

# Freecor<sup>®</sup> PGC

## 1 Description

**Freecor<sup>®</sup> PGC** - mixed with the appropriate amount of water - is used as a cooling and heat transferring fluid in combustion engines. The heat of the internal combustion is transferred via the fluid to the radiator where the mixture is cooled by means of air flow.

**Freecor<sup>®</sup> PGC** is a propylene glycol based

fluid that provides maintenance-free protection against *freezing and boiling* but also against *corrosion*. Through the use of virtually non-depleting corrosion inhibitors, extended coolant life, often for the whole life of the engine or vehicle, is obtained.

## 2 Benefits

**Freecor<sup>®</sup> PGC** offers many benefits to the engine designer as well as to the user:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>▪ <b>low toxicity</b></li> <li>▪ <b>extended life</b></li> <li>▪ <b>improved heat transfer</b></li> <li>▪ <b>reduces repairs</b></li> <li>▪ <b>reliability</b></li> <li>▪ <b>improved hard water stability</b></li> <li>▪ <b>save time and money</b></li> <li>▪ <b>suitable for mixed fleets</b></li> <li>▪ <b>environmentally friendly</b></li> </ul> | <p>by using propylene glycol as base fluid<br/>by synergistic combination of inhibitors<br/>leaves more flexibility to engine design<br/>to thermostat, radiator and water pump<br/>depletion free and stable inhibitor<br/>absence of silicates and phosphates<br/>maintenance-free coolant<br/>1 coolant for automotive &amp; heavy duty application<br/>by using carboxylic additives in the inhibitor package</p> |
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Based on patented *silicate-free* aliphatic additives technology, **Freecor<sup>®</sup> PGC** provides long-life corrosion protection for all engine metals, including aluminium and ferrous alloys. The synergistic combination of mono- and di-carboxylates present in this coolant, has proven to provide protection for at least **650,000 km** (ca. 8,000 hours) in truck & bus-application or **250,000 km** (ca. 2,000 hours) for passenger cars or a minimum of **32,000 hours** (or 6 years) for stationary engines. It is recommended to change the coolant every five years or at above mileages or operating times, whichever comes first.

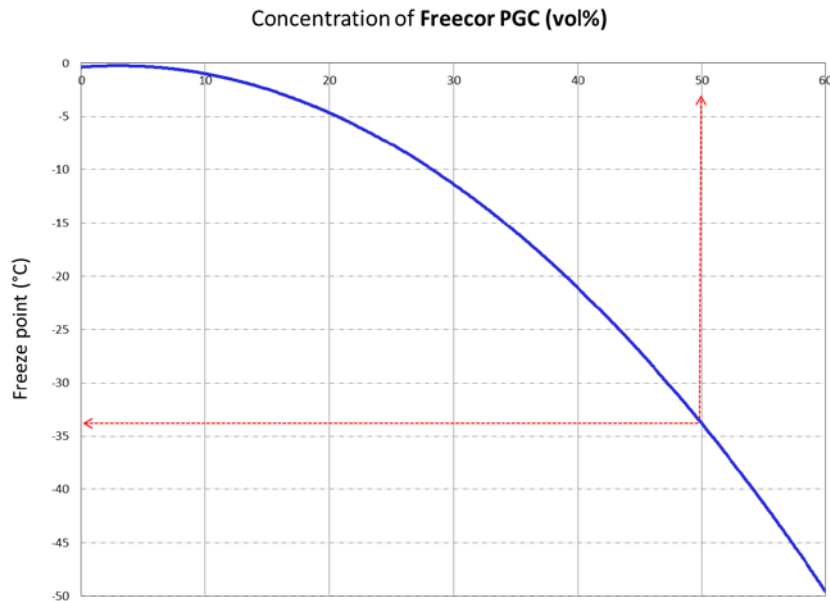
**Freecor<sup>®</sup> PGC** provides long-life protection against all forms of *corrosion* by the use of optimized and patented organic corrosion inhibitors. Excellent and lasting high temperature corrosion protection is provided for the **aluminium** heat transfer surfaces contained in modern engines. The inhibitor package of **Freecor<sup>®</sup> PGC** offers excellent cavitation protection even without using nitrite or nitrite-based supplemental coolant additives (SCA's).

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## 3 Application

**Freecor<sup>®</sup> PGC** provides long-life frost and corrosion protection. To ensure good corrosion protection it is recommended to use at least 33 vol. % of **Freecor<sup>®</sup> PGC** in the coolant solution. This provides freezing protection to -16.4°C. Typical mixtures in Northern Europe are 50/50, offering freezing protection down to -38°C.

