Net weight/kg
AST/TP 24-1	1.5	1770	800	970	1850	1600	3400	3250	2500
AST/TP 32-1	3.0	1850	800	1050	2050	1850	3500	3365	3500
AST/TP 41-1	4.0	2200	800	1400	2160	2000	4500	4287	4500
AST/TP 49-1	7.0	2500	800	1650	2450	2560	6000	5550	6000

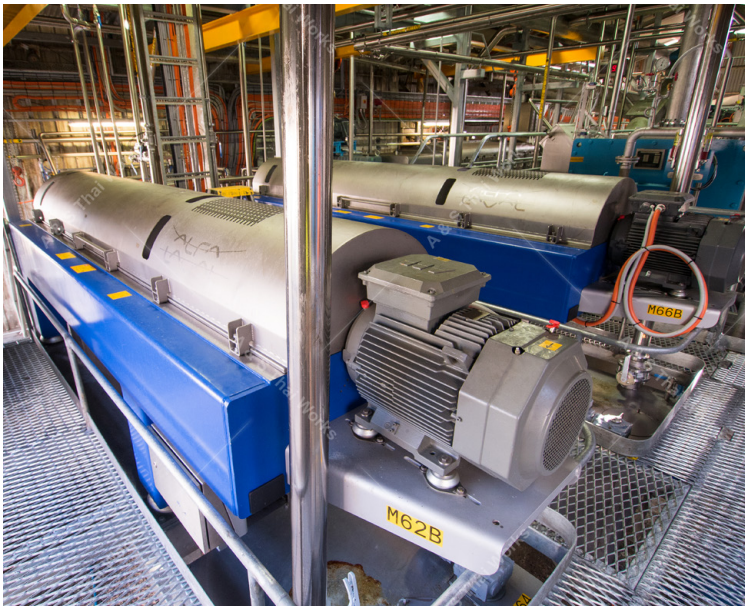
*H1 – Depend on layout

Plant Equipment, OFP

Decanter

Using a 3-phase decanter centrifuge separates fish oil pumped to tank, stick water (pumped to tank) and meat sludge (pumped to the drier).
Each pump is started by a float level switch and stopped by an adjustable timer.

The decanter needs to be flushed with hot water during startup and especially during close down so that all liquids and deposits are removed before the decanter is stopped. Decanters are high speed machines that need special care, cleaning, lubrication and relative frequent change of bearings (every 1 - 1.5 years or so) by qualified technicians.



Rotary Disc Driers

Type	Input capacity tons/24 hrs.	Heating surface, sq.m.
AST/TST 4.4	24	44
AST/TST 8.0	44	80
AST/TST 10.0	55	100
AST/TST 16.0	90	160
AST/TST 24.0	120	240
AST/TST 30.0	160	300
AST/TST 40.0	220	400

ASTW disc driers have more distance between the discs for :

Better material flow and easy operation, less wear and long lifetime, low electric consumption, more efficiency.

Disc driers are the most used driers in the fishmeal industry worldwide, using clean steam for heating.

ASTW driers have been developed and improved continuously since 1986 when the first LFP drier was installed in Thailand. Many driers are still in operation after 20 years. Since 1986, we have produce 260 driers and currently make about 15 driers per year. ASTW make the most heavy duty driers with 12mm mild steel discs with stainless anti-wear U-caps, 19mm stator shell and 6mm stainless cladding on exposed areas. We can also deliver driers with stainless steel discs. As a customer you pay for wear allowance, safe operation and long lifetime.

ASTW driers always have steam jackets to increase the effective heating surface and increase the efficiency of the drier. Note that steam pressure should be maximum 6 bar. Higher pressure will burn and destroy the protein in the fishmeal.

ASTW driers are inspected and certified to British Standard BS/PD 5500 cat. 2, European PED and Australian AS1210.

ASTW rotary disc driers come with 1-3 years warranty for Southeast Asia.

Plant Equipment:

Fish bin

Raw material bin where the fish is dumped coming from processing or port.

One or two bottom screw conveyors transport the raw fish to an inclined conveyor and then to the hogger (OFP Plants) or to feeding unit (LFP Plants).

Fish hogger

Hogger to reduce the size of larger pieces of fish and fish waste so that it can cook properly and not block the press.

Hopper under the hogger with an inclined screw conveyor to transport the raw material to the feeding unit.

A level switch is installed in the hopper under the hogger and will stop the screw conveyors to the hogger when full.

