



# Design Engineer's Guide to Uniflor™ PFPE Lubricants

The most complete line of PFPE  
lubricants for extreme environments







# UNIFLOR™ PFPE LUBRICANTS

THE MOST INERT, THERMOOXIDATIVELY STABLE LUBRICANTS

## What Are PFPE's?

Perfluoropolyether's (PFPEs) are fluorinated synthetic fluids that are well suited for the demanding environments or applications where chemical interaction between materials may pose an issue. While all PFPEs are composed of carbon, fluorine, and oxygen, the molecular structure of each PFPE fluid varies depending on the base materials and polymerization processes used by PFPE manufacturers. These structural differences will effect the fluid's pour point, volatility, viscosity, and viscosity index — all critical factors in lubricant formulation. Some PFPE oils, for example, have a pour point of only -20°C, while others offer pour points as low as -90°C. Similarly, some PFPE oils offer better wear resistance and vapor pressure properties than others.

## Why Nye?

Nye's Uniflor™ PFPEs are the most thermooxidatively stable lubricants available today. Unlike any other brand of fluorinated lubricants, the Uniflor™ line utilizes every available PFPE oil to create a diverse product line and achieve optimal performance under a variety of operating conditions. Uniflor™ products can withstand temperatures from -90°C to +250°C, and even higher excursions.

## Advantages of Uniflor™

- Wide temperature performance
- Excellent oxidative and thermal stability
- Low volatility and vapor pressure
- Nonflammable and chemically inert
- Excellent plastic and elastomer compatibility
- Resistant to aggressive chemicals and solvents

### Automotive

To produce more powerful and efficient vehicles, automotive lubricants must be compatible with a range of materials while withstanding high temperatures. Uniflor™ lubricants are compatible with most plastics and elastomers and were designed to withstand harsh chemicals like brake fluid, and exhaust fumes. PFPE's high temperature stability helps protect against wear and arcing conditions to extend the service life.

- Anti-Lock Brake Bearings & Pistons
- EGR Valves
- Sensors
- Switches



### Medical

Medical lubricants are often selected to prevent wear and/or seal applications against fluids and debris that might adversely affect patients. Uniflor™ lubricants resist chemicals to protect your components and minimize risk. Additionally, their wide temperature capabilities make Uniflor™ the ideal choice for motorized, high temperature applications. For medical systems where proximity to patients causes concern for bio compatibility, our NyeMed® product line includes PFPE formulations that have been tested and certified.

- Lead Screws
- O-rings
- Bearings
- Bushings



### Defense

Thrust vectoring allows jets to direct engine power for maximum maneuverability, short take offs and landings. The actuator physically redirects jet propulsion, requiring a lubricant that survives the engine's hot exhaust. Uniflor™ greases are well suited for defense applications as they resist hydrocarbon fuel and liquid oxygen.

- F-15 and F-16 Engine Thrust Actuators
- Hydraulic Systems
- Oxygen Systems
- Navigational Instruments



### Aviation

Primary flight controls need to activate properly as desired by the pilot when the aircraft is in flight. Lubricating airframe components with a grease designed for high speed, wide temperature conditions will ensure proper long-term function and maintenance-free operation of these critical flight systems. Likewise, engine components, including the lubricant, must withstand a wide range of temperatures, be compatible with aviation fuels and resist corrosive fuel system vapors.

- Flight Controls
- Fuel Systems
- Electrical Systems
- Cabin Mechanisms



## Formulated for Specific Applications.

Each line of Uniflor™ oil and grease has been custom-designed for your application. Nye offers economical Uniflor™ formulations for gears, slides and bearings. Another Uniflor™ series is engineered for high-speed, high-temperature bearings. Wide-temperature, ultra-viscous Uniflor™ greases are available for heavy-duty industrial bearings. These products also serve as sealants for vacuum applications.

Some Uniflor™ oils and greases combine wide-temperature, high-load capability and ultra-low volatility for metal-on-metal applications. Other formulations are designed for delicate precision instruments, sensors, potentiometers and actuators where ultra-low temperature and low starting torque are critical design parameters. Uniflor™ is not a one-size-fits-all solution. Combining the right PFPE fluid – or blend of fluids – with appropriate thickeners and proprietary additives means you get the best PFPE lubricant for your application.

## Validated to Minimize Risk

Uniflor™ lubricants are typically selected for applications with demanding operating requirements. To assure you that our lubricants are compatible with your application, Nye offers in-house validation testing for all our lubricants. Our test equipment can be modified to meet unique design specifications and allows us to simulate conditions like temperature, load, and even in-vacuum environments.

Automotive	Temperature Range	Evaporation	Kinematic Viscosity ASTM D445		NLGI Grade	Product Description
			100 °C	40 °C		
<b>Uniflor™ 8172</b>	-45 to 225 °C	0.23%	18 cSt	167 cSt	2	General Purpose Use, OEM Specifications
<b>Uniflor™ 8512</b>	-50 to 225 °C	1%	15.8 cSt	65 cSt	2	Improved Low Temperature Performance
<b>Uniflor™ 8921</b>	-65 to 250 °C	0.1%	40 cSt	135 cSt	2	Very Wide Temperature Serviceability

Medical	Temperature Range	Evaporation	Kinematic Viscosity ASTM D445		NLGI Grade	Product Description
			100 °C	40 °C		
<b>Uniflor™ 8981</b>	-65 to 250 °C	0.18%	41 cSt	136 cSt	1.5 – 2.5	Very Wide Temperature Serviceability
<b>Uniflor™ 8512-FG</b>	-50 to 225 °C	< 3%	15.8 cSt	65 cSt	2	NSF H-1 Food Grade Approval, Wide Temperature Use
<b>Uniflor™ 8612</b>	-20 to 250 °C	0.3%	33 cSt	345 cSt	3	High Viscosity, Mechanical Damping and Sealing

Defense	Temperature Range	Evaporation	Kinematic Viscosity ASTM D445		NLGI Grade	Product Specification
			100 °C	40 °C		
<b>Uniflor™ 8991MT</b>	-60 to 250 °C	5.1%	90 cSt	310 cSt	2	Honeywell ES-2155
<b>Uniflor™ 8961MT</b>	-80 to 200 °C	3.31%	21.7 cSt	71 cSt	1.5 – 2.5	MIL-PRF-27617 Type IV
<b>Uniflor™ 8172MT</b>	-45 to 225 °C	0%	18 cSt	167 cSt	2	MIL-PRF-27617 Type III

Aviation	Temperature Range	Evaporation	Kinematic Viscosity ASTM D445		NLGI Grade	Product Description
			100 °C	40 °C		
<b>Uniflor™ 8921</b>	-65 to 250 °C	0.1%	40 cSt	135 cSt	2	Very Wide Temperature Serviceability
<b>Uniflor™ 8980</b>	-65 to 250 °C	0.1%	45 cSt	140 cSt	–	Very Wide Temperature Oil
<b>Uniflor™ 8172</b>	-45 to 225 °C	0.23%	18 cSt	167 cSt	2	General Purpose Use

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