



Performance Fluid

PF-5052

Introduction

3M™ Performance Fluid PF-5052 is a clear, colorless, fully-fluorinated liquid ideal for use in medium temperature range heat transfer applications. Like other 3M Performance Fluids, PF-5052 fluid is chemically and thermally stable, practically non-toxic, and nonflammable.

The unique solvent properties of PF-5052 fluid also make this an ideal solvent for depositing or removing fluorinated oils and lubricants.

Typical Physical Properties

Not for specification purposes

All values determined at 25°C unless otherwise specified

Properties	PF-5052
Appearance	Clear, colorless
Average Molecular Weight	299
Boiling Point (1 atm)	50 °C
Pour Point	-80 °C
Estimated Critical Temperature	454 K
Estimated Critical Pressure	1.97 x 10 ⁶ Pa
Vapor Pressure	36.4 x 10 ³ Pa
Latent Heat of Vaporization (at normal boiling point)	105 J/g
Liquid Density	1.70 g/ml
Kinematic Viscosity	0.40 centistokes
Absolute Viscosity	0.68 centipoise
Liquid Specific Heat	1.05 J g ⁻¹ °C ⁻¹
Liquid Thermal Conductivity	0.062 W m ⁻¹ °C ⁻¹
Coefficient of Expansion	0.0016 °C ⁻¹
Surface Tension	13 dynes/cm
Refractive Index	1.266
Water Solubility	14 ppmw
Solubility in Water	<5 ppmw

3M™ Performance Fluid PF-5052 Heat Transfer Properties

The following formulas can be used to calculate the specific heat, thermal conductivity, density and vapor pressure of 3M™ Performance Fluid PF-5052 at various temperatures.

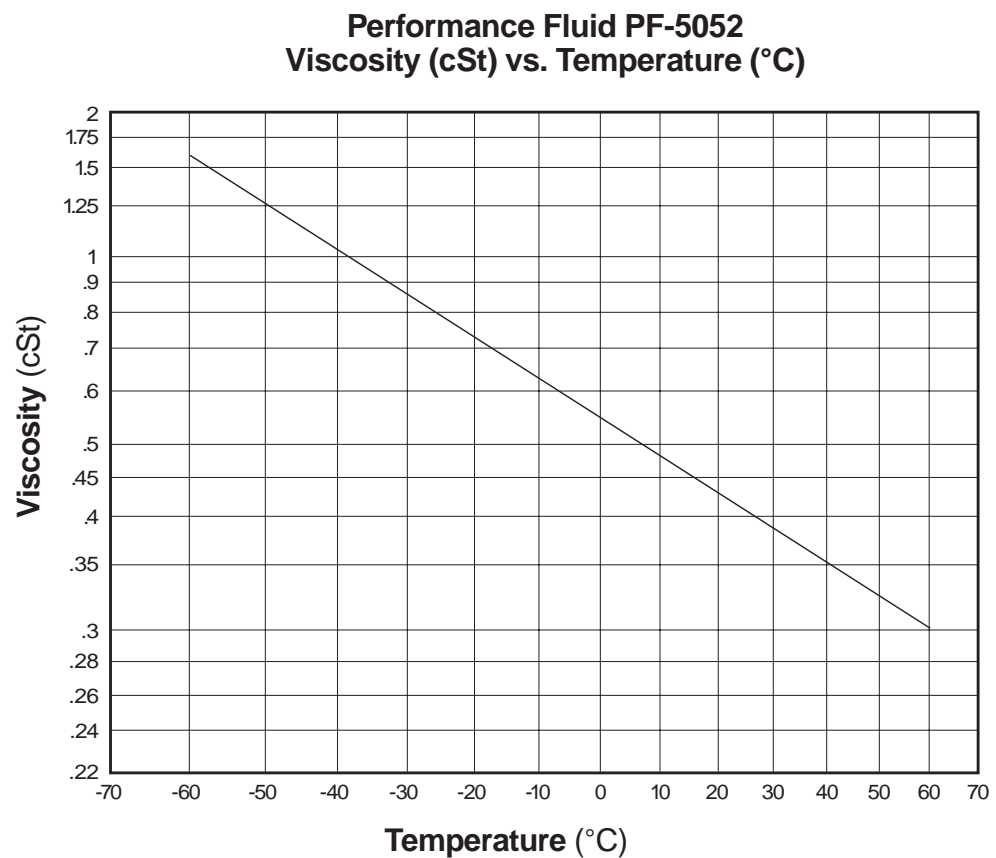
$$\text{Specific Heat (J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}) = 1014 + 1.554 (T, ^{\circ}\text{C})$$

$$\text{Thermal Conductivity (W m}^{-1} \text{ }^{\circ}\text{C}^{-1}) = 0.065 - 0.00013 (T, ^{\circ}\text{C})$$

$$\text{Density (kg/m}^3) = 1776 - 2.65 (T, ^{\circ}\text{C})$$

$$\text{Log}_{10}(\text{Vapor Pressure (Pa)}) = 10.062 - (1643/(T, \text{K}))$$

The following graph can be used to determine the viscosity of performance fluid PF-5052 over the indicated temperature range.



3M™ Performance Fluid PF-5052 Materials Compatibility

3M™ Performance Fluid PF-5052 is compatible with most metals, plastics and elastomers.

Toxicity Profile

PF-5052 fluid is non-irritating to the skin. The product also demonstrates very low acute and sub-chronic inhalation toxicity. A Material Toxicity Summary Sheet (MTSS) is available upon request.

Safety and Handling

PF-5052 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-5052 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-5052 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-5052 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-5052 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-5052 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-5052 fluid, contact your local 3M office.

www.3m.com/electronics/chemicals

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60 3 706 2888

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3M Philippines, Inc.
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3M Singapore Pte. Ltd.
65 454 8611

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886 2 2704 9011

Other Areas

651 736 7123 (U.S.)

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