Feeding unit

Feeding unit with adjustable speed screw conveyor by frequency inverter which controls the capacity of the plant and volume of raw material entering the machinery per minute.

A second level switch stops the conveyor from the hogger when the feeding unit is full and starts again by an adjustable timer.

Meal coolers

For plant size larger than 60 tons input per 24 hours. Using air is the best way to cool fishmeal. Avoids “burning”, protects the quality of protein and makes grinding easier.

Complete with stainless blower, ducting and cyclone with rotary airlock. No fishmeal dust will be carried over if the fishmeal is not over dried.

Cooling of fishmeal is very important as it stops the heat deterioration of the protein, reduces the reaction of the fish oil left in the fishmeal and makes the fishmeal particles brittle and easier to grind.

Plant Equipment:

Cooling screw conveyors

For plant size under 60 tons input per 24 hours.

Combined screw conveyor and meal cooler in one unit.

Cooling screw conveyors are mounted after the drier and cools down the fishmeal by airflow, connected to a cyclone and blower, the outlet can be inside or outside the factory.

Rotary strainer and meal feeder

Rotary strainer and meal feeder Rotary strainer separator for stone, steel scrap, rope and plastic, mounted on top of the meal feeder.

Meal feeder, buffer hopper and screw conveyor for feeding to the hammer mill.

Hammer mill

Feed mills request the fishmeal to be ground quite fine in a hammer mill.

The requirements from different feed mills can vary.

The hammer mill hits and cracks the fishmeal particles with “hammers” mounted on a rotor. When the particles are fine enough they fall down through a screen.

Bagging unit

Bagging unit with hopper and built in screw conveyor for electric start/stop operation.

Complete with gear motor and weighing machine capacity.

Smell Removal

Air cooled condenser shell and tube condenser and water scrubber-deodorizer

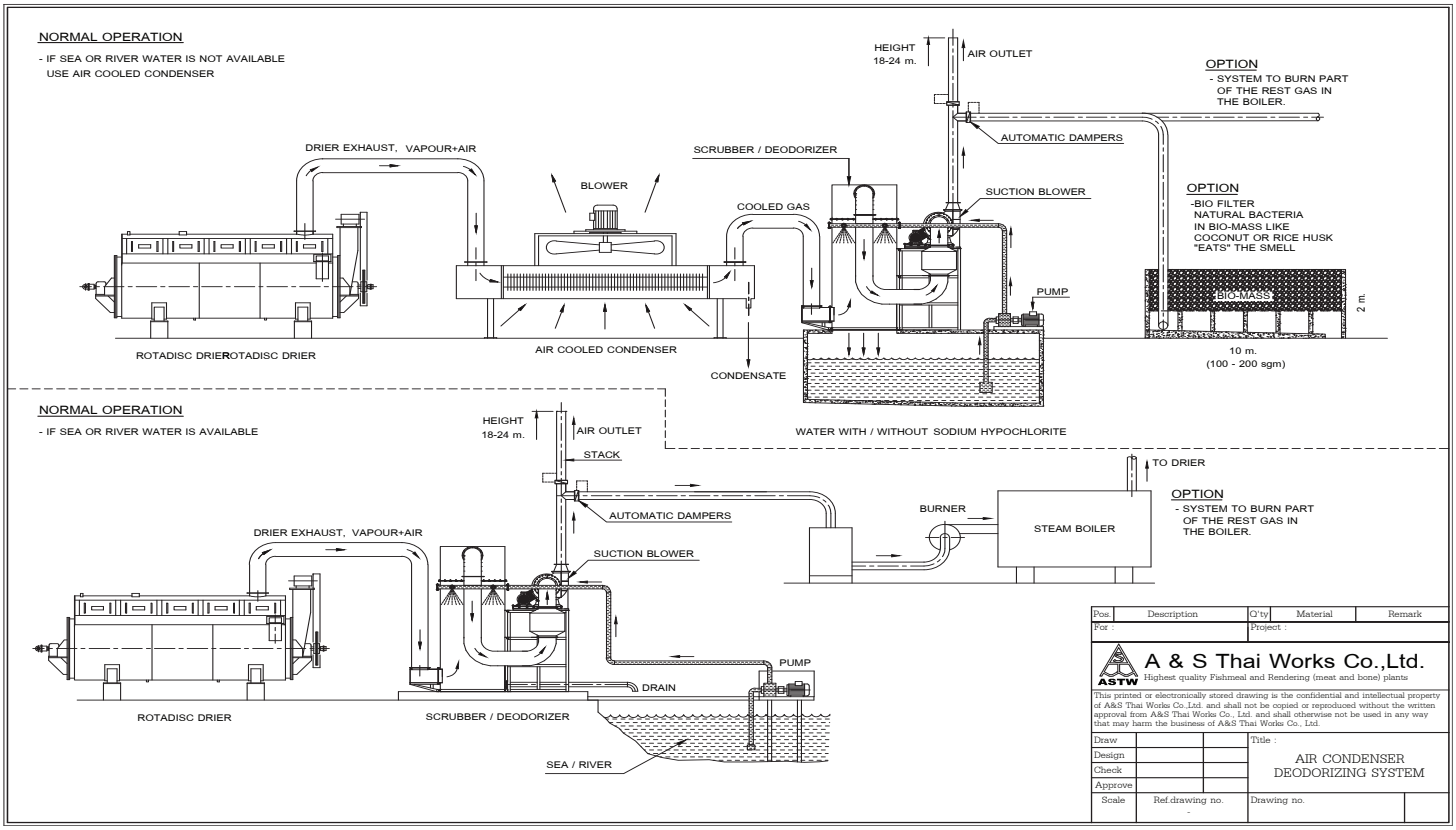
The hot vapor exhaust from the drier is quite smelly and must be treated by condensing (cooling) to water.

