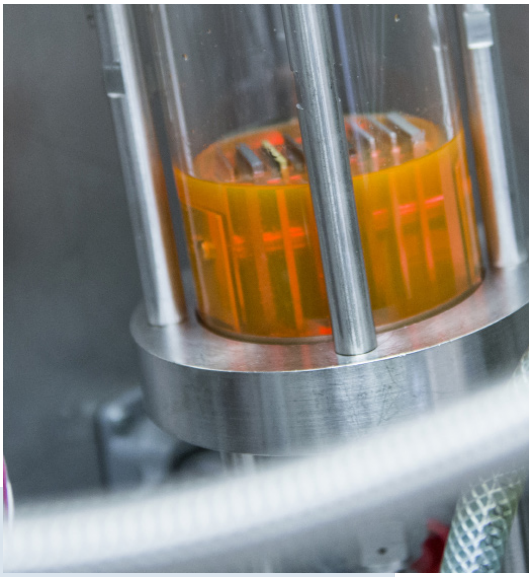
Freecor® FTC

x-OAT technology



Freecor® FTC is a premium engine coolant based on Organic Additive Technology (OAT) that provides year-round frost and excellent corrosion, freeze and boil protection. The coolant can withstand high temperatures thanks to the increased oxidation stability and compensates the negative effects of potential flux contamination.

Freecor® FTC is designed to cope with the most extreme engine conditions in both passenger cars and heavy-duty applications.

PRODUCT BENEFITS

Superior flux compensation

- Contains a neutralisation package to avoid adverse effect of flux material, used during the production process of Aluminium heat exchangers
- Prevents the formation of gels or deposits in the cooling system

Robustness

- Excellent hard water stability avoiding the formation of insoluble deposits
- Superior oxidation and pH stability at high temperatures, resulting in limited amount of glycol degradation acids
- Outstanding heat transfer

Long life performance

- Increased service interval
- Long-lasting protection thanks to the OAT backbone with virtually non-depleting organic corrosion inhibitors

Environment and safety

- Carefully selected additives to reduce environmental impact
- 2-EHA, nitrite and borate free technology
- Compliant with EU CO_2 emission performance standards

Application

Arteco's **Freecor® FTC** can be used with confidence in engines manufactured from cast iron, aluminium or combinations of the two metals, and in cooling systems comprising aluminium or copper alloys. The coolant is particularly recommended for hi-tech engines, where high temperature aluminium protection is important.
Freecor® FTC is suitable for use in combustion engines and Battery Electric Vehicles in automotive and heavy duty applications if there is no requirement on electrical conductivity.

Key approvals, standards and specifications

Freecor® FTC complies with following standards:
- ASTM D3306
- ASTM D6210
- JIS K 2234 : 2018

Freecor® FTC is approved for use in (non-exhaustive list):
- Claas
- AGCO Power
- Deutz according to standard DQC CB-14

For the complete overview and details, please consult Arteco's Product Finder.

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.

Elastomer, plastic & metallic compatibility

Freecor® FTC has an improved elastomer, plastic & metallic compatibility:
- EPDM, HNBR, NBR, FKM, Sillicone
- PP, PA, PTFE, PPS, ...
- Iron, Steel, Copper, Aluminium, ...

Packaging

Arteco's **Freecor® FTC** is available in the following packs & colours:


Bulk


Pail


Flexi bag/ IBC 1000L


Drum


Other: 1L, 2L, 5L, 20L


CL00

Contact details

Should you have questions with regards to Arteco's **Freecor® FTC**, related to available packages or colours or on 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.

Addendum - Technical information

Chemical and Physical Properties

Property	Freecor® FTC	Unit	ASTM D3306 requirements	Method
Ethylene glycol	92 min.	% w/w	base	
Other glycols	1 max.	% w/w	5% max.	
Inhibitor content	4 typ.	% w/w		
Water content	4 max.	% w/w	report	ASTM D1123
Ash content	1.5 max.	% w/w	5% max.	ASTM D1119
Nitrite, borate, 2EHA	-			
Relative density (20°C)	1.124 typ.	kg/l	1.110 - 1.145	ASTM D5931
Colour	coloured or uncoloured			
Equilibrium boiling point	180 max.	°C	> 163	ASTM D1120
Reserve Alkalinity	6.4		report	ASTM D1121
pH (20°C)	8.6 typ.			ASTM D1287

