

LOSS OF OIL FROM OIL-SEALED ROTARY VANE PUMPS

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Let us consider a typical laboratory system where a 1 litre volume flask is being evacuated from atmospheric pressure every hour.

- At a temperature of 295 K the mass of air transferred/pumped in each cycle is ~ 1.2 g
- A typical 'small' Oil sealed rotary vane pump has an oil charge of approximately 1 litre. With unit density this is a mass of $\sim 1,000$ g

If 25% of the mass of oil, compared to the mass of the pumped air, is carried over (i.e. transferred with the pumped air) during each flask evacuation then

- During each cycle the oil loss ~ 0.3 g

This suggests that in ~ 3300 cycles all the oil will be lost from the pump. At a rate of one cycle per hour this occurs in approximately 4 to 5 months. (Note that this could be confirmed by checking how often the oil in the Oil sealed rotary vane pump needs to be re-filled) and or we can surmise that in 3 months we would expect > 600 g of oil to be lost from the pump.

This will result in a layer of aromatic (smelly) oil of 0.1 mm thickness coating an area of $60,000$ cm² of the laboratory.

As a comparison operating a pump at ultimate pressure (< 1 Pa) the mass flow of air is < 0.001 g/h



When using oil sealed rotary vane pumps we also need to consider

- The cost (financial and environmental) of the safe disposal of oil
- The potential contamination of a laboratory system from the back-migration of oil in a oil sealed rotary vane pump
- The required maintenance such as oil re-filling and seals replacement
- Oil contamination versus time
- The required configuration and equipment to prevent oil loss
- The potential for contamination of a sterile laboratory environment by any oil being present within it
- The risk of the oil sealed rotary vane pump becoming a potential source of ignition if it is operated below the minimum level of oil



nXDS scroll pumps are completely oil-free, hermetically sealed.

They have no oil in the gas pathway so there is no potential contamination of the process nor of the laboratory environment.

They can be configured to pump a wide range of laboratory applications and maintenance intervention is 2.5 years or more



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