The air cooled condenser is cooled by air, while a shell and tube condensers cooled by water.

The remaining gas is treated in a scrubber using water or a chemical solution of sodium hypochlorite and water.

If seawater or river water is available, a water scrubber-condenser can be used. Otherwise an air-cooled condenser is used.

For increased effect, a water scrubber and air cooled condenser can be used in combination, a solution that is increasingly common due to more rigid environmental regulations. If the rest gas from the water/chemical scrubber still has some smell, it can be channeled to the burner and burnt in the boiler.



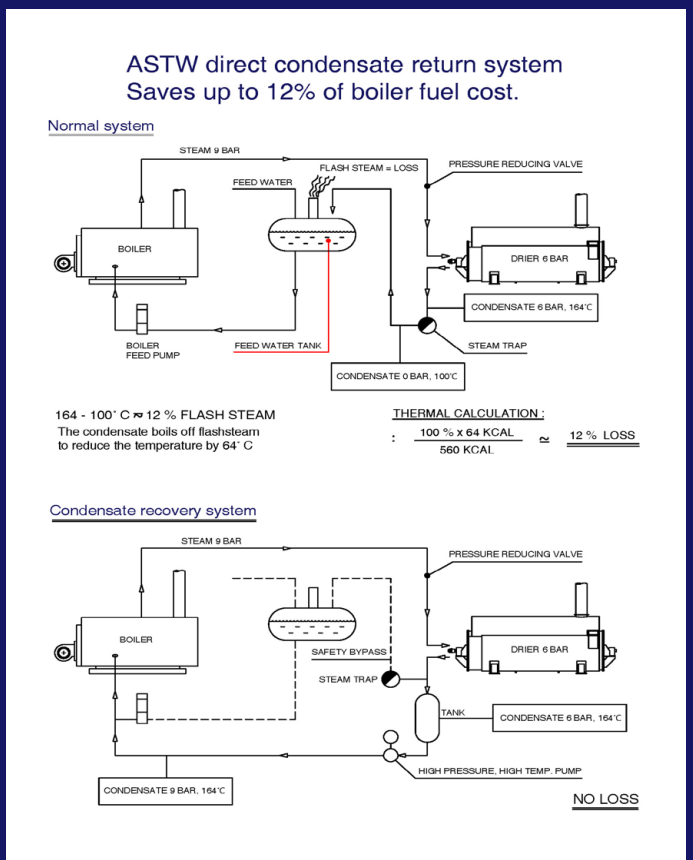
Plant Equipment:

Waste Heat Evaporator

The only purpose of the WHE is to save energy and lower the steam consumption.

The WHE is mostly used for OFP (Oily Fish Plants) with cooker and press where the stick water and fish oil is separated anyway, but can also be used for lean fish to save energy.

The WHE come in 1-stage if there is little stick water (tuna waste) and 2-stage if there is more stick water (sardine).



ASTW direct condensate return system (save tank)

Direct condensate return system. Save up to 12% of your boiler fuel oil consumption and save boiler feed water and boiler chemicals.