Chemical and Physical Properties - Dilutions

	40% dilution	50% dilution	60% dilution	ASTM D3306 (50% dilution)	Method
pH	8.2 - 8.7	8.2 - 8.7	8.2 - 8.7	7.5 - 11.0	ASTM D1287
Foaming properties at RT • **Volume, ml** • **break time**	85 typ. 3 typ.	85 typ. 3 typ.	85 typ. 3 typ.		ASTM D1881
Initial crystalisation, °C	< -24	< -36.4	< -53	< -36.4	ASTM D1177
Density (20°C), kg/l	1.059 typ.	1.073 typ.	1.085 typ.		ASTM D5931
Equilibrium boiling point, °C	108 min.	108 min.	108 min.		ASTM D1120
Staining characteristics	no effect	no effect	no effect	no effect	ASTM D1882
Hard water stability	no precipitate	no precipitate	no precipitate		VW PV 1426

Addendum - Laboratory test results

Arteco's **Freecor® FTC** 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	30	10	10	30
Freecor® FTC	0	1	3	1	0	5

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

ASTM D4340 - Aluminium heat rejection test

	Weight change in mg/cm²/week[1]	pH after test
ASTM D3306 (max.)	1.0	report
Freecor® FTC	0.44	8.1

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

ASTM D2570 - Simulated service corrosion test

	Weight change in mg/coupon[1]					
	Brass	**Copper**	**Solder**	**Steel**	**Cast Iron**	**Aluminium**
ASTM D3306 (max.)	20	20	60	20	20	60
Freecor® FTC	8	7	6	2	0	2

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

ASTM D2809 - Water pump cavitation test

	Pump rating[1]
ASTM D3306 requirement	> / = 8
Freecor® FTC	9

[1] ASTM D3306 requires a pump rating of 8 or higher on a scale of 10

ASTM D7820 - Oxidation Stability (air charged to 620 kPa gauge prssure, 150°C)

	Glycol oxidation products after testing (ppm)			
	Glycolate	Formate	Oxalate	Total
Reference coolant	4777	683	70	5530
Freecor® FTC	2835	595	18	3448

Hard Water Stability (per OEM requirement)

	Amount of deposit (v/v%)
Freecor® FTC	<0.05

FVV-Heft R530/2005 - Dynamic Heat Transfer Test

	Weight change in mg/copoun[1]			
	Cast Iron (EN-GJL-250)		Aluminium (EN AC-AlSi6Cu4)	
	Heated coupon	Non-heated coupon	Heated coupon	Non-heated coupon
Freecor® FTC 40 v%[2]	-28	-23	-19	-22
Freecor® FTC 40 v%[3]	1	-17	-14	-3

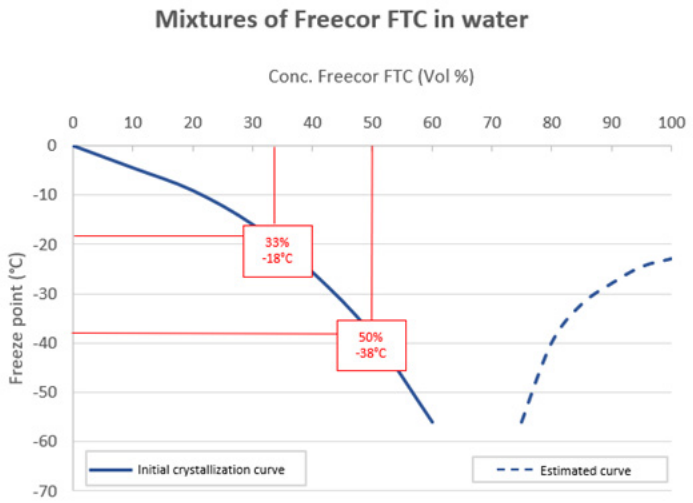
[1] Weight loss AFTER chemical cleaning according to ASTM procedure. Weight gain is indicated by a - sign
[2] 40% coolant dilution in deionised water, 105°C operating temperature
[3] 40% coolant diluation in 10° dGH FVV water, 115°C operating temperature

Shelflife & storage requirements

Freecor® FTC can be stored for minimum 3 years in unopened containers without any effect on the product quality for performance. The product 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, to use new and not recycled containers and where possible packages with a UV filter. As with any antifreeze coolant, the use of galvanised steel is not recommended for pipes or any other part of the storage/mixing installation and for packaging.

Compatibility and mixability

Freecor® FTC is compatible with most other coolants based on ethylene glycol. Exclusive use of **Freecor® FTC** 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.
It is recommended to use at least 33vol% of **Freecor® FTC** in the coolant solution. This provides an initial freezing point of -18°C. Mixtures with more than 70 vol% **Freecor® FTC** in water are not recommended.
We refer to our product information leaflet on water quality recommendations. Contact your local Area Sales Manager for more information.



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