

APPLICATION OF DRY SCREW VACUUM PUMPING SYSTEM IN VACUUM/PRESSURE IMPREGNATION PROCESS



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

DESCRIPTION

Vacuum Pressure Impregnation (VPI) is a process that uses vacuum and pressure to seal porous materials with varnish or resin. The process is used primarily to fill gaps in materials to create a void free insulation in various devices.

Industrial electromechanical equipment is designed for durability to provide reliable function and increased longevity, but age, temperature, and environmental factors can degrade porous metals over time. The process of impregnation seals porous materials with varnish or resin, improving the function and longevity of equipment.

The Vacuum Pressure Impregnation Process:

Basic vacuum pressure impregnation process comprises several steps.

Preheating

Place the equipment in an oven that heats the equipment and allows moisture to evaporate. This helps the resin better penetrate the material.

Dry-Vacuuming

Remove the equipment from the oven and place it into a vacuum chamber, which removes air and any remaining moisture.

Filling

Fill the chamber with resin, coating the part and filling in all the gaps and pores in the piece of equipment.

Wet-Vacuuming

Reduce the vacuum levels and hold it for a set period of times

Pressure

Increase pressure within the chamber using dry air, nitrogen, or other gases. This allows for even deeper penetration of the resin.

Draining

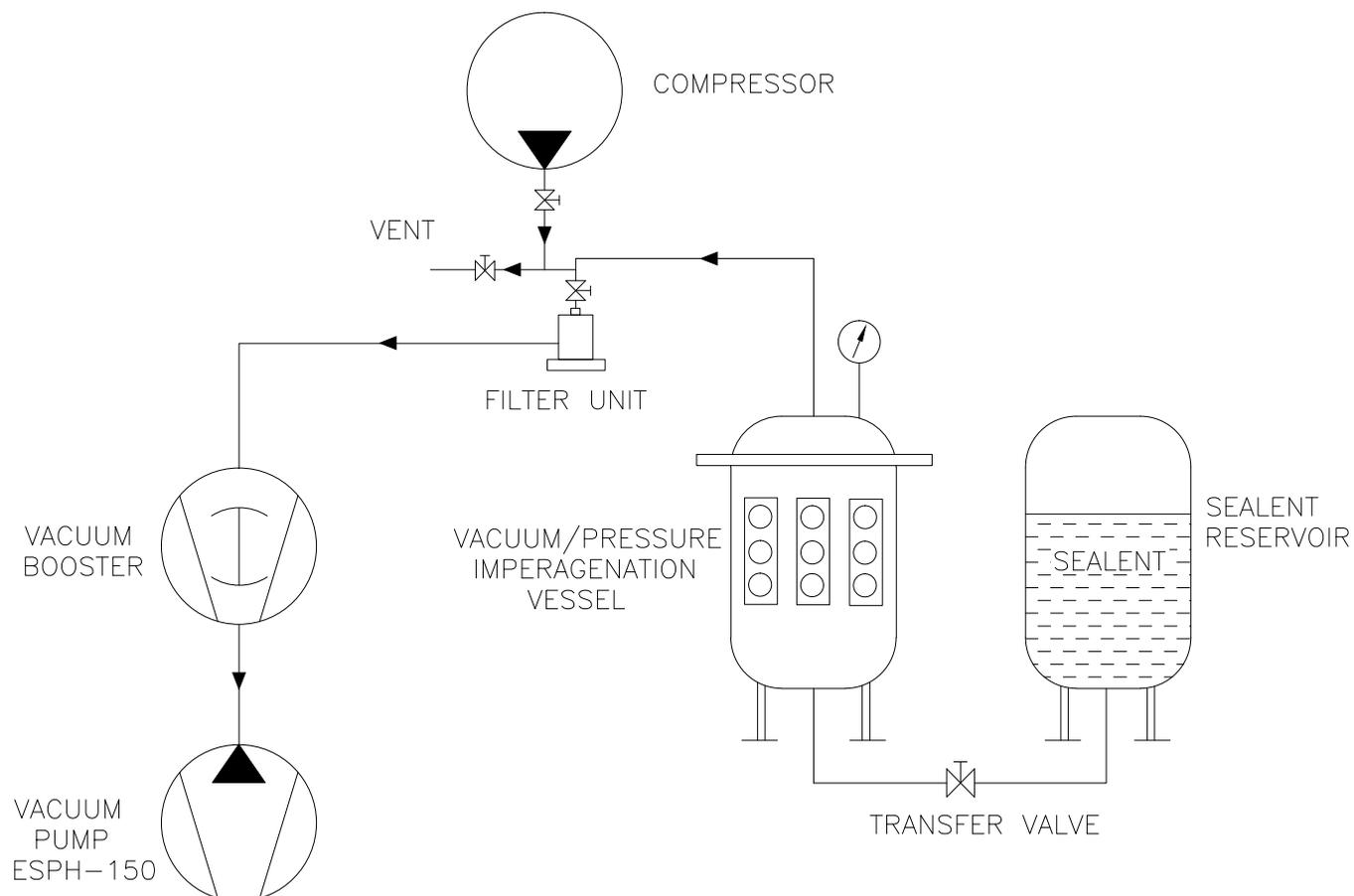
Then vent the pressure, drain the chamber of excess resin, and remove the part.

Curing

Finally, the equipment is placed into an oven to cure the resin. 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.



Typical Installation of DryScrew Vacuum Pump in Vacuum Impregnation Process.



Vacuum/Pressure Impregnation Process

- Process Parameters:
- Kettle Capacity: 10KL
- Air and Moisture Evacuation from Process Chamber
- Process: 20 minutes to 1hr
- Working vacuum: 1mbar
- Pump Capacity: 800.150m³/hr
- Dry Screw vacuum pump with Vacuum Booster.
- Filtration unit is installed at suction of vacuum pump to protect from Sealant resin.

APPLICATION

Description	Applicable Plant	End User
Vacuum/Pressure Impregnation Process	Vacuum Pressure Impregnation	Emco Electrodyne Pvt. Ltd.

RESULTS

Before Improvement (Wet Type)	After Improvement (Dry Type)
Oil waste due to contamination with Process Moisture and sealant traces carryover.	No Contamination of oil as it works on dry technology.
Unstable vacuum due to contamination of Pump sealing fluid.	Constant vacuum level as no sealing fluid is required.
Evacuation time is high	Good ultimate vacuum results in less evacuation time
Vacuum fluctuation increases process evacuation time.	Constant vacuum level throughout process leads the short evacuation time
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.
	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, 1hr Air and Moisture Evacuation Vacuum: 1mbar, 150m3/hr Vacuum Pump: Rotary Vane Vacuum Pump	Process Cycle: Batch, 1hr Air and Moisture Evacuation Vacuum: 1mbar, 150m3/hr Vacuum Pump: Dry Screw vacuum Pump
Consumables	Consumption	Oil replacement required in 30 days Oil Cost - INR4900/month, Oil Filter - INR750/month Exhaust Filter - INR55000/yr	Gear oil replacement after 1000 hrs. Cost -INR 560/month
	Yearly	INR122800	INR6720
Cooling Water	Consumption	None	Flow rate: 1 m3/hr
	Yearly		No Cost, Recycle
Power	Consumption	5.5 KW * 5(hr/day) * 250 Days: 6875KW	3.5 KW * 5(hr/day) * 250 Days:4375 KW
	Yearly	INR68750	INR43750
Service and Maintenance	Yearly	INR15000	INR30000
Total Cost	Yearly	INR 206550	INR80470
Direct Cost Saving	Yearly	INR126080	
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.

