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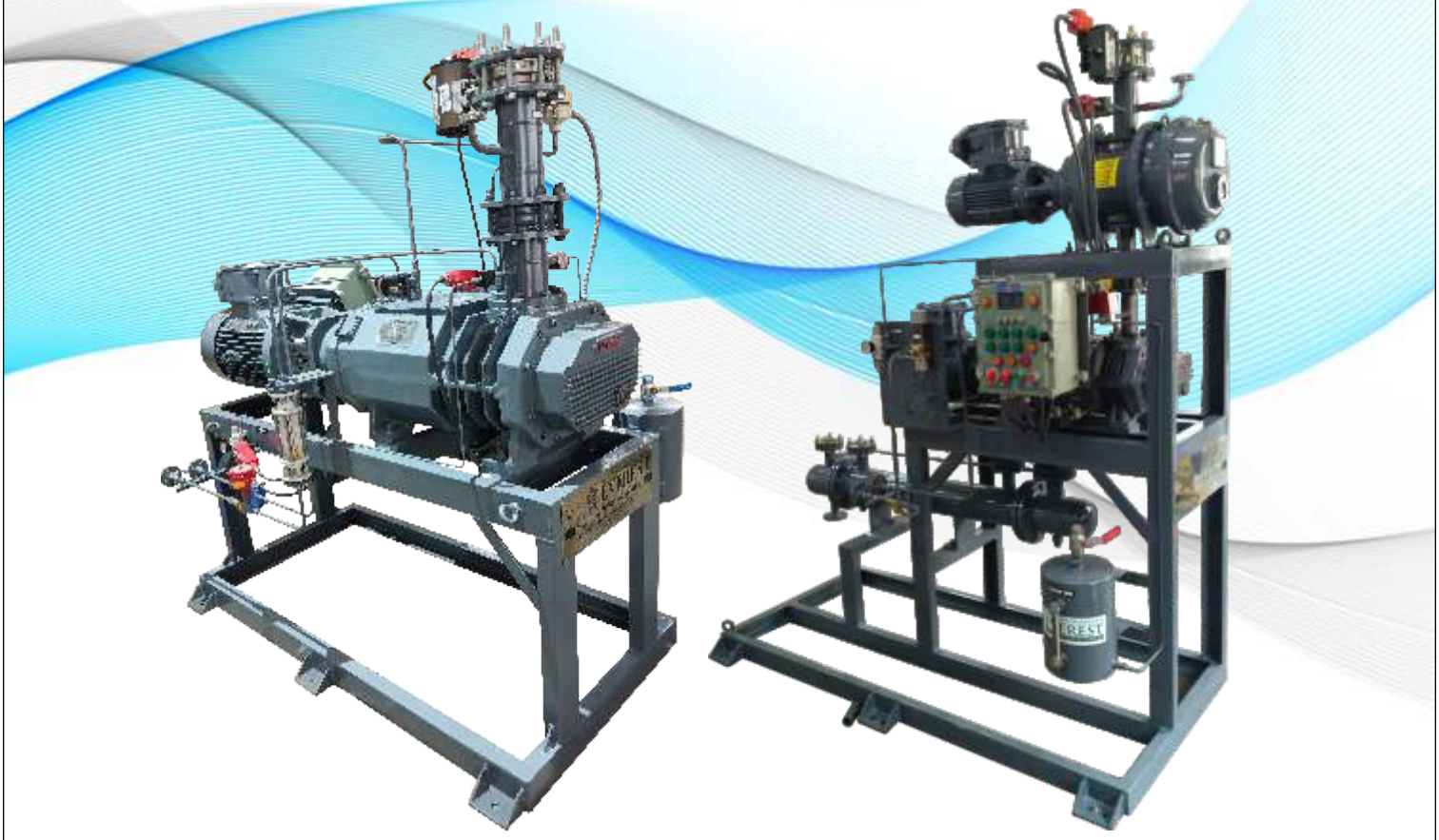
Leaders In Vacuum Technology

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 systems.



