

## **Vacuum Pumps Common Problems and Troubleshooting**

Vacuum Pumps and Systems are one of the widely used equipment in process plants. It is very important to correctly size and select the vacuum pump as it is to lay down the right specifications. Understanding the fundamentals of vacuum as well as the system and its integration would enable the operators to deal with the day to day problems, which are inevitable.

Some of the common problems faced in vacuum systems could be on account of the following major factors:

- ⌚ **Process conditions & Variations.**
- ⌚ **Variation in Utility Specifications.**
- ⌚ **Equipment Malfunctioning.**

For proper functioning of Vacuum Systems various parameters are required to be defined before design/selection of the Vacuum Pumps and Systems. The same are as following:

- ⌚ Suction loads (Condensable + Non Condensable)
- ⌚ Inlet Temperature. (At the suction of the Pump/System)
- ⌚ System Leakages rate.
- ⌚ Composition of Suction Gases and its Nature.

Some of the most commonly observed problems in different kinds of vacuum pumps along with suitable trouble-shooting guidelines.

## Everest Mechanical Vacuum Boosters :

Symptom	Probable Cause	Remedy
<p>1.) System operating pressure not attainable.</p>	<p>Faulty equipment or booster not attainable. Pumping system malfunctioning.</p> <p>Oil level very low or dirty retained oil.</p> <p>Process equipment contaminated.</p>	<p>Drain pump &amp; replenish.</p> <p>Clean equipment with alcohol, ether or acetone.</p> <p>Pump down with mechanical pump overnight for cleaning low vapor pressure contamination.</p>
<p>2.) Booster pump starts after short time delay regardless of pressure</p>	<p>Pressure switch malfunction(loose or broken electrode, connecting wire or frozen relay contacts)</p>	<p>Repair or replace</p>
<p>3.) Excessive power consumption of booster</p>	<p>Differential pressure across the suction and discharge openings too high</p> <p>Impellers rubbing</p>	<p>Check gauge readings across the suction and discharge ends and correct system to maintain differential pressure within safe limits.</p> <p>Check the impellers for any hot spots/rubbing marks. This operation requires skill and patience. If in doubt, contact “Everest Service Team <a href="mailto:service.ebs@everestblowers.com">service.ebs@everestblowers.com</a>”</p>

<p>4.) Overheating of bearings and gear/booster</p>	<p>Inadequate lubrication</p> <p>Differential pressure across the suction and discharge openings too high</p> <p>Coupling misalignment Too much oil in gear case Internal contact</p>	<p>Check for oil level &amp; replace dirty oil Check gauge readings across the suction and discharge ends.</p> <p>Check alignment and realign Correct oil level Reset clearances</p>
<p>5.) Vibration</p>	<p>Drive misalignment Impeller rubbing (Distant knocking sound would be observed)</p> <p>Worn gears/bearings</p> <p>Loose pulley/coupling</p>	<p>Check alignment Check for hot points. Recheck booster alignment and mounting. Recheck impeller timing Check and replace the bearings/gears</p> <p>Check if pulley/coupling is loose on shaft. Check key</p>
<p>6.) Booster jams after running for a short period</p>	<p>Insufficient end clearances (Rotors disturbed axially and rub side plates)</p>	<p>Correct end clearances</p>
<p>7.) Booster makes heavy knocking sound on running</p>	<p>Unit out of time Distortion due to improper mounting or pipe strains</p> <p>Differential pressure across the suction and discharge openings too high</p> <p>Worn bearings/gears</p>	<p>Retime impellers Check mounting alignment and relieve pipe strains.</p> <p>Check gauge readings across the suction and discharge ends.</p> <p>Check and replace the bearings/gears.</p>
<p>8.) Traces of oil in booster casing</p>	<p>Oil seal leakage</p>	<p>Check and replace oil seals</p>

**Note:-**

Replace Oil after every 600 hrs of Operation  
Recommended Oil – Gear Oil Shell Omala S2 GL 150

## Conclusion:-

A step-by-step procedure, adopted in troubleshooting vacuum pump and / or system helps in easily locating the problem and in finding appropriate solution. In general, the first step is to compare the original design conditions with the existing conditions. Any change in design conditions including utilities may have a direct impact on the performance of the unit. Once it is ascertained that external factors are not responsible for malfunctioning of vacuum system, trouble shooting of equipment should be done.