PentaVac 5

UHV Diffusion Pump Liquid & Electrical Corrosion Suppressor

PENTAVAC 5 is a superior synthetic diffusion pump fluid, based on polyphenylether, for use where ultra high vacuum is required. The key features of this product are:

- Ultra High Vacuum Capability
- Low Backstreaming
- Thermal & Oxidative Stability
- Radiation Resistance
- Polyphenylether Based

Ultra High Vacuum Capability

The performance of a vacuum pump is generally limited by the volatility of the fluid used in the diffusion pump. PentaVac 5 has a theoretical vapor pressure of 4 x 10^{10} torr at 25ºC, based on extrapolation from accurately measured vapor pressures at higher temperatures. This is shown in the graph on the next page.

The exceptionally low vapor pressure of PentaVac 5 ensures that ultra high vacuum, in the 10^{10} torr range, can be obtained in well designed systems without the requirement for liquid nitrogen traps. Thus, the ultimate vacuum obtainable is more dependent on system design and cleanliness than on the vapor pressure of the diffusion pump liquid.

Low Backstreaming

The low vapor pressure of PentaVac 5 ensures very low backstreaming rates, resulting in less contamination within vacuum chambers. Longer operating periods between routine cleaning and less contamination of working samples are results of this low backstreaming.

Thermal & Oxidative Stability

In thermal tests, PentaVac 5 remains stable at temperatures of 450ºC. This temperature is substantially higher than any fluid is likely to encounter within a diffusion pump. In fact, a normal diffusion pump is unlikely to run hotter than 200º C at any time.

The superior oxidative stability of PentaVac 5 is demonstrated by its resistance to increase viscosity following standard oxidation tests. In these tests, air is allowed into an operating diffusion pump three times per hour over 700 hours. Not only did the fluid continue to function well, but the jet assemblies remained clean.

This stability, in conjunction with the low backstreaming rates also greatly reduces the possibility of formation of insulating films on surfaces in the vacuum system. This is a great advantage for sensitive instruments and materials being processed.

Radiation Resistance

Polyphenylether, upon which PentaVac 5 is based, is among the most radiation resistant fluids available, showing resistance of up to 10^{10} ergs/gram of carbon.

PentaVac 5 Typical Properties

Vapor Pressure @ 25º C	4 x 10^{10} torr
Boiling Point @ 0.5 torr	275º C
Viscosity @ 40º C	279.3 cst
Viscosity @ 100º C	12.64 cst
Relative Density @ 20º C	1.204

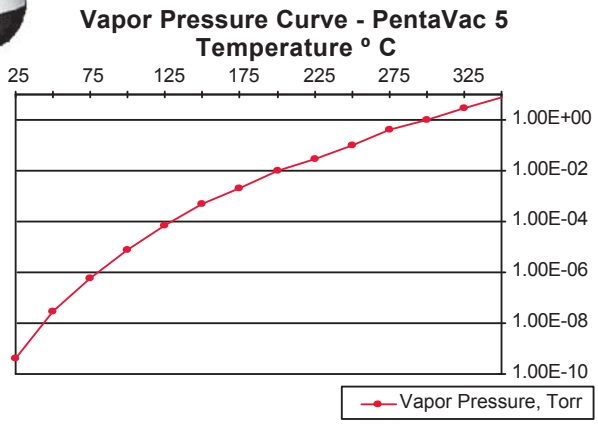
Applications

PentaVac 5 is ideal for use in a variety of applications wherever you require the cleanest high vacuum conditions. These applications include:

- Mass Spectrometry
- Electron Microscopy
- Thin Film Sputtering
- Surface Studies
- Optical Coatings
- Space Studies
- Leak Detection
- Particle Accelerators
- Radioactive Material Handling
- Corrosion Prevention

The Simple Solution

In fact, wherever your requirements are for a simple solution to a difficult diffusion pump problem, PentaVac 5 is the answer.



"Polyphenyl Ethers (PPEs) first found commercial applications as a high temperature lubricants and corrosion blockers in the engine turbines of the SR-71 spy aircraft, where operating temperatures of 316º C (600º F) would oxidize or decompose other hydrocarbon molecules. At the other extreme, they can remain in liquid form in temperatures below 0º C, where rigid molecules would pack tightly and become a solid. Their consistent performance across wide temperature ranges opened up such applications as lubricants on space satellites and as fluids in vacuum diffusion pumps–where they were selected for very low vapor pressures in the range of 4 x 10^{10} torr.

Anti-Corrosion Performance in Electrical Application

On the pins of electronic connectors, where they are used as lubricants and corrosion blockers, their lifetime is between 40 and 50 years. Applied to gold, tin/lead and other electronic metals, PPEs virtually eliminate metal wear and prevent fretting or galvanic erosion by capturing of blocking corrosive particles on the connector surface of the the atmosphere."

(excerpted from *Polyphenyl Ethers: Old Material Has New Benefits for Photonics* by Dr. David S Stone and Manuel E. Joaquim, Photonics Spectra, April 2002, pp 90-92)

See page 34 for price information.