APPLICATION OF DRY SCREW VACUUM PUMPING SYSTEM IN CURRENT AND POTENTIAL TRANSFORMER DRYING AND DEGASSING

EVEREST
PRESSURE & VACUUM SYSTEMS

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Description

Drying of transformers:

Need of Drying

The presence of moisture in the transformer, to whatever degree, does actual harm to insulation which is, in fact permanent damage. Drying methods only substantially reduce that deterioration.

Moisture enters the transformer either through external contamination or is generated internally by the oxidation (aging) of insulants. In either case, practically all the water present in the transformer (over 98%) is contained in solid insulants because the cellulose has very strong affinity with the water.

In order to avoid the deterioration of solid insulants, the moisture content should be kept under 2%. If the moisture level is suspected to exceed 2%, the transformer should be dehydrated as a matter of preventive maintenance.

Process:

The whole CT/PT unit is dried in an air heating oven under very high vacuum & strictly controlled conditions.

During the heating process, the vacuum level is kept at approx. 30mbar for safety reasons. If the temperature reaches the setpoint, the current heating is automatically stopped and only vacuum down to <1 mbar is applied. During this period most of the water will evaporate. The length of the heating break is dependent on the transformer size, humidity and insulation weight.

After the break, the vacuum level is automatically brought up to 30mbar again and the current heating is started again. This cycle is repeated as long as the moisture extraction rate is higher than a set point. The moisture extraction rate is continuously monitored to determine the end of the drying process.

Finally, the transformer is heated up to the final drying temperature where the same cycles run again. At the end of the process only fine vacuum is applied.

Once the desired drying quality is reached, the CT/PTs are filled with filtered, de-aerated EHV grade transformer oil under vacuum. The oil filtration plant, the processed oil storage tank & the vacuum drying chambers are all interfaced together to ensure that the CTs/PTs are filled with oil untouched by human hand.

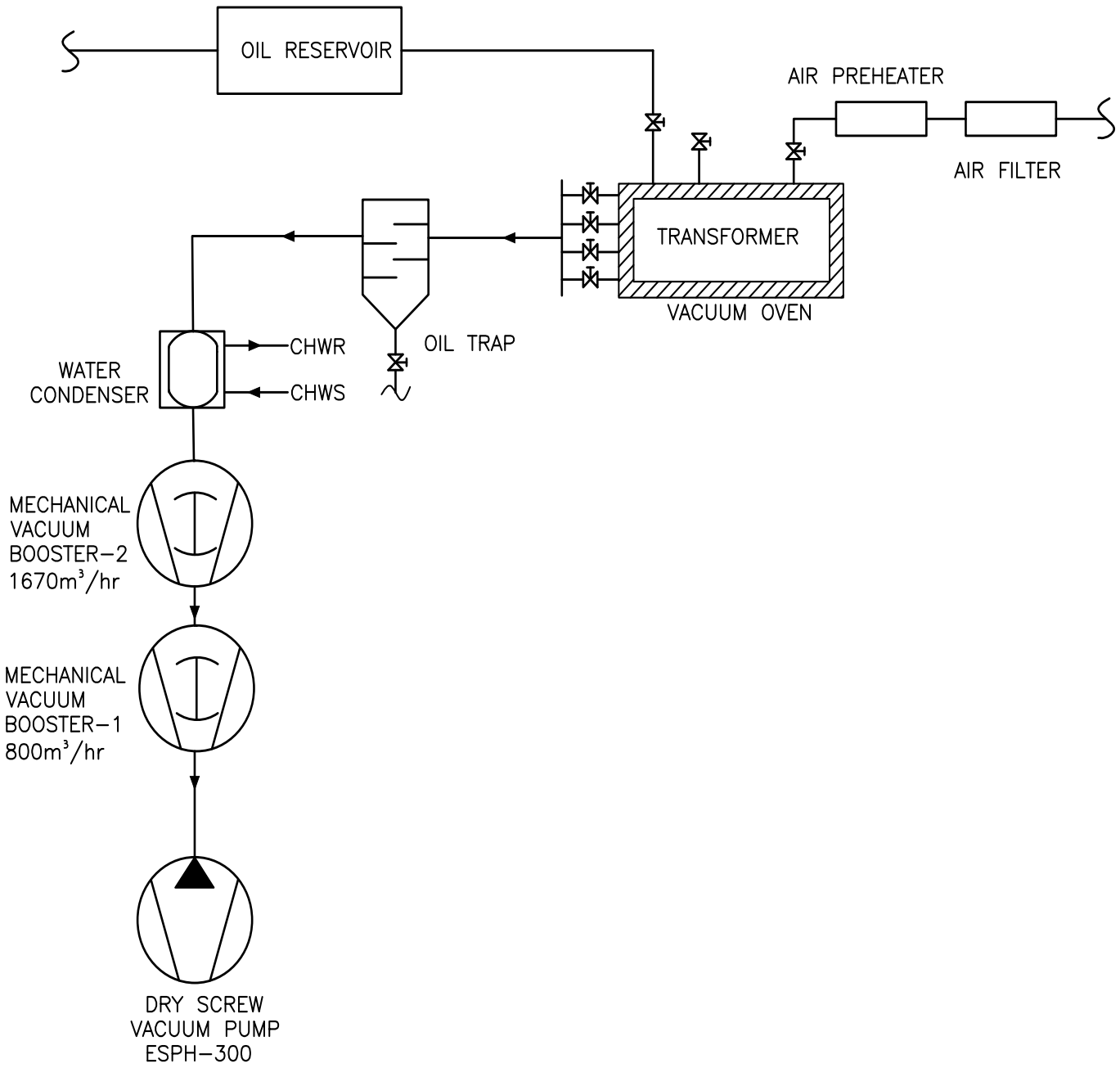
Dry screw vacuum pump has been used successfully in this process, if we compare with Rotary vane vacuum pump, no oil contamination occurs as no sealing fluid is required. No use of steam as needed in steam ejectors that makes the process economical and keeps the environment clean.

