OAT low conductive

Freecor® EV Milli 10

Reduced electrical conductivity coolant

Arteco's **Freecor® EV Milli 10** is a dedicated coolant for **battery thermal management** of Battery Electric Vehicles (BEV). Based on proven OAT technology, it combines all-round corrosion protection with **reduced electrical conductivity** to enhance electrical safety. Additionally, **Freecor® EV Milli 10** also contains a **brazing flux compensation package**, reducing the negative effects of CAB brazing.

Freecor® EV Milli 10 is specifically designed as a reduced electrical conductivity coolant (<100µS/cm) for indirect cooling in the battery cooling loop of Battery Electric Vehicles.

PRODUCT BENEFITS

5 fold protection

Electrical safety

- Stable and reduced electrical conductivity (< 100 µS/cm);
- Thanks to its **reduced electrical conductivity**, the effects of short circuit paths are minimised;
- Significant reduction of the consequential generation of hydrogen due to electrolysis compared to classic water-based coolants.

Material protection

- All-round protection to metals, especially aluminium, cast iron, steel and stainless steel, red and yellow metals such as copper and brass;
- Compatible with common elastomers as well as thermoplastics typically found in these cooling systems;
- Ensured longevity of components and reduced maintenance.

Flux stabilisation

- **Freecor® EV Milli 10** is the first coolant of its kind to compensate for aluminium CAB brazing flux, improving the compatibility of the coolant.
- Thanks to the exclusive combination of inhibitors and stabilisers, **Freecor® EV Milli 10** ensures low and stable electrical conductivity over time in the cooling system.

Sustainability

- Carefully selected organic additive technology

Freezing & boiling point

- Maintenance-free protection against freezing and boiling.

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Application

Freecor® EV Milli 10 is designed as a liquid heat transfer medium for indirect cooling of battery cells, modules and packs where coolants with low electrical conductivity are required.
It is not intended for use in traditional engine coolant applications. It should not be applied in fuel cell nor immersive cooling applications where direct electrical contact is possible.
Caution must be exercised when **Freecor® EV Milli 10** is used in combination with electrical motors, power electronics, auxiliary heaters or other heat rejecting devices as premature increase of electrical conductivity may occur.
The coolant as 50v% ready-mix has a freezing point of -37°C and boiling point of 108°C. **Freecor® EV Milli 10** is miscible with other low conductive fluids with a similar conductivity range. The use of **Freecor® EV Milli 10** in systems - designed for standard electrical conductivity products - may result in accelerate aging of the fluid, resulting in a loss of corrosion protection due to the increase in electrical conductivity of the fluid.

Toxicity & safety

For toxicity information, safe handling and disposal of the product, we refer to the Safety Data Sheet. This product should not be used to protect the inside of drinking water systems.

Colours

Freecor® EV Milli 10 is available in the following colours:

Blue BL12 for concentrate
Blue BL07 for ready-mix

Packaging

Arteco's **Freecor® EV Milli 10** is available as ready-mix and as concentrate **Freecor® EV Milli CC10**, in the following packs:

- **IBC 1000L**
- **20L**
- **Bottle 5L**
- **Plastic Drum**

Contact details

Should you have a questions on Arteco's **Freecor® EV Milli 10**, available packages or colours or one of the other Arteco solutions, please do not hesitate to contact your local Area Sales Manager or send your inquiry to info@arteco-coolants.com.

Shelflife & Storage requirements

Arteco advises to test the coolant's electrical conductivity and pH before the product is added to the system as a standard practice, especially when the storage period has exceeded one year.
Freecor® EV Milli 10 can be stored for 24 months at max. 30°C in unopened recipients without any effect on the product quality or performance. It is strongly recommended to use new, non-translucent containers and where possible with a UV filter. Direct sunlight and high temperatures can degrade the quality of the product.
Freecor® EV Milli 10 should be stored above -20°C and below 30°C. Periods of exposure to temperatures above 35°C should be minimized.

Handling instructions

Freecor® EV Milli 10 can be obtained by diluting **Freecor® EV Milli CC 10** with the proper amount of demineralised water for optimal performance, controlled quality and optimal conductivity levels. Recommended use concentration is 50v%. Please consult our product information leaflet on water quality recommendations for more information.

Arteco advises to rinse the cooling system with **Freecor® EV Milli 10** or demineralised water (electrical conductivity below 100 µS/cm) prior to (re)filling the cooling system. A full drain is required after rinsing.
A conventional engine coolant has electrical conductivity levels more than 10 times higher, potentially causing safety hazards in the cooling system. Therefore, **Freecor® EV Milli 10** should not be mixed with any conventional engine coolant. Even minor additions will increase electrical conductivity and may affect safety and performance of **Freecor® EV Milli 10**. As with any antifreeze coolant, the use of galvanised steel is not recommended for pipes or any other part of the storage/mixing installation.

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Addendum - Technical information

Chemical and Physical Properties Freecor® EV Milli CC10*

Property	Typical value	Unit	Specification
Appearance	Light blue		
eConductivity (25°C)	38	µS/cm	ASTM D1125
Density (20°C)	1,112	kg/l	ASTM D1122
pH as such	8,0		ASTM D1287
Kinematic viscosity (20°C)	17,3	mm^2/s	ASTM D445
Reserve Alkalinity (to pH 5.5)	2,8	ml 0.1 M HCL	ASTM D1121
Equilibrium boiling point	187	°C	ASTM D1120
Hard water stability (6 mmol Ca^{2+})	< 0.1	ml deposit	CEC C-06-T-95
Foaming tendency	50 // 2	ml // s	ASTM D1881

** Typical values*

Chemical and Physical Properties of Freecor® EV Milli CC10 in water*

	50 v%	Unit	Specification
Freezing point	-37	°C	ASTM D1177
Boiling point	111	°C	ASTM D1120
Pour point	-45,0	°C	ASTM D97
eConductivity (25°C)	96	µS/cm	ASTM D1125
eConductivity (60°C)	188	µS/cm	ASTM D1125
Density (20°C)	1,066	kg/l	ASTM D1122
pH	8,2		ASTM D1287
Kinematic Viscosity (20°C)	3.7	mm^2/s	ASTM D445
Thermal Conductivity (20°C)	0,42	W/mK	ASTM D7895
Specific heat (20°C)	3,3	kJ/kg.K	ASTM E1269

** Typical values*