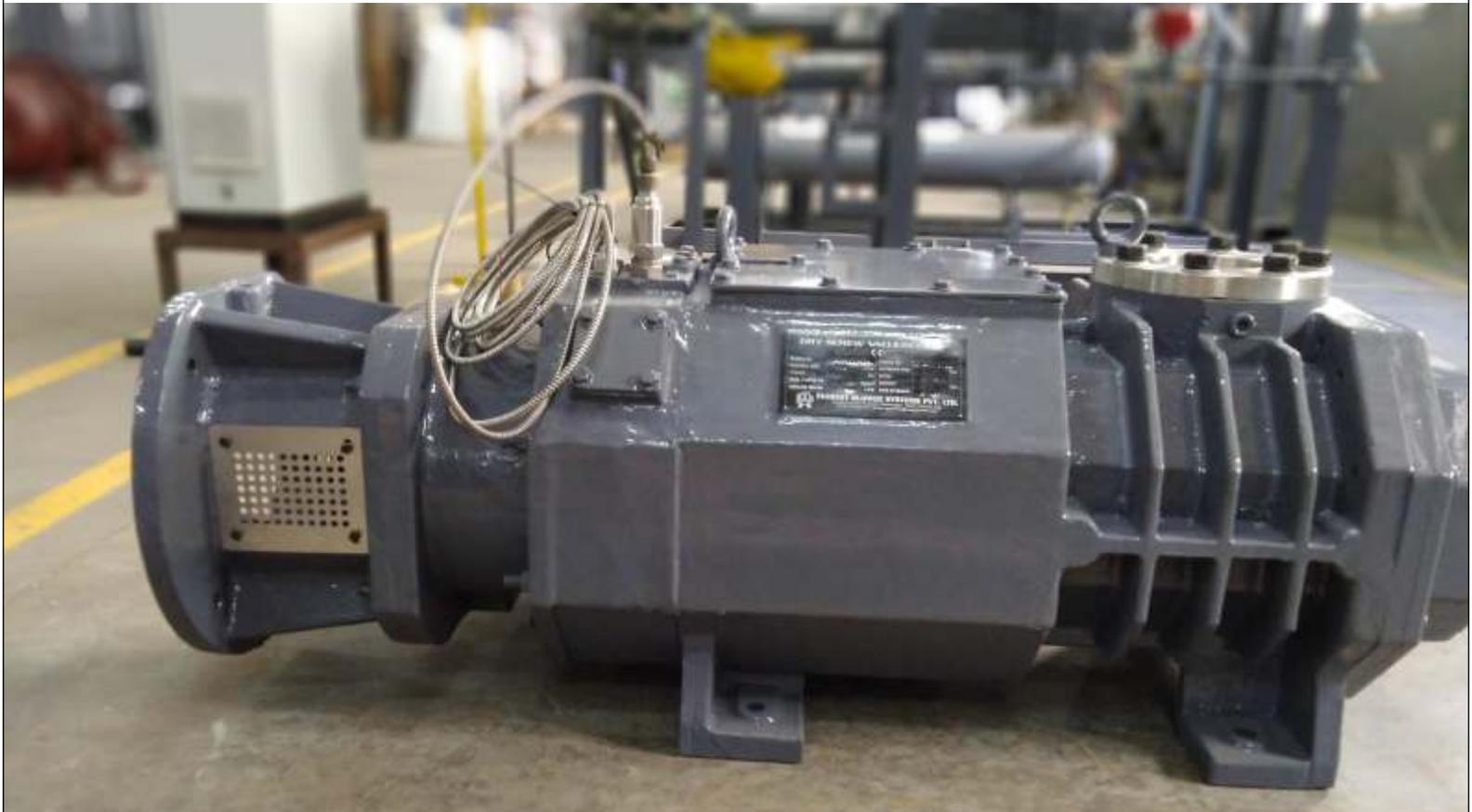




# DRY SCREW VACUUM PUMPS

**Solution for waste water treatment, oil contamination and  
Energy waste problems occurring using conventional vacuum systems  
We recommend for Oil / Water free Dry Screw vacuum system**



**APPLICATION OF DRY SCREW VACUUM PUMPING SYSTEM IN  
SQUALENE DISTILLATION FROM FISH OIL**

## DESCRIPTION

Squalane, a saturated hydrocarbon (C<sub>30</sub>H<sub>62</sub>), is obtained by hydrogenation of squalene, which have been used as cosmetics for moisturizer. At present, squalane is used as cosmetics, medicines and sometimes used with fibers.

Squalene, a material for squalane, is contained shark liver oil, rice, olive, soybean, and so on. Until now it was only obtained from shark liver oil, which can contain a lot of squalene than vegetable oil.

