

# Gemini<sup>®</sup> High Level PFPE Vacuum Pump Oils

## Ultra High Vacuum VPO-13X

### Introduction:

High Level PFPE VPO-13X series are ultra high vacuum pump oils, they are high level vacuum pump oils for high demanding vacuum systems.

VPO-13X have been specially distilled to remove the more volatile, lighter molecules that might evaporate easily, also eliminated metals and reactive compounds or large particles. They have merits of both super high molecular weight and ultra low vapor pressure. Those traits enable VPO-13X to perfectly serve in ultra high vacuum, clean room, high radioactive and other significant strategic areas.

### VPO-13X Introduction:

VPO-13X series are the precious pearls of PFPE vacuum pump oils, they are K type PFPE fluids based on HFPO. They have wide working temperatures and ultra low vapor pressures, their chemically inert properties are the best in all types of PFPE like K, Y, Z.

### Typical Properties:

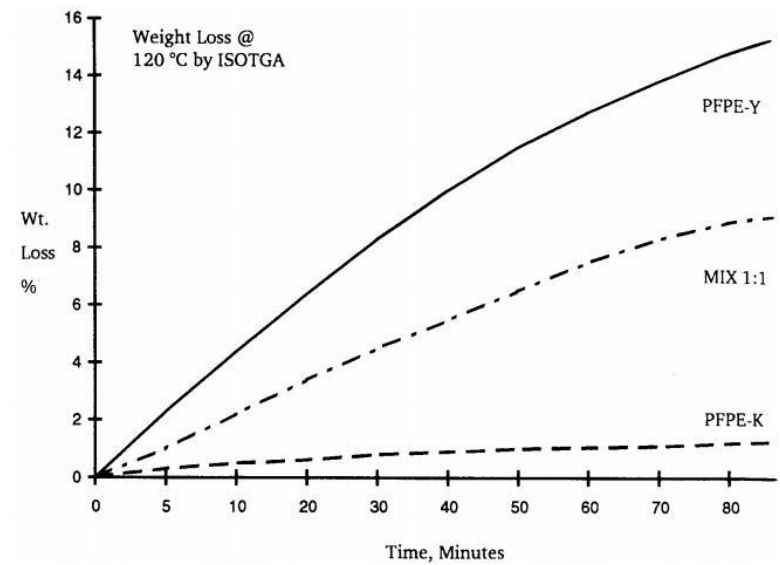
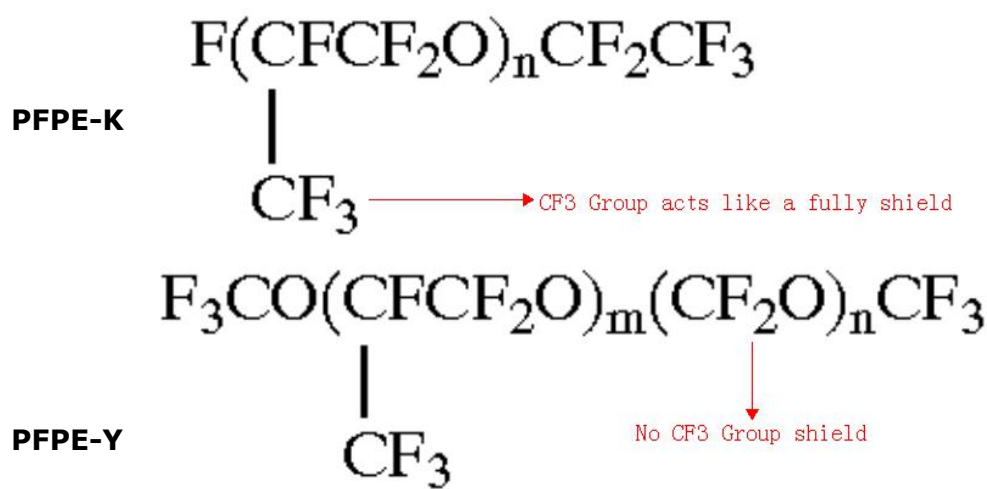
	Method	Conditions	Units	VPO-1305	VPO-1326	VPO-1335
Average Molecular Weight	NMR			5600	11000	15000
Vapor Pressure	Knudsen	20°C	torr	$5 \times 10^{-12}$	$3 \times 10^{-14}$	$4 \times 10^{-15}$
		50°C		$2 \times 10^{-10}$	$2 \times 10^{-12}$	$3 \times 10^{-13}$
		100°C		$2 \times 10^{-8}$	$1 \times 10^{-9}$	$2 \times 10^{-10}$
		200°C		$1 \times 10^{-5}$	$2 \times 10^{-6}$	$3 \times 10^{-7}$
Kinematic Viscosity	ASTM D445	20°C	mm <sup>2</sup> /s (cSt)	520	2600	3500
		40°C		160	750	1000
		100°C		18	65	88
		200°C		3	8.8	11.4
Pour Point	ASTM D97		°C	-36	-15	-5
Volatility at 22 hr	ASTM D2595	204°C	%	3	0.3	0.2
		260°C		7	0.6	0.5
Density		0°C	g/ml	1.94	1.95	1.95
		100°C		1.76	1.78	1.78

**K-Y Structure and Features Comparison:**

K type PFPE is fully shielding structured that has no -O-CF2-O- links, this enables superior chemical inertness. K type PFPE vacuum pump oils deliver outstanding performance in the presence of Lewis Acids and outperform Y type PFPE that has -O-CF2-O- links in extreme environments. So, in semiconductor manufacturing Lewis Acids infliction, and in all sorts of chemical gases and liquids environments, K type PFPE vacuum pump oils are the perfect choice.

The table on the left below indicates K type fully shielding structure with no -O-CF2-O- links and Y type no shielding structure that has -O-CF2-O- links. Without shielding protection, PFPE structure will be easily attacked by chemicals and depolymerize.

The Table on the right below indicates Relative Weight Loss of K type and Y type PFPE Fluids in presence of Lewis Acids. ( 15% wt AlCl3, 120°C )



**VPO-13X Applications:**

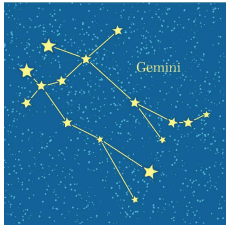
Ultra High vacuum pump oils

Lasers, spectrum analysis, waveguide, high power optical fibers and other scientific discoveries

**Attentions:**

- . Do not mix oils of different types. Thoroughly remove old oils before applying. We suggest use our PFS-190 as PFPE oils cleaning agent.
- . During processing, wear protection clothes, be careful of eye, skin contact.
- . Keep the container sealed and store in cool, well ventilated locations.

**Packaging/Transport:** 5Kg,20Kg,50Kg plastic container. Not classified as dangerous in the meaning of transport regulations.



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