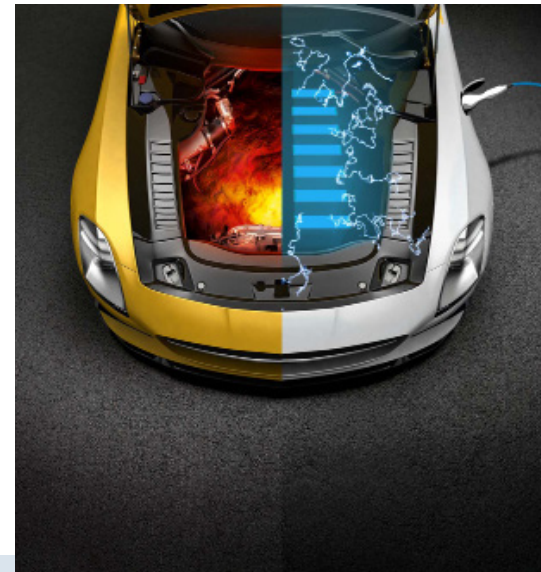


Freecor® EV Multi 10

1st of its kind all-round coolant for electric vehicles

Arteco's **Freecor® EV Multi 10** is the first of its kind all-round coolant for electrified vehicles (xEVs) from battery to hybrid electric vehicles. This versatile coolant is specially designed to provide all round protection for all parts of the EV thermal management system. Its organic additive package (OAT) protects the battery cooling plates, power electronic heat sinks and the combustion engine in hybrid applications. Furthermore **Freecor® EV Multi 10** prevents seal wear, leakage and noise issues with e-Motors.

Freecor® EV Multi 10 is specifically designed as an all-round EV coolant optimised to deliver lifelong protection and cooling of electric motors and electronic components.



PRODUCT BENEFITS



Optimised OAT package for EVs

- EV specific corrosion protection, focused on aluminium alloys used for EV systems
- Effective even at both battery and combustion engine operation temperatures
- Protecting the standard cooling system components in an excellent way



Motor seal protection

- No formation of abrasive substances thanks to the use of organic inhibitors
- High speed lubrication of dynamic seals due to the selection of specific additives
- Reduced leakage issues and noise generation (e.g. in rotor cooled e-motors)



Cooling of power electronics

- Additives designed for optimal aluminium (Al) protection
- High performance additives protecting copper (Cu)
- Compatible with coatings applied on heat sinks



Compatible with other typical automotive parts

- Suitable for use with radiators and heat exchangers containing Cu, Al and stainless-steel parts
- Wide range of compatibility with conventional automotive parts
- Compatible with a wide range of water pumps

Application

Arteco's **Freecor® EV Multi 10** is designed as an all-round liquid heat transfer medium for the complete range of electric vehicles from Hybrid Electric Vehicles (HEV) to Battery Electric Vehicles (BEV). In today's EVs, combustion engine coolants are being used. Such coolants are primarily developed for internal combustion engines (ICE) and are not optimized for electrified vehicles. **Freecor® EV Multi 10** changes all this. This versatile coolant is specially designed to provide all round protection for all parts of the EV thermal management system. Its organic additive package is optimised and therefore recommended for use in EV applications. It is however not intended as an alternative to cool applications that need a reduced electrical conductivity e.g. direct cooling of fuel cells (see our **Freecor® EV Micro** series for such applications). The coolant can also be used as a high performant OAT coolant for internal combustion engines of hybrid electric vehicles. The use of zinc, zinc containing and galvanised parts should be avoided.

Key approvals, standards and specifications

Freecor® EV Multi 10 fully complies with following standard:






- ASTM D3306
- BS 6580

Toxicity & safety

For Toxicity and Safety Data we refer to the Safety Data Sheet. The information and advice given should be observed and due attention should be given to the precautions necessary for handling chemicals. This product should not be used to protect the inside of drinking water systems against freezing.

Packaging

Arteco's **Freecor® EV Multi 10** is available in the following packs & colours:

	Bulk		Pail
	IBC 1000L		Drum
	Other: 1L, 2L, 5L, 20L		

 pink - RL04

Contact details

Should you have questions on Arteco's **Freecor® EV Multi 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@artecco-coolants.com.

Addendum - Technical information

Chemical and Physical Properties Freecor® EV Multi CC10*

Property	Typical value	Unit	Specification
Appearance	Pink		
Density (20°C)	1.121	kg/l	ASTM D1122
Equilibrium boiling point	> 170	°C	ASTM D1120
Kinematic viscosity (20°C)	< 5.0	mm ² /s	ASTM D445
pH as such	8.5		ASTM D1287
Reserve Alkalinity (to pH 5.5)	6.5	ml 0.1 M HCL	ASTM D1121
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 Multi 10 in water*

	33 v%	40 v%	50 v%	Dilution	Specification
Freezing point	-18.0	-24.5	-37.0	°C	ASTM D1177
Pour point	-26.0	-32.5	-45.0	°C	ASTM D97
Boiling point	104	106	109	°C	ASTM D1120
Density (20°C)	1.048	1.057	1.071	kg/l	ASTM D1122
Kinematic viscosity (20°C)	2.4	2.9	3.9	mm ² /s	ASTM D445
Thermal Conductivity (20°C)	0.47	0.44	0.42	W/mK	ASTM D7895
Specific heat (20°C)	3.8	3.6	3.3	kJ/kg.K	ASTM E1269
Electrical Conductivity (25°C)	3100	3120	2980	µS/cm	ASTM D1125
pH	8.7	8.7	8.7		ASTM D1287

* Typical values

Addendum - Laboratory test results

Arteco's **Freecor® EV Multi 10** has been submitted to various lab tests. For more details, please contact your local Area Sales Manager.

ASTM D1384 - Glassware corrosion test

	Weight change in mg/coupon ¹					
	Brass	Copper	Solder	Steel	Cast Iron	Aluminium
ASTM D3306 (max.)	10	10	10	10	10	10
Freecor® EV Multi 10	1.0	1.0	5.1	0.1	-0.2	0.0

¹ Weight loss AFTER chemical cleaning according to ASTM procedure. Weight gain is indicated by a - sign

ASTM D4340 - Aluminium heat rejection test (Hot surface corrosion test)

	Weight change in mg/cm ² /week ¹
ASTM D3306 (max.)	1.0
Freecor® EV Multi 10	-0.1
pH after test	8.1

¹ Weight loss AFTER chemical cleaning according to ASTM procedure. Weight gain is indicated by a - sign

Storage & shelf life

Freecor® EV Multi 10 should be stored above -20°C and preferably at ambient temperatures. Periods of exposure to temperatures above 35°C should be minimised.

It is strongly advised not to expose the coolant in translucent packages to direct sunlight because this can result in fading of the colour or discoloration over time. This reaction can be accelerated if coupled with high ambient temperatures. It is therefore advisable to store the coolant indoors and where possible to use packages with an UV filter.

Freecor® EV Multi 10 is an OAT coolant and can be stored for minimum 2 years in unopened containers without any effect on the product quality or performance.

Handling instructions

Freecor® EV Multi 10 is compatible with most other coolants based on ethylene glycol. Exclusive use of **Freecor® EV Multi 10** is however recommended for optimum performance. As for any coolant, we recommend the use of deionised or distilled water to prepare the ready-to-use dilutions for optimal performance and controlled quality.

We refer to our product information leaflet on water quality recommendations. Please contact your local Area Sales Manager for more information.

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