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

APPLICABLE SYSTEM COMPARISON

BEFORE IMPROVEMENT	AFTER IMPROVEMENT
- Oil lubricated Piston Pump	- Dry Screw Vacuum Pump

CT/PT DRYING AND DEGASSING PROCESS SET UP



Process Parameters:

CT/PT Transferring to Drying Chamber
Operation time: 25 days.
Working Temperature Range: 70 -130°C
Working vacuum: 50 torr to 0.001 torr
Pump Capacity: 1670.800.300m3/Hr
Water Recovery: Approx. 100liters at initial 5hrs.
Nitrogen Purging in the mid of batch for 4-5hrs in a day.
Oil lubricated Piston pump vacuum pump replaced with Dry screw vacuum pump.
Pre-condenser to vacuum system is important for the condensation of water vapors. Specially designed oil trap is installed at suction of vacuum pump for recovery of oil carryover from the process chamber.

Application

Description	Applicable Plant	End User
CT/PT Drying and Degassing	CT/PT Manufacturing Plant	Mehru Electrical and Mechanical Engineers

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.
Operational cost is 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 throughout 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 system during the process.	No such failure observed with Dry screw vacuum pump, hence no production loss.
	Desired vacuum can be achieved by regulating RPM through VFD.

1.OPERATIONAL COST COMPARISON

Description		Before Improvement(Oil lubricated piston pump)	After Improvement (Everest Dry Vacuum Pump)
Basic Specification		Process Cycle: Batch, 25 days Vacuum: 50-0.001 torr Vacuum Pump: Oil Lubricated Piston Pump, 370 m3/hr	Process Cycle: Batch, 25days Vacuum:50-0.001 torr Vacuum Pump: Dry Screw vacuum Pump, 300m3/hr
Consumables	Consumption	Oil replacement required in 20 days due to contamination of oil with process carryover, approx.11liter=INR5500/month	Gear oil replacement after 1000 hrs., 2.5liter, Cost-INR1500/month
	Yearly	INR66000	INR 18000
Cooling Water	Consumption	None	Flow rate:1 m3/hr
	Yearly		No Cost, Recycle
Power	Consumption	7.5KW *20(hr/day) * 250Days: 37500 KW	6 KW *20(hr/day) *250 Days: 30000 KW
	Yearly	INR375000	INR300000
Service and Maintenance	Yearly	INR20000	INR25000
Total Cost	Yearly	INR461000	INR343000
Direct Cost Saving	Yearly	INR118000	
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.

EVEREST
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