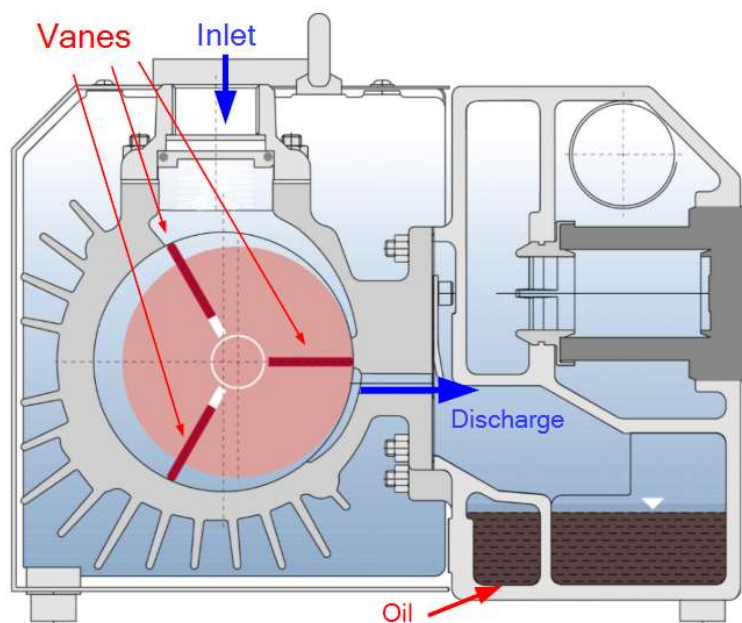


September 2019

I have started to publish the past “Learning Vacuum with the New Guy” emails as articles using LinkedIn as a platform, to archive and document these knowledges. Please feel free to connect with me if you are finding value in these emails. www.linkedin.com/in/tie-duan-11817bb1. Also, let me know if you don’t want to receive these emails anymore, it won’t hurt my feelings, I promise.

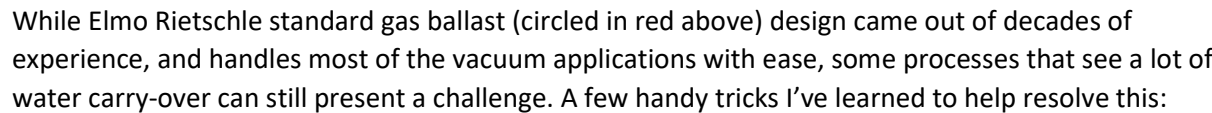
In addition to Nash liquid ring vacuum pumps, we also work closely with a few other vacuum technologies from Elmo Rietschle, namely rotary vane pumps, claw pumps, and side channel regen blowers. These pumps see different applications than Nash LRVP’s, and have their own set of technical knowledge that’s often not commonly known. One topic that came up a few times recently is the gas ballast in a rotary vane vacuum pump.

Volumetric reduction is the principle behind a rotary vane’s operation. Similar to a Nash LRVP, inside the rotary vane pump’s cylindrical casing a rotor is positioned eccentrically so it almost touches the cylinder. Vanes, or rotor blades, are positioned inside the rotor slots. When the rotor starts to turn, the centrifugal force throws out the vanes and they slide against the internal surface of the cylinder. A cell is formed between the two vanes and its volume is constantly changing as the rotor is turning counterclockwise in below diagram. This volumetric change of each cell pulls vacuum at the inlet then compresses and discharges the oil-gas mixture into a de-oiling chamber, where oil is separated mechanically from the gas, then separated further through fine filter elements.



Some applications of these rotary vane pumps expose them to water being pulled into the pump. When water mixes with the oil inside the pump, a potentially damaging emulsion can be created, and shorten the life span of a pump. Elmo Rietschle oil lubricated rotary vane pump comes equipped with a gas ballast in the compression zone of the pump, for the purpose of allowing water vapor to escape. I have heard that some of our competitors have called the function of their gas ballast “black magic”, because

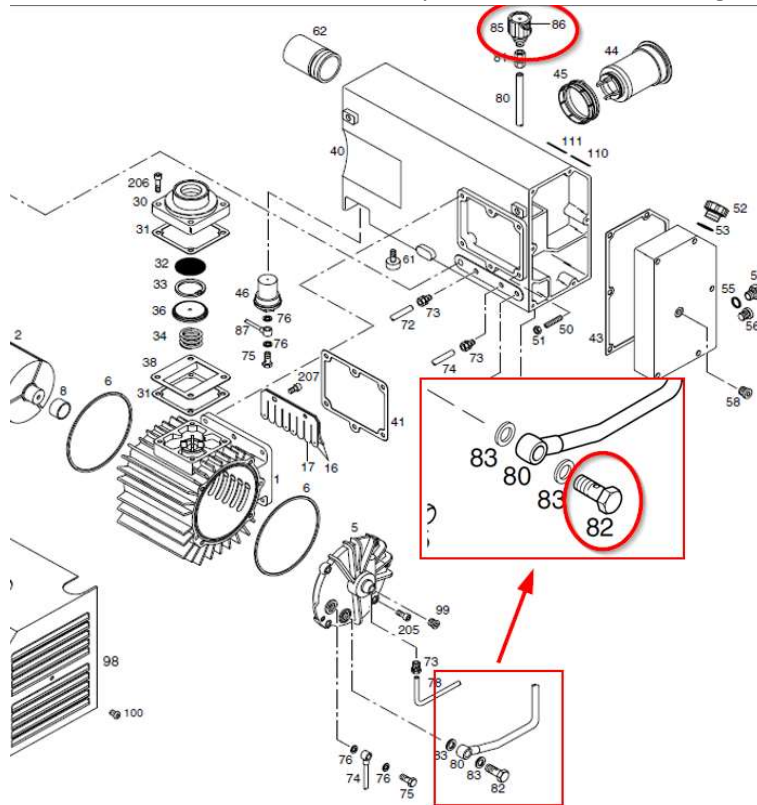
Diagram of the rear panel of the generator with labels U, H, D, M, N, O, Q, K, I, T, L. A red circle highlights the area around the H and D labels. An inset shows a cross-section of the oil level with 'max.' and 'min.' markings.



- Change oil to a synthetic grade, so to avoid creating emulsion from mixing with water.
- Install an isolation valve between the pump inlet and the process, then install a small bleed ball valve on a tee fitting between the pump inlet and the isolation valve. After running the pump on the process, close the isolation valve then open the small bleed ball valve to atmosphere, and run the pump for 20 minutes or so, to help boil off any water that has condensed in the oil. Under vacuum water will have a lower boiling temperature than 212F.
- Increase the amount of gas ballast by changing out the banjo bolt/orifice control in the ballast line. Below is an exploded view of an Elmo Rietschle VC rotary vane pump. The standard supplied banjo bolt (item # 82), which has a control orifice inside the bolt, can be replaced with a different banjo bolt that allows more ballast air volume to pass from the valve to the pump.

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Filter disc, item #86, can also be replaced to reduce blocking ballast air flow.



I hope you find value in this information. We also work with Alfa Laval heat exchangers, so I plan to share some knowledge on heat transfer systems in future emails as well.

Thanks and have a great week!