Science.
Applied to Life.™

Technical Data | September 2019

3M™ Fluorinert™ Electronic Liquid FC-70

Product description

3M™ Fluorinert™ Electronic Liquid FC-70 is a clear, colorless, fully-fluorinated liquid. Like other Fluorinert electronic liquids, Fluorinert liquid FC-70 is thermally and chemically stable, compatible with sensitive materials, nonflammable, demonstrates low toxicity and leaves essentially no residue upon evaporation. This unique combination of properties makes Fluorinert liquid FC-70 ideal for many electronics applications, including vapor phase soldering and thermal management.

An ideal fluid for use in condensation reflow soldering, the saturated vapor generated from boiling Fluorinert liquid FC-70 is very dense and easily contained. The elimination of oxygen allows for use of mild flux compounds, simplifying the cleaning of finished circuit boards.

Other uses for Fluorinert liquid FC-70 include heat transfer, electronics testing and inert reaction media.

Typical physical properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product. All values @ 25°C unless otherwise specified.

Properties	3M™ Fluorinert™ Electronic Liquid FC-70
Appearance	Clear, colorless
Average Molecular Weight	820 (g/mol)
Boiling Point (@ 1 atm)	215 °C (419°F)
Pour Point	-25 °C (-13°F)
Calculated Critical Temperature	335 (°C)
Calculated Critical Pressure	1.03×10^6 (pa)
Vapor Pressure	15 (pa)
Latent Heat of Vaporization (at normal boiling point)	69 (J/g)
Liquid Density	1940 (kg/m^3)
Kinematic Viscosity	12 (cSt)
Absolute Viscosity	24 (cP)
Liquid Specific Heat	1100 ($J\ kg^{-1}\ °C^{-1}$)
Liquid Thermal Conductivity	0.070 ($W\ m^{-1}\ °C^{-1}$)
Coefficient of Expansion	0.0010 ($°C^{-1}$)
Surface Tension	18 (dynes/cm)
Refractive Index	1.30
Ozone Depletion Potential	0
Flash Point	None

3M™ Fluorinert™ Electronic Liquid FC-70

Typical electrical properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes. Final product specifications and testing methods will be outlined in the products Certificate of Analysis (COA) that is shipped with the commercialized product. All values @ 25°C unless otherwise specified.

Properties	3M™ Fluorinert™ Electronic Liquid FC-70
Dielectric Strength (0.1" gap)	40 (kV)
Dielectric Constant (@ 1 kHz)	1.98
Electrical Resistivity (ASTM D-257)	2.3×10^{15} (ohm cm)

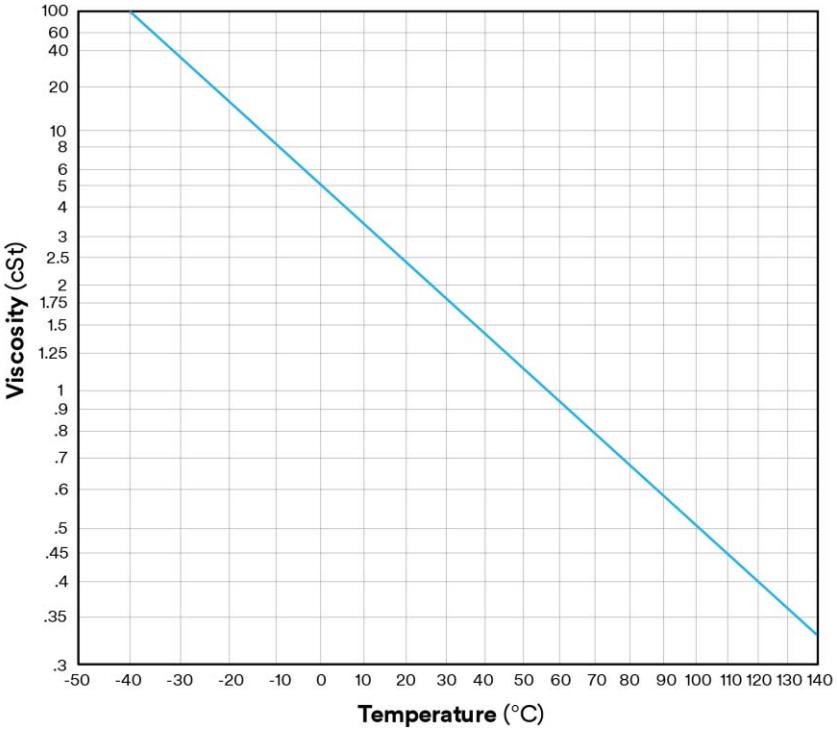
Heat transfer properties

The following formulas can be used to calculate the specific heat, thermal conductivity, density and vapor pressure of 3M™ Fluorinert™ Electronic Liquid FC-70 at various temperatures.

Specific Heat (J kg^{-1} °C^{-1}) = 1014 + 1.554 (T, °C)
Thermal Conductivity (W m^{-1} °C^{-1}) = 0.07 – 0.00001 (T, °C)
Density (kg/m^3) = 1984 – 1.93 (T, °C)
Log_{10} (Vapor Pressure (pascals)) = 11.211 – (2939/(T, K))

The following graph can be used to determine the viscosity of Fluorinert liquid FC-70 over the indicated temperature range.

3M™ Fluorinert™ Electronic Liquid FC-70 Viscosity vs. Temperature



Materials compatibility

Fluorinert liquid FC-70 is compatible with most metals, plastics and elastomers. Contact 3M for more information.

3M™ Fluorinert™ Electronic Liquid FC-70

Storage and shelf life

The shelf life of 3M™ Fluorinert™ Electronic Liquid FC-70 is 36 months from the date of manufacture when stored in the original packaging materials and stored at 21°C (70°F) and 50% relative humidity.

Toxicity profile

Not for specification purposes.

3M™ Fluorinert™ Electronic Liquid FC-70 is virtually non-irritating to the eyes and skin. The product also demonstrates very low toxicity. A Safety Data Sheet (SDS) is available from www.3m.com/SDS.

Safety and handling

Before using this product, please thoroughly read the current product SDS and label, following all applicable safety precautions described therein (e.g., recommended storage and safe handling, appropriate exposure controls and personal protective equipment (PPE), addressing accidental spills, disposal considerations, etc.). Fluorinert liquid FC-70 is nonflammable and is resistant to thermal breakdown and hydrolysis during typical use and storage.

Environmental properties

Fluorinert liquid FC-70 has zero ozone depletion potential. Additionally, this product has negligible photochemical reactivity and therefore it does not appreciably contribute to ground-level smog formation. As such, it is not defined or regulated by the U.S. EPA as a volatile organic compound (VOC).

As a perfluorocarbon (PFC), this product has a high global warming potential and a long atmospheric lifetime. As such, its use should be carefully managed to minimize emissions.

3M recommends that users of Fluorinert liquid FC-70 further limit emissions by employing good conservation practices, and by implementing recovery, recycling and/or proper disposal procedures. In general, 3M recommends that Fluorinert-branded liquids be disposed of by incineration at a permitted industrial waste facility capable of handling halogenated materials, in accordance with all applicable local, regional, national, and/or international regulations. See product SDS for further details. 3M also offers a Used Fluid Disposal Program.