



# Performance Fluid

## PF-5070

### Introduction

3M™ Performance Fluid PF-5070 is a clear, colorless, fully-fluorinated liquid. Like other 3M Performance Fluids, PF-5070 fluid is chemically and thermally stable, practically non-toxic, and nonflammable.

The high dielectric strength, excellent materials compatibility, and chemical and thermal stability make PF-5070 fluid useful in a wide range of applications, such as lubricant deposition, reaction media and heat transfer.

### Typical Physical Properties

Not for specification purposes

All values determined at 25°C unless otherwise specified

Properties	PF-5070
Appearance	Clear, colorless
Average Molecular Weight	388
Boiling Point (1 atm)	80 °C
Pour Point	-95 °C
Estimated Critical Temperature	478 K
Estimated Critical Pressure	1.75 x 10 <sup>6</sup> Pa
Vapor Pressure	10.6 x 10 <sup>3</sup> Pa
Latent Heat of Vaporization (at normal boiling point)	80 J/g
Liquid Density	1.73 g/ml
Kinematic Viscosity	0.50 centistokes
Absolute Viscosity	0.87 centipoise
Liquid Specific Heat	1.05 J g <sup>-1</sup> °C <sup>-1</sup>
Liquid Thermal Conductivity	0.060 W m <sup>-1</sup> °C <sup>-1</sup>
Coefficient of Expansion	0.0014 °C <sup>-1</sup>
Surface Tension	13 dynes/cm
Refractive Index	1.258
Water Solubility	11 ppmw
Solubility in Water	<5 ppmw

## 3M™ Performance Fluid PF-5070 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-5070 at various temperatures.

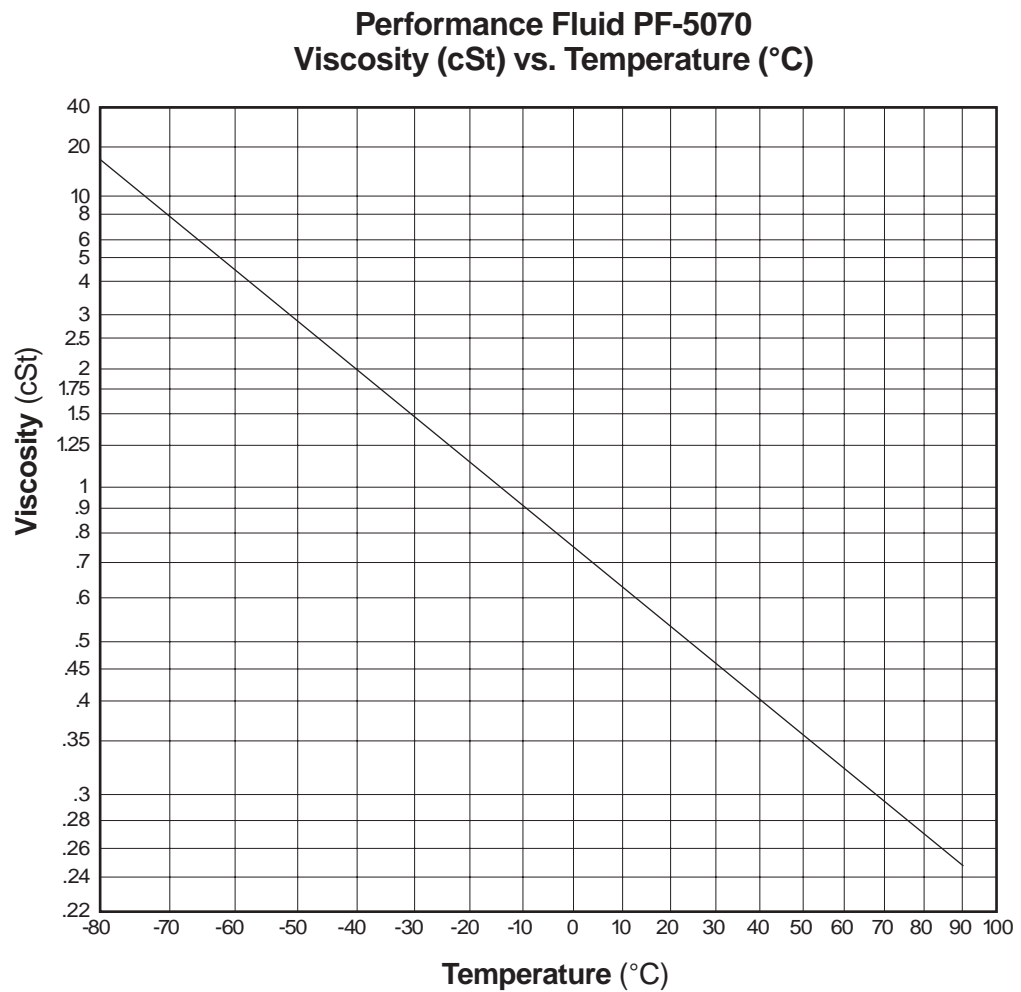
$$\text{Specific Heat (J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}) = 1014 + 1.554 (T, \text{ }^{\circ}\text{C})$$

$$\text{Thermal Conductivity (W m}^{-1} \text{ }^{\circ}\text{C}^{-1}) = 0.063 - 0.00012 (T, \text{ }^{\circ}\text{C})$$

$$\text{Density (kg/m}^3) = 1790 - 2.57 (T, \text{ }^{\circ}\text{C})$$

$$\text{Log}_{10}(\text{Vapor Pressure (Pa)}) = 10.142 - (1824/(T, \text{ K}))$$

The following graph can be used to determine the viscosity of performance fluid PF-5070 over the indicated temperature range.



## **3M™ Performance Fluid PF-5070 Materials Compatibility**

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3M™ Performance Fluid PF-5070 is compatible with most metals, plastics and elastomers.

## **Toxicity Profile**

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PF-5070 fluid is non-irritating to the eyes, minimally irritating to the skin, and is practically non-toxic orally. A Material Toxicity Summary Sheet (MTSS) is available upon request.

## **Safety and Handling**

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PF-5070 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**

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PF-5070 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-5070 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-5070 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**

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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-5070 Used Fluid Return Program

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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

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3M™ Performance Fluid PF-5070 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-5070 fluid, contact your local 3M office.

[www.3m.com/electronics/chemicals](http://www.3m.com/electronics/chemicals)

### United States

3M Electronics Markets  
Materials Division  
800 810 8513

### Canada

3M Canada Company  
800 364 3577

### China

3M China Ltd.  
86 21 6275 3535

### Europe

3M Belgium N.V.  
32 3 250 7521

### Japan

Sumitomo 3M Limited  
813 3709 8250

### Korea

3M Korea Limited  
82 2 3771 4114

### Malaysia

3M Malaysia Sdn. Berhad  
60 3 706 2888

### Philippines

3M Philippines, Inc.  
63 2 813 3781

### Singapore

3M Singapore Pte. Ltd.  
65 454 8611

### Taiwan

3M Taiwan Limited  
886 2 2704 9011

### Other Areas

651 736 7123 (U.S.)

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