


# MIVOLT®

LIQUID IMMERSION COOLING

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

## ***CL200*** Dielectric Liquid

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Technical Brochure

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# INTRODUCING MIVOLT CL200

A new, immersive approach to cooling electrical systems.

**MIVOLT CL200** is a new liquid for the immersive cooling of electrical systems. The unique chemistry of MIVOLT CL200 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:

- Low viscosity
- Readily biodegradable
- High oxidation and moisture stability
- Extremely low pour point -70°C
- Non-volatile
- Halogen free
- Non-toxic

## MIVOLT CL200 PROPERTIES

Thermal Properties	Units	Method	MIVOLT CL200
Density at 20°C	g/cc	ISO 3675	0.92
Specific Heat at 40°C	J/kg-K	ASTM E1269	1968
Thermal Conductivity at 40°C	W/m-K	ASTM D7896	0.125
Kinematic Viscosity at 40°C	mm <sup>2</sup> /s	ISO 3104	7.7
Kinematic Viscosity at 100°C	mm <sup>2</sup> /s	ISO 3104	2.2
Coefficient of Expansion at 40°C	1/K	ASTM D1903	0.00082
Pour Point	°C	ISO 3016	<-70
Chemical Properties			
Neutralisation Value	mg KOH/g	IEC 62021-2	<0.03
Net Calorific Value	MJ/kg	ASTM D240-02	<35
Dielectric Properties			
AC Breakdown Voltage	kV	IEC 60156	>70
Volume Resistivity at 20°C	GΩ.m	IEC 60247	>80
Fire Safety			
Flash Point	°C	ISO 2719	>190
Fire Point	°C	ISO 2592	>210
Auto-Ignition Temperature	°C	ASTM E659	>380
Environmental Impact			
Biodegradability		OECD 301	Readily Biodegradable
Global Warming Potential	GWP		<1
Ozone Depleting Potential	ODP		0

# MIVOLT CL200 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 CL200 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 CL200. 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 CL200 Material Safety Data Sheet (MSDS) before using this liquid. Please contact our technical team to request a copy.

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# MIVOLT®

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a product of  **M&I MATERIALS**

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