

Vacuum Pump Guide



JAVAC
Vacuum & Refrigeration
Process Technology

There are three types of pumps which are predominantly used in modern laboratories today. These are the piston type pump, diaphragm pump, and oil sealed rotary vane pump. All have specific applications where they operate at their best, and are most suitable. An understanding of why each fits best into a particular application, goes a long way towards proficiency in pump selection.

Piston style Pumps, in particular the “Wobble Plate” pumps, operate in the rough vacuum area, ie pressures from atmosphere to 10mbar. They are available in sizes from 9L/min to 168L/min. They are not corrosion resistant so they can only be used on benign, or aqueous based vapours, which will not damage the pump. Some models feature vacuum/pressure gauges, regulating valves, and inlet/exhaust filters. Unless totally overloaded, these pumps pump vapours very well and are oil free and low maintenance.



Diaphragm Pumps also operate in the rough vacuum region, although, with their superior head sealing, do have lower ultimate pressures of down to 2mbar. They are available with full PTFE/PVDF construction offering the advantage that they can be used in severe corrosive environments. In addition they pump vapour loads well and quite often do not require any form of inlet trapping. They are available in sizes from 10L/min through to 138L/min and due to the fact that they are oil free, they are virtually maintenance free.



Oil Sealed Rotary Vane Pumps have been the mainstay of the Laboratory for many years. A lot of the applications which they were once predominantly used in, now have been taken over by the Wobble Plate and Diaphragm pumps, which have the superior characteristics of being oil and maintenance free.

The advantage the rotary vane offers is that it is capable of producing high vacuum to 5×10^{-4} mbar. Being oil lubricated, the oil can suffer degradation due to the different types of vapours that pass through the pump. Oil degradation can cause wear and eventual maintenance problems. Rotary vane pumps therefore have to have adequate inlet trapping when pumping condensable vapours to ensure that the oil remains clean.



For more information refer to Javac's “Golden Rules For The Use of Rotary Vane Pumps In The Laboratory” note.

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