- For all types of driers, cookers and sterilizers that use indirect heating.
- The system pumps the pressurised hot condensate directly into the boiler in a completely closed system and without loss of flash steam.
- Example (see chart): a drier operating at 6 bar steam pressure will lose 12% flash steam after the steam trap when condensate boils to reduce the temperature from 164°C to 100°C.
- Automatic operation; if the pump stops, the system automatically switches over to normal steam trap operation.
- Single or multiple boiler installation.

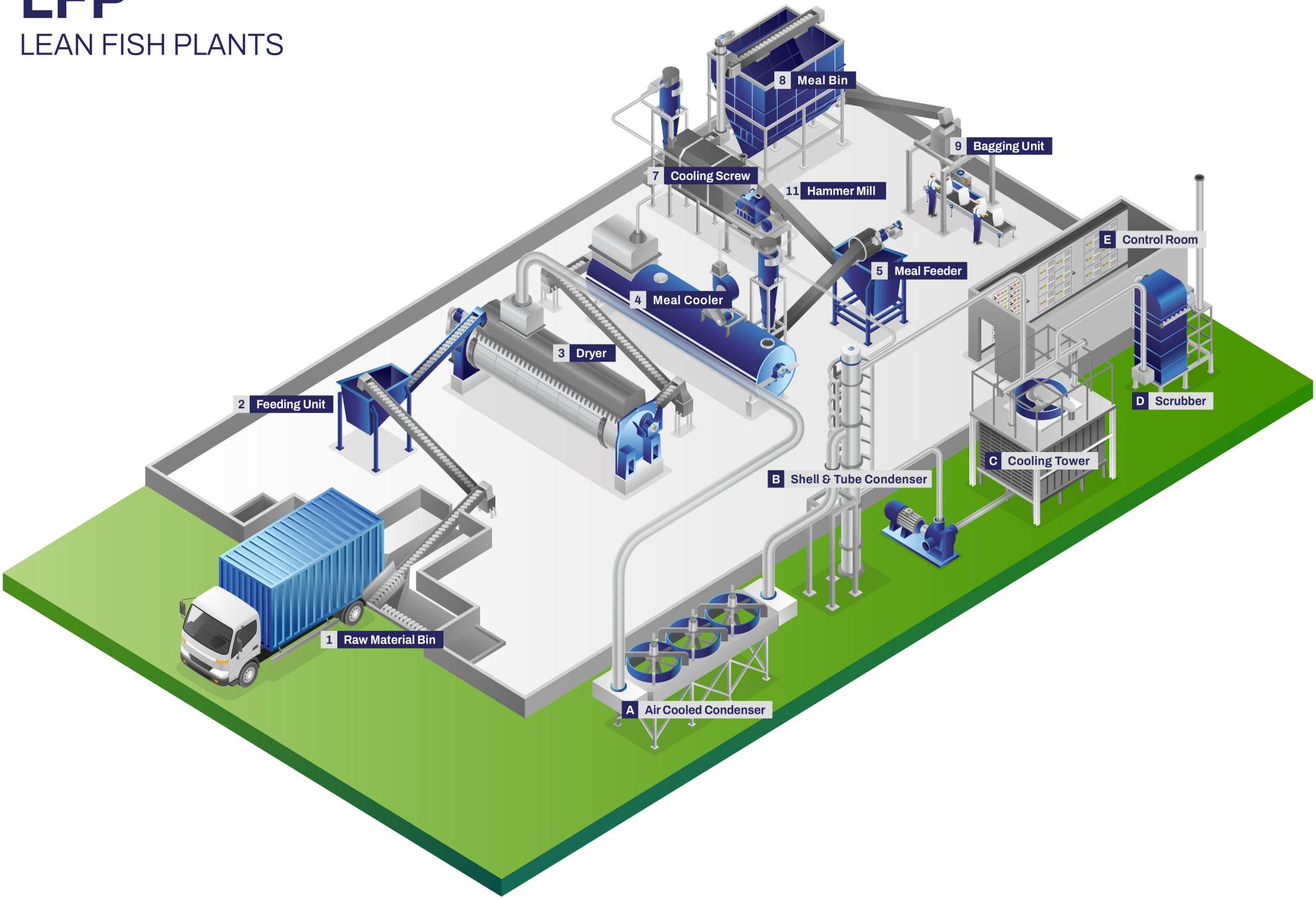
The system comes in a compact unit and consists of:

- Receiver tank (certified for 10 bar).
- High temperature, high pressure pump.
- Flow controllers and level switch.
- Automatic bypass systems using a steam trap.
- Electric control panel.
- Safety high water level switch for the boiler.
- Installation and commissioning included.
- Weight 1,275 kg. Volume 8.0 m^3.
- Dimension: W 2.0 x D 2.0 x H 1.90 (m)

Note: One unit is required for each drier.

