3M

Product Information

Performance Fluid

PF-5050

Introduction

3M™ Performance Fluid PF-5050 is a clear, colorless, fully-fluorinated liquid. Like other 3M Performance Fluids, PF-5050 fluid is chemically and thermally stable, practically non-toxic, and nonflammable.

The high dielectric strength, low pour point and low viscosity of PF-5050 fluid make it useful as a non-conductive heat transfer fluid.

Typical Physical Properties

Not for specification purposes

All values determined at 25°C unless otherwise specified

Properties	PF-5050
Appearance	Clear, colorless
Average Molecular Weight	288
Boiling Point (1 atm)	30 °C
Pour Point	-115 °C
Estimated Critical Temperature	423 K
Estimated Critical Pressure	2.13×10^{6} Pa
Vapor Pressure	81.1×10^{3} Pa
Latent Heat of Vaporization (at normal boiling point)	88 J/g
Liquid Density	1.63 g/ml
Kinematic Viscosity	0.27 centistokes
Absolute Viscosity	0.44 centipoise
Liquid Specific Heat	1.09 J g^{-1} $°C^{-1}$
Liquid Thermal Conductivity	0.056 W m^{-1} $°C^{-1}$
Coefficient of Expansion	0.0016 $°C^{-1}$
Surface Tension	9 dynes/cm
Refractive Index	1.243
Water Solubility	14 ppmw
Solubility in Water	<5 ppmw

The following formulas can be used to calculate the specific heat, thermal conductivity and density of 3M™ Performance Fluid PF-5050 at various temperatures.

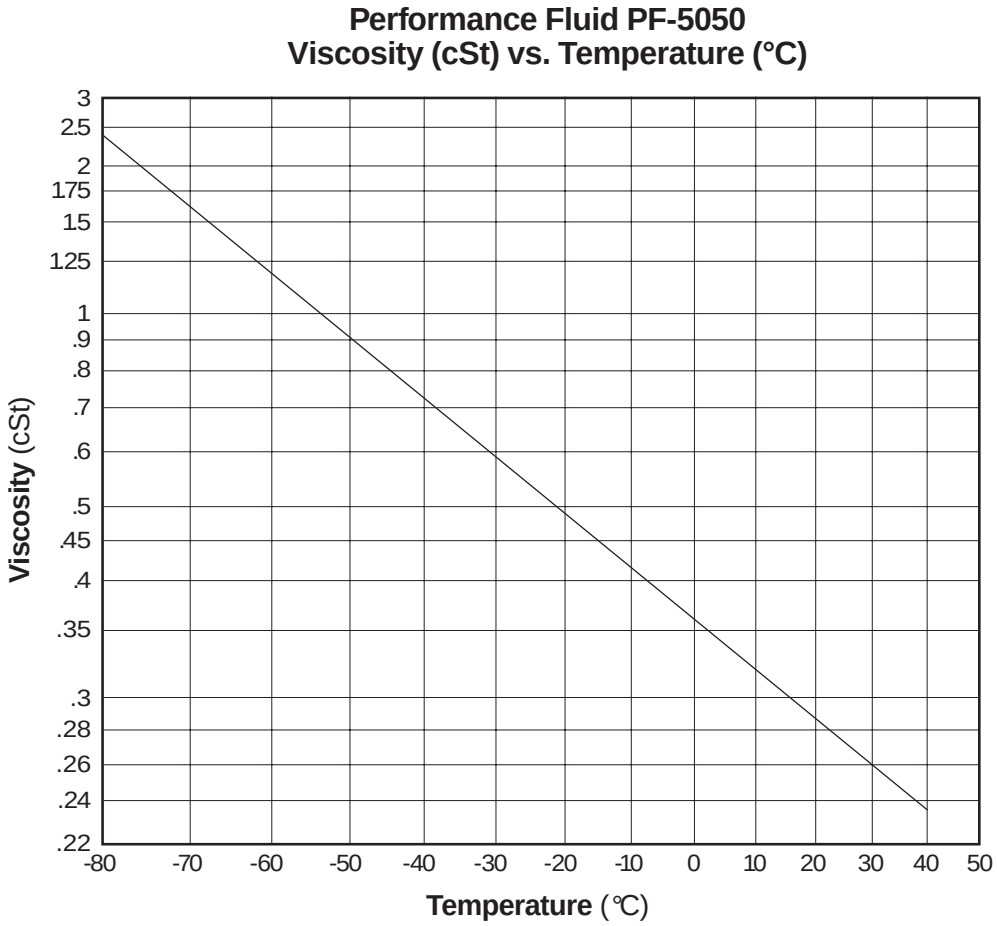
Specific Heat (J kg^{-1} $°C^{-1}$) = 1014 + 1.554 (T, °C)

