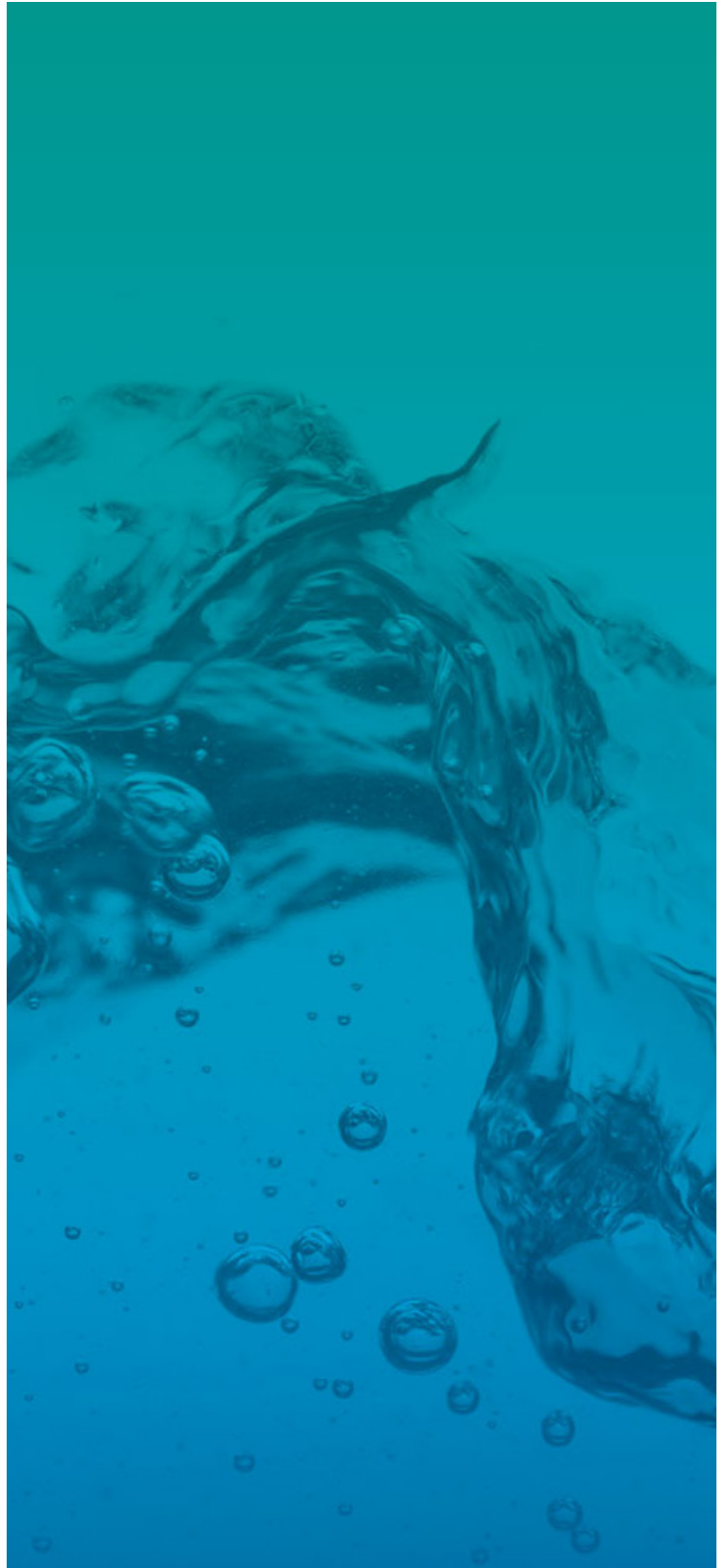


MIVOLT®

IMMERSION COOLING LIQUIDS

High fire point
Readily biodegradable
Low pour point
Non-volatile
Halogen free
Non-toxic



DFK Dielectric
Liquid

Technical Brochure

INTRODUCING MIVOLT DFK

A new, immersive approach to cooling electrical systems.

MIVOLT DFK is a new liquid for the immersive cooling of electrical systems. The unique chemistry of MIVOLT DFK allows it to act as a dielectric coolant, removing heat directly from all areas of a component. Not only does this liquid have a high fire point 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 (>300°C)
- Readily biodegradable
- Low pour point
- Non-volatile
- Halogen free
- Non-toxic

MIVOLT DFK PROPERTIES

Thermal Properties	Units	Method	MIVOLT DFK
Density at 20°C	kg/m ³	ISO 3675	968
Specific Heat at 20°C	J/kg-K	ASTM E1269	1902
Kinematic Viscosity at 20°C	mm ² /s	ISO 3104	75
Thermal Conductivity at 20°C	W/m-K	ASTM D7896	0.147
Coefficient of Expansion at 20°C	1/K	ASTM D1903	0.00075
Cold Behaviour			
Kinematic Viscosity at -10°C	mm ² /s	ISO 3104	572
Kinematic Viscosity at -30°C	mm ² /s	ISO 3104	4362
Pour Point	°C	ISO 3016	< -50
Fire Safety			
Flash Point	°C	ISO 2719	>250
Fire Point	°C	ISO 2592	>300
Auto-Ignition Temperature	°C	ASTM E659	>400
Environmental Impact			
Biodegradability		OECD 301	Readily Biodegradable
Global Warming Potential	GWP		<1
Ozone Depleting Potential	ODP		0
Chemical Properties			
Neutralisation Value	mg KOH/g	IEC 62021-2	<0.03
Net Calorific Value	MJ/kg	ASTM D 240-02	30.8
Dielectric Properties			
AC Breakdown Voltage	kV	IEC 60156	>75
Volume Resistivity at 20°C	GΩ.m	IEC 60247	>90

MIVOLT DFK 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)
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 DFK 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 DFK. 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 DFK Material Safety Data Sheet (MSDS) before using this liquid. Please contact our technical team to request a copy.

T: +44 (0)161 864 5464

E: mivolttech@mimaterials.com

W: mivolt.com

MIVOLT®

IMMERSION COOLING LIQUIDS

a product of  **M&I MATERIALS**

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

T: +44 (0)161 864 5464
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 2019. V1.3.23