

MIVOLT®

LIQUID IMMERSION COOLING

- + Single-phase
- + High fire point
- + Extremely low pour point
- + High oxidation and moisture stability
- + Low viscosity
- + Readily biodegradable
- + Non-volatile
- + Halogen free
- + Non-toxic

FF316 Dielectric
Liquid

Technical Brochure

INTRODUCING MIVOLT FF316

A new, immersive approach to cooling electrical systems.

MIVOLT FF316 is a new liquid for the immersive cooling of electrical systems. The unique chemistry of MIVOLT FF316 allows it to act as a dielectric coolant, removing heat directly from all areas of a component. Not only does this liquid have low viscosity and readily biodegradable status, but as a single phase coolant it does not require any of the complex systems necessary to evaporate and condense multiphase fluids.

Key Features:

- High fire point
- Extremely low pour point -56°C
- Low viscosity
- Readily biodegradable
- Non-volatile
- Halogen free
- Non-toxic

MIVOLT FF316 PROPERTIES

Thermal Properties	Units	Method	MIVOLT FF316
Density at 20°C	kg/m ³	ISO 3675	968
Specific Heat at 20°C	J/kg-K	ASTM E1269	1902
Thermal Conductivity at 20°C	W/m-K	ASTM D7896	0.147
Coefficient of Expansion at 20°C	1/K	ASTM D1903	0.00075
Kinematic Viscosity at -20°C	mm ² /s	ISO 3104	1440
Kinematic Viscosity at 40°C	mm ² /s	ISO 3104	29.5
Kinematic Viscosity at 100°C	mm ² /s	ISO 3104	5.3
Pour Point	°C	ISO 3016	-56
Fire Safety			
Flash Point	°C	ISO 2719	260
Fire Point	°C	ISO 2592	316
Net Calorific Value	MJ/kg	ASTM E659	30.8
Environmental Impact			
Biodegradability		OECD 301	Readily Biodegradable
Chemical Properties			
Neutralisation Value	mg KOH/g	IEC 62021-2	<0.03
Dielectric Properties			
AC Breakdown Voltage	kV	IEC 60156	>75
Volume Resistivity at 90°C	GΩ.m	IEC 60247	>10
Dielectric Dissipation Factor (tan δ) at 90°C		IEC 60247	>0.05

MIVOLT FF316 MATERIALS COMPATIBILITY

Based upon testing with ester based dielectric liquids.

Application	Compatible Materials
Seals and 'O' Rings	Nitrile Rubber (BS2751), Silicone Rubber, Polyurethane Rubber, Fluorocarbon Rubber (Viton), PTFE (Teflon), Nylon
Gaskets and Jointings	Cork Bonded with Nitrile (Nebar Grey and Nebar Purple) / Cork Bonded with Neoprene Rubber (Nebar White and Nebar Orange)
Wire and Wire Enamels	Polyesterimide / Polyamide-imide Coated Copper (Synflex), Polyester, Epoxy, Polyurethane
Tank Enamels	Alkyd, Polyurethane Modified Alkyd, Polyurethane, Epoxy
Insulating Varnishes	Alkyd, Acrylic, Epoxy, Polyurethane, Polyimide
Metals	Copper, Phosphor Bronze, Aluminium, Iron, Brass, Zinc Plated Steel
Sleevings	Epoxy / Glass, Silicone Glass, Polyurethane / Glass, Polyester / Glass, Silicone Coated Glass Braided Sleeving (SCGB)
Plastics	boPET (Mylar), Cellulose Triacetate, Polyester (Melinex), Cotton / Epoxy Resin (TUFNOL 4F / 45), Cotton / Phenolic Resin (TUFNOL CARP), PVC Sheet (Sika-Trocal)*, Glass / Epoxy Resin (HGW), Polyetheretherketone Film (APTIV Grade 1000), Polymethyl Methacrylate (Perspex), Polycarbonate**, Polypropylene, Polythene, Fibre Reinforced Epoxy Glass (FRP), Acetal Copolymer (Ertacetal C), Close Cell Polymethacrylimide (PMI) Foam, Polyvinyl Alcohol (PVA), Nylon
Cable	Fluoropolymer (Raychem Flexlite), PVC (Soflex TQ)*, Cross Linked Modified Polyester (Raychem 99M)
Hose	Goodyear SAE J30R3 (inner only compatible), Gates Premoflex, Trelleborg Chemikler D-UPE (inner only compatible)
Adhesives / Sealants	Bisphenol F-Epoxy Resin (Araldite 2014), Dimethacrylate Ester (Loctite 601), Silicone Sealant (Loctite 5920), Gum Arabic Adhesive
Miscellaneous	Kraft Paper, Aramind Paper (Nomex), Pressboard, Phenolic Paper Laminate, Porcelain, Cotton Tape, Mica Insulation (Mica), Polyurethane Casting Resin, Diamond Patterned Epoxy Paper, Elephantide, Plywood, PVC Cable Sheathing*

* At elevated temperatures PVC may release plasticisers into MIVOLT FF316 and after prolonged immersion may become brittle.

** Certain amorphous polymers or those with a low degree of crystallinity (e.g. Polycarbonate, ABS and CPVC) may exhibit environmental stress cracking in contact with MIVOLT FF316. Use of these polymers for pipework or mechanically stressed components in contact with the liquid is not recommended.

ENVIRONMENTAL HEALTH & SAFETY

We advise that you read through the MIVOLT FF316 Material Safety Data Sheet (MSDS) before using this liquid. Please contact our technical team to request a copy.

T: +44 (0)161 864 5429

E: mivolttech@mimaterials.com

W: mivoltcooling.com

MIVOLT®

LIQUID IMMERSION COOLING

a product of  **M&I MATERIALS**

M&I Materials Ltd
Hibernia Way, Trafford Park
Manchester M32 0ZD
United Kingdom

T: +44 (0)161 864 5429
E: mivolttech@mimaterials.com
W: mivolt.com

Any recommendation or suggestion relating to the use, storage, handling or properties of the products supplied by M&I Materials Ltd or any member of its group, either in sales and technical literature or in response to a specific enquiry or otherwise, is given in good faith but it is for the customer to satisfy itself of the suitability of the product for its own particular purposes and to ensure that the product is used correctly and safely in accordance with the manufacturer's written instructions. © M&I Materials Ltd 2020. V1.