TMC-7000 ENGINEERED FLUID

TMC-7000 Engineered Fluid is a miscible drop-in replacement for 3M™ Novec™ 7000.

PRODUCT INFORMATION

TMC-7000 is a clear, colorless, thermal-stable dielectric fluid capable of extreme low temperature operation (-120°C). The properties of TMC-7000 make it very useful in a variety of heat transfer applications in the semiconductor, electronics, and chemical manufacturing industries. It is also non-ozone depleting and has very low global warming potential, making it an attractive alternative to perfluorocarbon and perfluoropolyether heat transfer liquids.

APPLICATIONS

- Heat Transfer
- Electronics
- Semiconductor Manufacturing

FEATURES

- Zero Ozone Depletion Potential (ODP)
- Low Global Warming Potential (GWP)
- Low Toxicity
- Good Materials Compatibility
- NVR <1.0 ppm

MATERIALS COMPATIBILITY

TMC-7000 is compatible with metals, glasses, ceramics and polymers.

Material compatibility testing for "soft" or elastomeric polymers in TMC-7000 is primarily focused on two effects: the extraction of mobile organics, such as plasticizers, from the polymer and the absorption of the fluid into the polymer. The former is associated with hardening or shrinking of the polymer and the latter with swelling and softening of the polymer or diffusion of the fluid through it.

TMC-7000 is unlikely to swell common hydrocarbon elastomers such as EP, EPDM, nitrile and butyl. Other materials, such as highly fluorinated or silicone elastomers, are prone to absorption and swelling. Material compatibility testing can be used to quantify these effects. This testing reveals significant variation in the extractable content of elastomers within any elastomer category.

Application experience reveals that not all applications are equally sensitive to dimensional and hardness changes. For these reasons, material compatibility should be treated on a case-by-case basis at the discretion of the system designer with the specific application in mind.

Compatible Materials

METALS	PLASTICS	ELASTOMERS[1]
Aluminum	Acrylic (PMMA)	EPDM
Copper[2]	Polyethylene	EPR
Stainless Steel	Polycarbonate	Polyurethane
Brass[2]	Polyester	Fluorosilicone
	ABS	
	PEEK	
	PTFE	

[1]As with most fluorinated liquids, TMC-7000 fluid will absorb into fluorinated plastics (e.g., PTFE) and elastomers (e.g., FFKM, FKM types) over longer exposures. Absorption and swelling of silicone rubber are also observed. Not all formulations of these polymers are compatible.

[2]Some surface oxidation of copper during testing.

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PHYSICAL & ENVIRONMENTAL PROPERTIES COMPARISON

PROPERTY	UNITS	3M™ NOVEC™ 7000	TMC-7000
Type	—	Legacy	Replacement
Form	—	Liquid	Liquid
Color	—	Colorless	Colorless
Odor	—	Odorless	Odorless
Boiling Point (@1 atm)	°C	34	34
Flash Point	—	None	None
Freeze/Pour Point	°C	-122	-122
Molecular Weight	g/mol	200	200
Vapor Pressure	kPa	65	65
Latent Heat of Vaporization	kJ/kg	142	142
Liquid Density	kg/m^3	1400	1400
Coefficient of Expansion	K^{-1}	0.0022	0.0022
Specific Heat	$J \cdot kg^{-1} \cdot K^{-1}$	1300	1300
Kinematic Viscosity	cSt	0.32	0.32
Thermal Conductivity	$W \cdot m^{-1} \cdot K^{-1}$	0.075	0.075
Surface Tension	dynes/cm	12.4	12.4
Solubility of Water in Fluid	ppmw	~60	~60
Solubility of Fluid in Water	ppmw	<5	<5
Dielectric Strength (0.1" gap)	kV	>25	>25
Volume Resistivity	Ohm-cm	10^8	10^8
Autoignition Temperature	°C	415	415
Ozone Depletion Potential[1]	ODP	0.0	0.0
Global Warming Potential[2]	GWP	530	530
Atmospheric Lifetime	Years	4.9	4.9

[1]CFC-11 = 1.0

[2]GWP 100-year integrated time horizon (ITH). IPCC 2013.

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

TMC-7000 Continued

PACKAGING

TMC-7000 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.

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