

# 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  $\sim 1.2$  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  $\sim 0.3$  g

This suggests that in  $\sim 3,300$  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  $60,000$  cm<sup>2</sup> 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 an 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
- An exhaust mist filter with oil return capability can be used but is not always practicable



**nXDS scroll pumps** are completely oil-free and 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.

Publication Number: 3601.2084.01

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