

MIRACLE Series

Immersion Cooling Fluids

Product Description

Digital technologies such as cloud computing, 5G, and generative AI rapidly develop, the need to process massive amounts of data at high speeds is increasing. As a result, the performance and processing capabilities of network equipment have improved, but the heat generated has also increased, making server cooling an important consideration. The **Miracle Series** is a cooling fluid designed for single-phase immersion cooling systems that boast high cooling efficiency within server cooling systems. It uses carefully selected additives to provide excellent oxidation stability and electrical insulation properties in a balanced manner, enabling long-term use.

Features

1. Superior oxidation stability

Immersion cooling fluids are subjected to long-term thermal loads on cooling servers, so oxidation stability is very important. The **Miracle series** offers improved durability and excellent oxidation stability thanks to additives based on lubricant formulation technology.

2. Compatible with various materials

Immersion cooling systems and servers use a variety of metals and organic materials. The **Miracle Series** can be used to evaluate compatibility with a variety of materials, allowing you to check compatibility with materials used in actual systems in advance.

3. Colorless, transparent, and odorless

In immersion cooling systems, the refrigerant must be colorless and transparent to allow inspection of immersed electronic equipment. In addition, single-phase immersion cooling systems are exposed to the atmosphere, so the refrigerant must have very low odor. The base materials of the **Miracle series** were carefully selected to be colorless, transparent, and virtually odorless.

4. Safety

We have taken worker safety into consideration by using food-grade.



Technical Data Sheet

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Product Line

1. MIRACLE FR

With a flash point exceeding 250°C, it is classified as non-hazardous under Korean fire safety laws. By achieving both low viscosity and a high flash point, it enhances cooling efficiency and reduces restrictions associated with handling hazardous materials.

2. MIRACLE LV

It pursues cooling through low viscosity while achieving an auto-ignition point of over 300°C as specified by the OCP (Open Compute Project) standard, which is widely used in the industry handling data center hardware.

3. MIRACLE Bio

By using biodegradable raw materials, we significantly reduce CO₂ emissions throughout the product life cycle and contribute to carbon neutrality. In addition to energy savings through efficient immersion cooling, the refrigerant itself also contributes to reducing environmental impact.

Typical Application

- Immersion cooling system for IT equipment
- ESS(Electricity Storage System) Cooling System
- UPS (Uninterruptible Power Supply) Cooling System

Package Sizes

- 200L Steel Drum
- 20L Pail Can

MIRACLE Series Specification

		MIRACLE FR	MIRACLE LV	MIRACLE Bio
Color (ASTM)		L0.5	L0.5	L0.5
Density @15°C	g/cm ³	0.837	0.831	0.946
Kinematic Viscosity @ 40°C	mm ² /s	34.8	7.80	20.0
Flash Point (COC)	°C	256	162	258
Auto-Ignition Point	°C	400	310	400
Acid Number	mgKOH/g	0.01	0.01	0.01
Volume Resistivity @25°C	TΩ · m	>1	>1	>1

These characteristics are typical of current production. For more information, please contact us or visit www.michang.co.kr.

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Breakdown Voltage	kV	>40	>40	>40
Moisture	ppm	≤30 ppm	≤30 ppm	≤30 ppm
Specific Heat	Joule/g·°C	1.93	1.94	1.91
Thermal Conductivity	Wm·°C	0.138	0.139	0.130
Dielectric Dissipation Factor	60Hz %	0.002	0.002	0.002

Note: The typical properties may be changed without notice. (June 2024)

Health and Safety

Detailed health and safety information for this product is provided in the Material Safety Data Sheet (MSDS), available upon request.