LFP

LEAN FISH PLANTS



Lean Fish Plants

- Fishmeal plant type LFP for lean fish, fresh fish, fish/waste and tuna/waste with maximum oil content 3.0% which gives maximum oil content in the fishmeal 12-15%.
- Complete installation, commissioning and startup.
- Capacity 24-160 tons raw material input per 24 hours, which equals 1,000-6,700 kg/hr. Larger plants on special order.
- Rotary Disc Driers come with 3 years warranty* for drier body, gear, bearings and even the motor.

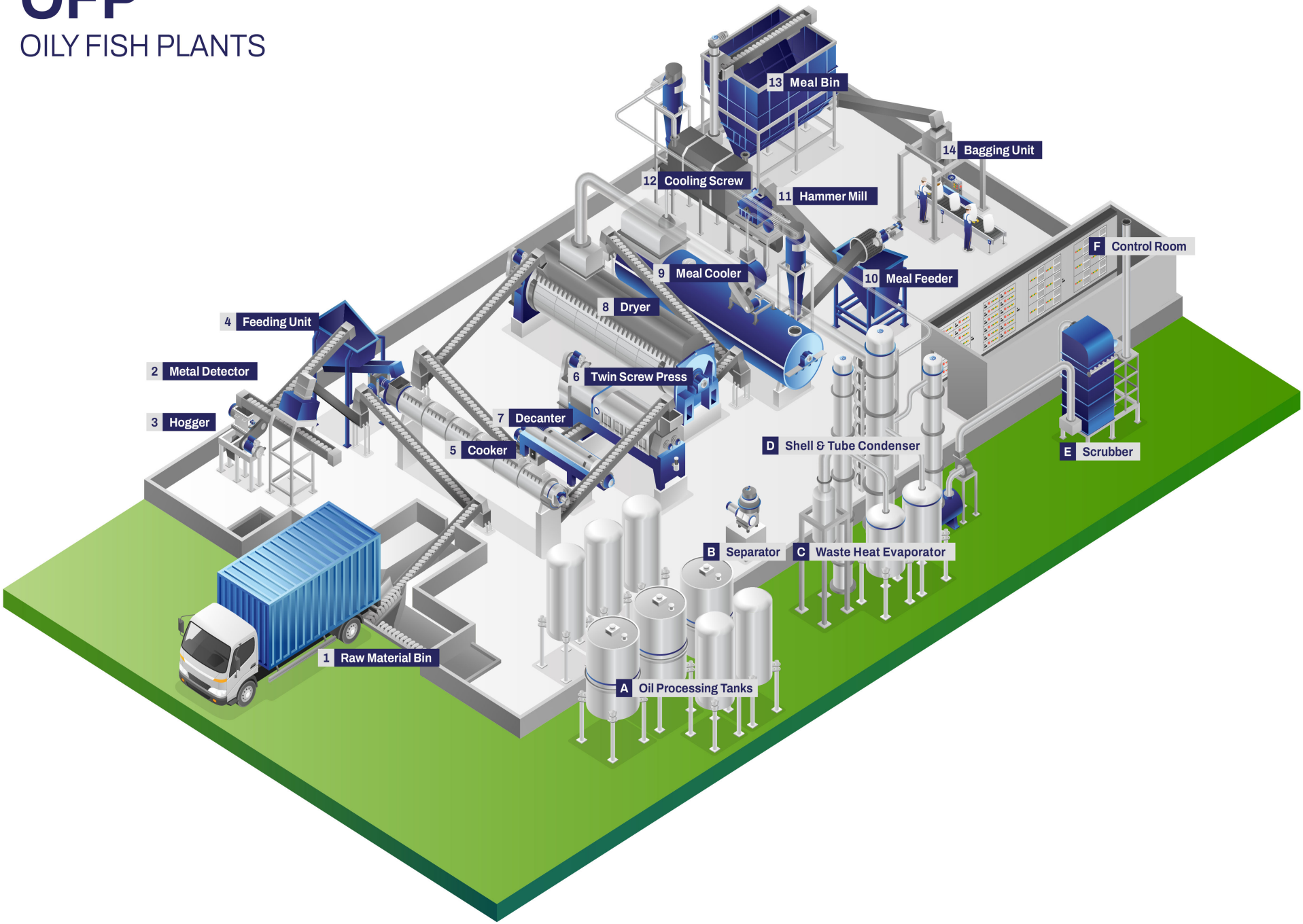
**Southeast Asia only, otherwise 1 year warranty.*