Fish oil contains squalene and alkoxy glycerol, where squalane is extracted from fish oil. Squalene is extracted from crude fish oil using batch distillation where purity is increased throughout the batch.

Dry screw vacuum pump has been used successfully in this process, if we compare with water ring vacuum pump, no water contamination occurs as no sealing fluid require. No use of steam as needs in steam ejectors that makes the process economical and keeps the environment clean.

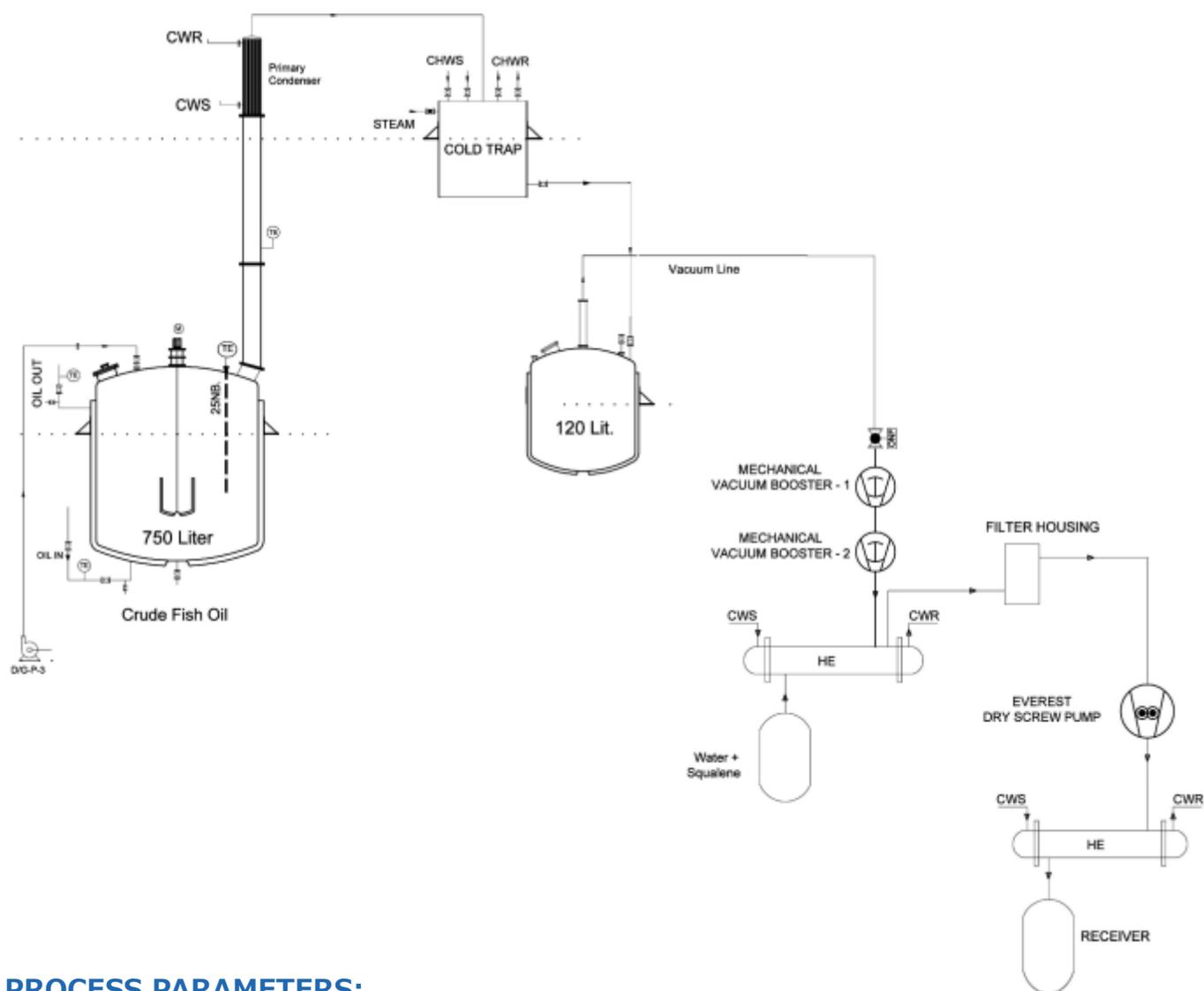
Automatic flushing with suitable solvent is done at regular intervals to make the system maintenance free, hence added values into the system.