Thermal Conductivity (W m^{-1} $°C^{-1}$) = 0.059 – 0.00015 (T, °C)

Density (kg/m^3) = 1710 – 2.5 (T, °C)

Log_{10}(Vapor Pressure (Pa)) = 10.102 – (1548/(T, K))

The following graph can be used to determine the viscosity of liquid PF-5050 over the indicated temperature range.



3M™ Performance Fluid PF-5050 Materials Compatibility

3M™ Performance Fluid PF-5050 is compatible with most metals, plastics and elastomers.

Toxicity Profile

PF-5050 fluid is non-irritating to the skin, and is practically non-toxic orally. A Material Toxicity Summary Sheet (MTSS) is available upon request.

Safety and Handling

PF-5050 fluid is nonflammable, and is highly resistant to thermal breakdown and hydrolysis in storage and during use. Recommended handling procedures are provided in the Material Safety Data Sheet, which is available upon request.

Environmental Properties

PF-5050 fluid has zero ozone depletion potential. The material is exempt from the U.S. EPA and most State definitions of a volatile organic compound (VOC), and does not contribute to ground-level smog formation.

PF-5050 fluid, a perfluorocarbon (PFC), has a high global warming potential and a long atmospheric lifetime. As such, it should be carefully managed so as to minimize emissions.

3M recommends that users of PF-5050 fluid further limit emissions by employing good conservation practices, and by implementing recovery, recycling and/or proper disposal procedures. 3M offers a program in the U.S. for used fluid return. Guidelines for the safe handling and use of this 3M product are provided in the Material Safety Data Sheet.

Environmental Policy

3M will recognize and exercise its responsibility to:

- prevent pollution at the source wherever and whenever possible
- develop products that will have a minimal effect on the environment
- conserve natural resources through the use of reclamation and other appropriate methods
- assure that its facilities and products meet and sustain the regulations of all Federal, State and local environmental agencies
- assist, wherever possible, governmental agencies and other official organizations engaged in environmental activities

3M™ Performance Fluid PF-5050 Used Fluid Return Program

3M offers a program for free pickup and return of used 3M Specialty Materials in the U.S. through Safety-Kleen Corporation. A pre-negotiated handling agreement between users and this service provider offers users broad protection against future liability for used 3M product. The fluid return program is covered by independent third-party financial and environmental audits of treatment, storage and disposal facilities. Necessary documentation is provided. A minimum of 30 gallons of used 3M Specialty Materials is required for participation in this free program.

Safety-Kleen Corporation has a network of 156 branch service centers in the U.S. This large fleet will provide timely, economical fluid disposal service. For additional information on the 3M Used Fluid Return Program, contact Safety-Kleen Corporation at this toll-free line: 1.888.932.2731.

Resources

3M™ Performance Fluid PF-5050 customers are supported by global sales, technical and customer sales resources, with fully staffed technical service laboratories in the U.S., Europe, Japan, Latin America and Southeast Asia. Users benefit from 3M's broad technology base and continuing attention to product development, performance, safety and environmental issues.

For additional information on PF-5050 fluid, contact your local 3M office.

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