TMC INDUSTRIES

GLOBAL LEADER PROVIDING
PERFORMANCE FLUIDS & LUBRICANTS

TECHNICAL DATA SHEET

TMC-49 SPECIALTY FLUID

TMC-49 is a two-phase immersion cooling liquid.

PRODUCT INFORMATION

TMC-49 Specialty Fluid is a two-phase coolant designed for use in data centers and for cleaning electronic products. It is highly effective for immersion cooling due to its excellent thermal stability and efficacy of heat radiation. TMC-49 is non-flammable, insoluble in water, and not hazardous to human health. TMC-49 is a hydro-fluoroolefin (HFO) dielectric fluid with zero ozone depletion potential (ODP) and a very low global warming potential (GWP) of 20.

FEATURES

- No Flash Point
- Non-Flammable
- ODP of 0
- GWP of 20

APPLICATIONS

- Heat Transfer Agent for Industries Like Data Mining
- Two-Phase Coolant
- Data Centers
- Supercomputing Centers
- Energy Storage Power Centers
- Cleaning Agent for Electronic Products or Electric Parts

TMC-49 is a high-performance, two-phase, closed-loop liquid cooling solution designed for processors with extreme power demands (2500W+). It uses direct-to-chip cooling with a waterless heat transfer fluid, eliminating risks of leaks or corrosion while efficiently extracting and dispersing heat. Scalable for new or retrofitted data centers, it supports computing power of 120 kW and above, with a single cabinet handling up to 160 kW of heat dissipation. Power consumption is reduced from 12 kW to 9 kW.

Power usage effectiveness (PUE) is less than 1.1 of TC4600E-LP server by Sugon, whose power density of a single cabinet is 160kW.

TMC-49 two-phase coolant has been successfully applied for supercomputing and internet data centers (IDCs).

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MATERIALS COMPATIBILITY

Compatible Materials

METALS

- Aluminum (Al)
- Zinc (Zn)
- Nickel (Ni)
- Stainless Steel (304L, 316L)
- White Copper
- Brass
- Copper (Cu)
- Gold (Au)
- Alloys (Au/Sn/Ni)
- Lead Tin Alloy
- Purple Copper
- Titanium

PLASTIC (Plasticizer less than 5%)

- Polyethylene (PE)
- Polystyrene (PS)
- Polyester (PET, PBT)
- Polyether Sulfone (PES)
- Liquid Crystal Polymer (LCP)
- Fiberglass Board
- Polyimide (PI)
- Nylon (PA66, PA9T, NA66)
- Polytetrafluoroethylene (PTFE)
- Polylactic Acid (PLA)

RUBBER

- Silicone Rubber
- Chlorosulfonated Polyethylene (Heparin, CSM)
- Chloroprene Rubber (CR)

ADHESIVES

- UV Adhesive
- Thread Fastener Adhesive
- ABS Adhesive Material
- SR Adhesive
- Bare Wire Adhesive

OTHER

- Epoxy Resin (EO)
- ABS Resin

Incompatible Materials

ALKALI METALS

- Lithium (Li)
- Potassium (K)
- Cesium (Se)
- Sodium (Na)
- Rubidium (Ru)

ALKALINE EARTH METALS

- Beryllium (Be)
- Calcium (Ca)
- Barium (Ba)
- Magnesium (Mg)
- Strontium (Sr)

MATERIAL WITH CERTAIN RISKS

- EPDM
- NBR
- Acrylic (PMMA)
- Polyvinyl Chloride (PVC)
- Soft Polytetrafluoroethylene (PTFE)
- IIR
- Hydrogenated Nitrile Rubber (HNBR)
- Polyurethane (PU)
- Polychlorinated Trifluoroethylene (PCTFE)
- Plasticizer content more than 5%

TMC-49 Continued

PHYSICAL & ENVIRONMENTAL PROPERTIES

PROPERTY	UNITS	TMC-49
Form	—	Liquid
Color	—	Colorless
Odor	—	Odorless
Purity	—	≥99.0%
Water Content	ppm	≤100
Boiling Point	°C	47
Pour Point	°C	115
Dielectric Constant	—	188
Dielectric Strength	kV	43.4
Freezing Point	°C	-80
Latent Heat of Vaporization	kJ kg^{-1}	93.22
Vapor Pressure (20°C)	kPa	36
Kinetic Viscosity	cSt	0.373
Critical Temperature	K	443.3
Critical Pressure	kPa	2.205
Liquid Density	g/cm^3	1.6
Liquid Viscosity	mm^2/s	0.3562
Surface Tension	mN/m	11.44
Liquid Thermal Conductivity	$W \cdot m^{-1} \cdot K^{-1}$	0.0609
Volume Resistivity	Ω·m	3.070×10^{15}
Ozone Depletion Potential (ODP)	—	0
Global Warming Potential (GWP)	—	20
Flash Point	—	None

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

PERFORMANCE

PARAMETER	UNITS	RESULTS
Vapor Pressure at Saturation Temperature, ASTM E 1719	psia	14.73
Viscosity, Kinematic, ASTM D 445.a		
@ 16°C	cSt	0.395
@ 18°C	cSt	0.387
@ 21°C	cSt	0.376
@ 24°C	cSt	0.365
@ 27°C	cSt	0.354
@ 29°C	cSt	0.348
@ 32°C	cSt	0.338
@ 35°C	cSt	0.328
@ 40°C	cSt	0.312
@ 45°C	cSt	0.297
Density of Liquids by Digital Density Meter, ASTM D 4052		
@ 16°C	g/cm³	1.6313
@ 21°C	g/cm³	1.6142
@ 27°C	g/cm³	1.5969
@ 32°C	g/cm³	1.5790
@ 35°C	g/cm³	1.5702
@ 38°C	g/cm³	1.5610
@ 40°C	g/cm³	1.5515
@ 43°C	g/cm³	1.5427
@ 46°C	g/cm³	1.5336
@ 49°C	g/cm³	1.5241

TMC-49 Continued

PACKAGING

TMC-49 is available in the following sizes and weights:

- **1 Gallon Jug** — 12 lb / 5.4 kg
- **5 Gallon Pail** — 40 lb / 18.1 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

- 3rd Party Laboratory Testing: Non-Detectable PFAS
- 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.

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DS-ENG-20250630-4900-Rev1