**Freecor<sup>®</sup> PGC** may be used with confidence in engines manufactured from cast iron, aluminium or combinations of the two metals, and in cooling systems made of aluminium or copper alloys. **Freecor<sup>®</sup> PGC** is particularly recommended for hi-tech engines, where high temperature aluminium protection is important.



## 4 Compatibility and mixability

**Freecor<sup>®</sup> PGC** is compatible with most other coolants based on propylene or ethylene glycol. Exclusive use of **Freecor<sup>®</sup> PGC** is however, recommended for optimum corrosion protection and sludge control. For optimal performance and controlled quality, we recommend the use of deionised or distilled water to prepare the ready-to-use

dilutions. We refer to our product information leaflet on water quality recommendations.

Still, despite these recommendations, lab testing has shown that acceptable corrosion results are still obtained with water of 20°dH, containing up to 500 ppm chlorides or 500 ppm sulphates. Contact your local area sales manager for more information.

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## 5 Availability

**Freecor<sup>®</sup> PGC** is available in bulk and various packages. Please contact your local Artecó area sales manager for further information.

## 6 Storage and requirements

The product should be stored above -20°C and preferably at ambient temperatures. Periods of exposure to temperatures above 35°C should be minimized.

Further, it is strongly advised not to expose the coolant in translucent packages to direct sunlight because this can degrade the colour dyes present in the coolant, and 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 coolant filled in

translucent packages indoors to avoid this issue.

**Freecor<sup>®</sup> PGC** can be stored for minimum 8 years in unopened containers without any effect on the product quality or performance. It is strongly recommended to use new containers and not recycled ones.

As with any antifreeze coolant, the use of galvanized steel is not recommended for pipes or any other part of the storage/mixing installation

## 7 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. The transport is not regulated.

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## Addendum - technical information

### Chemical and physical properties

	Freecor <sup>®</sup> PGC	ASTM 3306 requirements	method	
propylene glycol	93.0 % w/w glycol	base		
other glycol's	0.5 % max.	5 % w/w max.		
inhibitor content	5 % w/w			
water content	4 % w/w max	5 % w/w max	ASTM D1123	
ash content	1.4 % w/w typ.	5 % w/w max	ASTM D1119	
nitrite, amine, phosphate, borate, silicate	nil			
colour	uncoloured			
specific gravity, 15°C	1.045 typ.	1.030 to 1.065	ASTM D1122	
specific gravity, 20°C	1.042 typ.		ASTM D1122	
equilibrium boiling point	163°C typ.	> 152°C	ASTM D1120	
reserve alkalinity	5.7 typ.	report	ASTM D1121	
refractive index	1.431 typ.			
	50 % dilution	33 % dilution	ASTM 3306	method
pH	8.8	8.5	7.5 to 11.0	ASTM D1287
foaming properties at 25°C	50 ml typ			
■ break Time	5 sec. typ..	/		ASTM D1881
foaming properties at 88°C	50 ml typ.	50 ml typ.	150 ml max.	
■ break time	5 sec. typ.	5 sec typ		ASTM D1881
initial crystallization	- 32.6°C typ.	-14.9°C typ.	< - 32 °C	ASTM D 1177
freezing protection	-37.8°C typ.	- 16.4 °C typ.		
effect on non-metals	no effect	no effect		GME 60 255
staining characteristics	/	no effect	no effect	ASTM D 1882
hard water stability	no precipitate	/		VW PV 1426

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## ASTM D1384 glassware corrosion tests

	weight loss in mg/coupon <sup>1</sup>					
	Brass	Copper	Solder	Steel	Cast iron	Aluminium
ASTM D5216 (max)	10	10	30	10	10	30
<b>Freecor<sup>®</sup> PGC</b>	0.8	0.9	2.6	-0.1	-0.9	-0.9

<sup>1</sup> weight loss AFTER chemical cleaning acc. to ASTM procedure. Weight gain is indicated by a - sign.

## ASTM D4340 aluminium heat rejection test, 25 %

	weight loss in mg/cm <sup>2</sup> /week <sup>1</sup>
ASTM D5216 (max)	1.0
<b>Freecor<sup>®</sup> PGC</b>	< 0.2

<sup>1</sup> weight loss AFTER chemical cleaning acc. to ASTM procedure. Weight gain is indicated by a - sign.

## Modified MTU high temperature corrosion test (20vol%, 1890 W, 48h)

	weight loss in mg/coupon <sup>2</sup>	
	Cast iron	Aluminium
<b>Freecor<sup>®</sup> PGC</b>		
hot coupon	36	18
top coupon	25	13

<sup>2</sup> weight loss AFTER chemical cleaning acc. to (shortened) MTU procedure. Weight gain is indicated by a - sign.

Corrosion protection