## APPLICABLE SYSTEM COMPARISON

BEFORE IMPROVEMENT	AFTER IMPROVEMENT
Rotary Vane Vacuum Pump	Dry Screw Vacuum Pump



## TYPICAL INSTALLATION OF DRY SCREW VACUUM PUMP IN SQUALENE DISTILLATION FROM FISH OIL



### PROCESS PARAMETERS:

Kettle Capacity: 0.8m<sup>3</sup>

Total Loading: 400 kg

Squalene Recovery: 262.45 kg

Residue: 137 kg

Distillation Rate: 13.1 kg/hr

Batch time: 20 hrs

Working Temperature: 110 -180 °C

Working vacuum: 0.2 torr - 0.05 torr

Pump Capacity: 1080. 250m<sup>3</sup>/Hr

Product Loss: 500ml/batch, collected in Post receiver.

Rotary vane vacuum pump replaced with Dry screw vacuum pump.

Specially designed KOP is installed at suction of vacuum pump to protect from

Process contamination.

## APPLICATION

DESCRIPTION	APPLICABLE PLAT	END USER
Squalene distillation from Fish Oil	Fish oil extraction and Distillation Plant	Arbee Biomarine Extracts Pvt. Ltd.

## RESULTS

Before Improvement (Wet Type)	After Improvement (Dry Type)
Oil waste due to contamination with process carryover	No contamination of oil as it works on dry technology.
Operation cost is very high	Saves consumables cost that result in lower operational cost.
Unstable vacuum due to contamination of Pump sealing fluid.	Constant vacuum level as no sealing fluid is required.
Vacuum fluctuation increases process operation cycle	Shorten process cycle due to constant vacuum level through hour process.
Environment contamination due to oil disposal frequently.	Saves environment as no need to replace oil frequently
Mean time between failure (MTBF) is less	MTBF is very much high.
Production loss due to frequent failure of vacuum systems in this process.	No such failure observed with Dry screw vacuum pump, hence no production loss.
	Disired vacuum can be achieved by regulating RPM through VFD



## OPERATION COST COMPARISON

Description		Before Improvement (Rotary vane vacuum pump)	After Improvement (Everest Dry Vacuum Pump)
Basic Specification		Process Cycle : Batch, 20 hrs Feed : 400 Kg crude fish oil Vacuum : 0.2- 0.05 torr Vacuum Pump : Rotary Vane Vacuum Pump	Process Cycle : Batch, 20hrs Feed : 400 Kg crude Fish oil Vacuum : 0.2 - 0.05 torr Vacuum Pump : Dry Screw vacuum Pump
Consumables	Consumption	Oil replacement required in 10 days due to contamination of oil with process carryover, Oil Cost - INR 15600 /month, Oil Filter - INR 1500 /month Exhaust Filter - INR 55000 /yr	Gear oil replacement after 1000 hrs. Cost - INR 1500 /month
	Yearly	INR 260200	INR 18000
Cooling Water	Consumption	None	Flow rate : 1 m <sup>3</sup> /hr
	Yearly		No Cost, Recycle
Power	Consumption	6.7 KW * 20(hr/day) * 250 Days : 33500 KW	6 KW * 20(hr/day) * 250 Days : 30000 KW
	Yearly	INR 167500	INR 150000
Nitrogen	Consumption	None	Flow Rate : 0.3 m <sup>3</sup> /hr Per day cost (20 hrs) : INR 240 N <sub>2</sub> Cost : INR 40 /m <sup>3</sup>
	Yearly		INR 60000
Service and Maintenance	Yearly	INR 50000	INR 40000
Total Cost	Yearly	INR 477700	INR 268000
Direct Cost Saving	Yearly	INR 209700	
Indirect Cost Saving		Pollution and Water Control	



Everest Blower Systems Pvt. Ltd. is an ISO 9001:2015 certified manufacturer of Mechanical Vacuum Boosters, Dry Screw Vacuum Pumps, Industrial Vacuum Systems & Roots Type Mechanical Vapour Recompressors. Everest Group was established in 1980 & is a pioneer in design and manufacturing of Positive Displacement Blowers with over 1,50,000 installation till date. Blowers are manufactured under name and style of Everest Blowers Pvt. Ltd. - Pressure Division of Everest Group. Everest Blower Systems Pvt. Ltd. is a sister concern of Everest Blowers Pvt. Ltd. and designated as Vacuum Division of Everest Group. EBSPL was established in 2007 and is your one stop shop of all solutions related to vacuum.

EBSPL is established in HSIIDC Industrial Area at Bahadurgarh, Haryana, India spread over 40,000 Sq. Ft. and employees over 140 people including 40 graduate engineers. Facilities include in-house design & development, manufacturing, assembly & testing of high end vacuum pumps and systems. This facility also houses a DSIR approved R&D center which has won national award for energy efficient vacuum pumps.



*For Energy Efficient Pumps and Research & Development*



**We don't just offer Blowers, Boosters and Systems we offer SOLUTIONS !!**

Our technology is so flexible, we can custom manufacture **Special Blowers, Vacuum Pumps & Systems** by alloying and cross linking diverse designs to suit individual requirements and import substitutes.

