

Tip of the month/No. 18

Extending intervals between oil changes in rotary vane pumps



Question: I am a user of an analytical measurement instrument, a gas chromatograph with mass spectrometric detection (GC-MS). All I want is to obtain the analysis data reliably and without any fuss. I would like to spend as little time as possible thinking about the internal workings of the equipment, especially the vacuum components. What hampers me most during my everyday work are the short maintenance intervals of the rotary vane pump in the instrument. Is there such a thing as a sturdy rotary vane pump with longer intervals between oil changes?

Answer: As a user of a rotary vane pump, you yourself are able to proactively contribute towards extending intervals between maintenance. This can be done by regularly checking the operating environment of the pump (e.g. ensuring adequate ventilation) or the pump itself. Of prime importance are the oil level and using the right operating fluid for your particular purpose.

Background: Allow us to explain what is important for ensuring steady, long-term operation of a pump in analytical applications. We will take the two-stage rotary vane pumps from our new DuoLine product family as an example.

To optimize the service life of a rotary vane pump, several parameters need to be monitored. These include oil age, oil level, ambient temperature and process gases. As the manufacturer, there are certain parameters that play a role in shortening intervals between oil changes that we are unable, however, to monitor or eliminate.



The reliable, two-stage DuoLine rotary vane pumps from Pfeiffer Vacuum



Advantages of the new DuoLine pump series for extending the service life

Slowing down the aging of oil

The intervals between maintenance in a rotary vane pump depend to a large degree on the aging of the oil. If the temperature of the oil is too high, the oil will age more quickly, with a resulting loss of lubricating and sealing properties in the pump. Maintenance will be required in this case. For this reason, we have thermally optimized the pumps, and fitted them with an efficient system which keeps the oil temperature low, and so extends the interval between maintenance. The temperature must not be too low, however, as condensation should not take place in the pump.



Figure 2: The Duo 3 with an oil mist filter and oil return unit

Closed oil circuit ensures an adequate oil level

A further reason for premature maintenance is the oil level in the pump. Through constantly pumping gases at various intake pressures, oil escapes from the pump. If too little operating fluid is used, this results in inadequate lubrication. In extreme cases, the pump may break down as a result. If this occurs, expensive maintenance will be necessary, resulting in outages of the whole instrument. To prevent this risk, we recommend using an oil mist filter with an oil return system.

On the one hand, the oil mist filter ensures that neither the pump compartment inside the analysis equipment nor the ambient air become contaminated with oil mist. On the other hand, returning oil from the oil mist filter to the pump helps to extend intervals between maintenance. An integrated oil return system ensures that there is always enough operating fluid in the pump for lubricating and sealing purposes and also guarantees reliable operation. A condition for this is that the oil has not yet exceeded its service life and is not contaminated with aggressive process gases.

All pumps from the new DuoLine product family are supplied with a ready-integrated connection for an oil return system. This provides easy adaptation to a variety of different oil mist filters from our product portfolio.

The rotary vane pumps in our new pump series were specially designed for use in analysis equipment. Key aspects in the design are not only the vacuum performance but also easy integration of the pump into existing analysis equipment as well as optimizing the service life of the pump to the particular application.

With the new modular system, we have succeeded in designing small compact pumps in the pumping speed range from 1.6, 3, 6 and 11 m³/h.

By optimizing this pump series, it has also been possible to enhance process reliability. Read more about this in Tip of the Month No. 9 entitled, "Using built-in rotary vane pumps".

Do you have a question yourself which you would like us to answer on this page as a new tip of the month? If so, please let us know. (info@pfeiffer-vacuum.de)

We would be happy to assist you in optimizing your vacuum solutions for specific applications – go ahead and ask us:

<http://www.pfeiffer-vacuum.com/contact>