GLOBAL LEADER PROVIDING
PERFORMANCE FLUIDS & LUBRICANTS

TECHNICAL DATA SHEET

TMC-649 ENGINEERED FLUID

TMC-649 Engineered Fluid is a direct replacement for, and is miscible with, 3M™ Novec™ 649.

PRODUCT INFORMATION

TMC-649 is a clear, colorless, and low-odor fluid designed to replace ozone-depleting substances (ODSs) and compounds with high global warming potentials (GWPs) such as sulfur hexafluoride (SF6) and hydrofluorocarbons (HFCs) such as HFC-134a and HFC-245fa. TMC-649 is an advanced heat transfer fluid that balances customer needs for physical, thermal, and electrical properties with desirable environmental properties.

APPLICATIONS

TMC-649 is a chemically identical replacement for 3M™ Novec™ 649 with specific properties suitable for heat transfer applications where non-flammability and environmental concerns are important.

- Electronics Cooling (Dual Phase)
- Computer/Data Center Cooling
- Power Electronics such as IGBTs or Inverters
- Solar Applications
- Transformers and other equipment
- Heat Transfer

FEATURES

- Low Global Warming Potential (GWP)
- Zero Ozone Depletion Potential (ODP)
- Excellent Environmental Profile
- Noncorrosive

STABILITY

TMC-649 should be used in a sealed system to prevent interaction with water. However, it is remarkably stable in its absence to over 300°C.

MATERIALS COMPATIBILITY

Experiments show that TMC-649 is compatible with rubber and metal, and it has good compatibility with and little impact on a variety of materials.

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TMC-649 Continued

PHYSICAL & ENVIRONMENTAL PROPERTIES COMPARISON

PROPERTY	UNITS	3M™ NOVEC™ 649	TMC-649
Boiling Point @ 1 atm	°C (°F)	49 (120)	49 (120)
Freeze/Pour Point	°C (°F)	-108 (-162.4)	-108 (-162.4)
Average Molecular Weight	g/mol	316.04	316.04
Critical Temperature	°C (°F)	169 (336)	169 (336)
Vapor Pressure	bar (psia)	0.404 (5.85)	0.404 (5.85)
Heat of Vaporization @ Boiling Point	kJ/kg	88	88
Liquid Density	g/mL	1.60	1.60
Kinematic Viscosity	cPs	0.64	0.64
Specific Heat, Liquid	J/kg-K	1103	1103
Critical Pressure	mPA	1.88	1.88
Dielectric Strength @ 0.1" gap	kV	48	48
Dielectric Constant	1kHz	1.8	1.8
Ozone Depletion Potential (ODP)	—	0.0	0.0
Global Warming Potential (GWP)	—	1	1
Flash Point	—	None	None

Not for specification purposes. All values @ 25°C unless otherwise specified.

PACKAGING

TMC-649 is available in the following sizes and weights:

- **1 Gallon Jug** — 12 lb / 5.4 kg
- **5 Gallon Pail** — 44 lb / 20 kg
- **55 Gallon Drum** — 550 lb / 250 kg
- **Sample** — 2.2 lb / 1 kg
- **275 Gallon Tote** — Available Upon Request

SHELF LIFE & STORAGE

Shelf life is 5 years from the date of manufacture when stored in the original packaging materials and stored under normal conditions. TMC will re-certify material every 5 years up to 20 years.

DISPOSAL & RECYCLING

This fluid can be recycled and reused. Help protect the environment and don't pay for expensive disposal services.

TMC Industries can reclaim your used fluorinated fluids, restoring them to like-new condition, and save you up to 50% in replacement fluids while protecting the environment.

TMC Reclaimed Fluids are tested to meet new product specifications. It will be clear and odorless, and a Certificate of Analysis is issued with every order.

TMC Industries offers a **100% satisfaction guarantee** on all our reclaimed fluids. We back this up with a no-questions-asked refund policy. To learn more, click here.

EXTERNAL DOCUMENTS

- TMC Used Fluid Reclamation Service Brochure

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.).

Safety Data Sheet: Consult Safety Data Sheet before use.

Regulatory: For regulatory information about this product, contact your TMC representative.

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that TMC believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond TMC's control and uniquely within user's control can affect the use and performance of a TMC product in a particular application. Given the variety of factors that can affect the use and performance of a TMC product, user is solely responsible for evaluating the TMC product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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