Technical Data :

LFP 24	**Steam consumption at 6 bar. Recommended boiler size 1.2 tons/hr. (max. 10 bar)**	**0.9 tons/hr.**
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	**60 liters/hr.**
	Electric Load kW (70%)	**42 kW (56 HP)**
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (60/0.8 = 75 KVA)	**60 kW (80 HP)**
LFP 55	Steam consumption at 6 bar. Recommended boiler size 2.5 tons/hr. (max. 10 bar)	2.0 tons/hr.
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	138 liters/hr.
	Electric Load kW (70%)	75 kW (100 HP)
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (107/0.8 =134 KVA)	107 kW (143 HP)
LFP 90	**Steam consumption at 6 bar. Recommended boiler size 4.0 tons/hr. (max. 10 bar)**	**3.4 tons/hr.**
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	**270 liters/hr.**
	Electric Load kW (70%)	**99 kW (132 HP)**
	Electric installed kW Note: KVA= kW/power factor for motor 0.8 (142/0.8 =178 KVA)	**142 kW (189 HP)**
LFP 120	Steam consumption at 6 bar. Recommended boiler size 6 tons/hr. (max. 10 bar)	4.5 tons/hr.
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	300 liters/hr.
	Electric Load kW (70%)	126 kW (168 HP)
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (180/0.8 =225 KVA)	180 kW (240 HP)
LFP 160	**Steam consumption at 6 bar. Recommended boiler size 6.8 tons/hr. (max. 10 bar)**	**6 tons/hr.**
	Fuel consumption – heavy oil 65 liters/ton steam (Diesel oil 60 liters/ton steam)	**400 liters/hr.**
	Electric Load kW (70%)	**165 kW (220 HP)**
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (235/0.8 =300 KVA)	**235 kW (313HP)**

OFP

OILY FISH PLANTS



Oily Fish Plant

- Fishmeal plant type OFP, oily fish with oil content more than 3% which gives oil content in the fishmeal approx. 10%
  All types of oily and lean fish and fish waste. *(Large fish must be cut into small pieces by pre-breaker)*
- Complete installation, commissioning and startup.
- Capacity 24-160 tons raw material input per 24 hours, which equals 1,000-6,700 kg/hr. Larger plants on special order.
- Rotary Disc Driers come with 3 years warranty* for drier body, gear, bearings and even the motor.

**Southeast Asia only, otherwise 1 year warranty.*

Technical Data :

OFP 24	**Steam consumption at 6 bar. Recommended boiler size 8.5 tons/hr. (max. 10 bar)**	**6 tons/hr.**
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	**60 liters/hr.**
	Electric Load kW (70%)	**112 kW (150HP)**
	Electric installed kW. Note: KVA = kW/power factor for motor 0.8 (160/0.8 = 200 KVA)	**160 kW (213 HP)**
OFP 55	Steam consumption at 6 bar. Recommended boiler (max. 10 bar)	2.0 tons/hr.
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	138 liters/hr.
	Electric Load kW (70%)	136 kW (181 HP)
	Electric installed kW Note : KVA = kW/power factor for motor 0.8 (195/0.8 = 243.75 KVA)	195 kW (260 HP)
OFP 90	**Steam consumption at 6 bar. Recommended boiler (max. 10 bar)**	**3.4 tons/hr.**
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	**240 liters/hr.**
	Electric Load kW (70%)	**182 kW (245 HP)**
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (260/0.8 = 325 KVA)	**260 kW (350 HP)**
OFP 120	Steam consumption at 6 bar. Recommended boiler (max. 10 bar)	5 tons/hr.
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	300 liters/hr.
	Electric Load kW (70%)	192 kW (256 HP)
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (275/0.8 = 343 KVA)	275 kW (366 HP)
OFP 160	**Steam consumption at 6 bar. Recommended boiler size 8.5 tons/hr. (max. 10 bar)**	**6 tons/hr.**
	Fuel consumption – heavy oil 65 liters/ton steam. (Diesel oil 60 liters/ton steam)	**300 liters/hr.**
	Electric Load kW (70%)	**252 kW (336 HP)**
	Electric installed kW Note: KVA = kW/power factor for motor 0.8 (360/0.8 = 450 KVA)	**360 kW (480 HP)**

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