
Freecor® HCC

1 Description

Freecor® HCC is designed for heavy duty applications and to be used as a cooling and heat transfer fluid in internal combustion engines. Excess heat is transferred via the fluid to the radiator where the mixture is cooled by means of airflow. To protect the engine and cooling system from corrosion and frost damage, the coolant contains a corrosion inhibitor additive package and ethylene glycol.

Freecor® HCC is a coolant concentrate based on OAT technology with the inclusion of nitrites and molybdates. The product is free from amines, silicates, borates and phosphates. Due to the absence of additives that require stabilization (silicate for example) the formulation is inherently stable.

2 Benefits

Freecor® HCC provides effective freezing and boiling protection, and offers the following benefits:

- | | |
|--|---|
| • Superior corrosion protection | Balanced inhibitor package |
| • Excellent cavitation protection | Nitrite and Molybdate are proven to provide excellent cavitation protection |
| • Stable additive package | OAT inhibitor backbone |
| • Highly efficient cast iron protection | Well balanced corrosion inhibitor additive package |
| • Designed for HD applications | Suitable combination of additives to meet industry requirements |

A superconcentrate is available under the **Freecor® HCB** product name. This superconcentrate only requires a 6 wt% treat rate with ethylene glycol to obtain **Freecor® HCC**. More information on the blending instructions can be found in the product information leaflet for **Freecor® HCB**.

3 Performance & Standards

Freecor® HCC, complies with the requirements of the heavy-duty standard ASTM D6210 and the heavy-duty performance requirements of GB 29743-2013 (HEC), industry standard ASTM D3306 and the Chinese national standard performance requirement of GB 29743-2013 (LEC).

Freecor® HCC has proven to offer protection for in excess of 100,000 km in heavy duty applications.

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4 Compatibility and mixability

For optimal performance, we recommend the use of deionised or distilled water to prepare ready-to-use dilutions of **Freecor® HCC**. Please refer to our product information leaflet describing water quality recommendations. Contact your local area sales manager should you require more information.

5 Availability

Freecor® HCC is available in various packaging options, in different colours and with and without bittering agent. Please contact your local area sales manager regarding the availability of packages, dilutions, colours or customer adapted variants.

6 Storage requirements

The product should be stored above -20°C and preferably at ambient temperature. 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 as this can degrade dyes present in the coolant, and result in fading of the colour and/or it's discoloration over time. This reaction can be accelerated when coupled with high ambient temperatures. It is therefore advisable to store coolant filled in translucent

packages indoors to avoid this issue. **Freecor® HCC** can be stored for minimum 2 years in unopened containers without any effect on the product quality or performance. It is strongly recommended to use new and not recycled containers.

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

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7 Toxicity & safety

For Toxicity and Safety Data refer to the Safety Data Sheet. The information and advice provided 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 of this product is not regulated.

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Version 06/2022-v01.0

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Addendum - Technical information

Chemical and physical properties

	Freecor [®] HCC	GB 29743-2013 HEC-I	method
Appearance	Clear liquid	Clear, transparent without deposits	Visual
Density 20°C, kg/l	1.114	1.108 – 1.144	SH/T0068
pH, 50vol%	8.8	7.5 – 11.0	SH/T0069
Reserve alkalinity, ml HCl 0.1N	3.3	report	SH/T0091
Boiling point °C, 50vol%	111.2	≥ 108.0	SH/T0089
Freezing point, °C, 50vol%	-37.9	≤ -36.4	SH/T0090
Ash content (wt%)	0.8	≤ 5.0	SH/T0086
Chloride (mg/kg)	≤ 10	≤ 60	SH/T0621
Water content (wt%)	3.7	≤ 5.0	SH/T0086
Foam volume, ml	40	≤ 150	SH/T0066
Foam disappear time, s	2.0	≤ 5.0	SH/T0066

	Freecor [®] HCC -35°C	Freecor [®] HCC -45°C	method
Appearance	Clear liquid	Clear liquid	Visual
Density 20°C, kg/l	1.066 typ.	1.074 typ.	ASTM D5931
pH	8.7 typ.	8.8 typ.	ASTM D1287
Reserve alkalinity, ml HCl 0.1N	1.5 typ.	1.6 typ.	ASTM D1121
Freezing point, °C,	-36 typ.	-46 typ.	ASTM D1177
Nitrite (mg/kg)	387 typ.	437 typ.	ASTM D5827
Molybdate (mg/kg)	437 typ.	492 typ.	ASTM D6130

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GB 29743-2013: SH/T 0085 Glassware Corrosion test for engine coolants

	Weight loss in mg/coupon ¹					
	Brass	Copper	Solder	Steel	Cast Iron	Aluminium
GB 29743-2013 (max)	+/-10	+/-10	+/-30	+/-10	+/-10	+/-30
Freecor[®] HCC (typ.)	0	0	-5	0	0	-8

¹ Weight loss AFTER chemical cleaning acc. to SH/T0085. Weight gain is indicated by a - sign.

GB 29743-2013: SH/T 0620 Corrosion of cast Aluminium alloys in engine coolants under heat-rejecting conditions

	Weight loss in mg/cm ² /week ¹
GB 29743-2013 (max)	+/-1.0
Freecor[®] HCC (typ.)	0.2

¹ Weight loss AFTER chemical cleaning acc. to SH/T 0620. Weight gain is indicated by a - sign.

GB 29743-2013: SH/T 0087 Cavitation corrosion and erosion characteristics of Aluminium pumps

	Visual rating
GB 29743-2013 (min)	8
Freecor[®] HCC (typ.)	9

GB 29743-2013: SH/T 0088 Simulated service corrosion testing of engine coolants

	Weight loss in mg/coupon ¹					
	Brass	Copper	Solder	Steel	Cast Iron	Aluminium
GB 29743-2013 (max)	+/-20	+/-20	+/-60	+/-20	+/-20	+/-60
Freecor[®] HCC (typ.)	3	2-	8-	0	0	4

¹ Weight loss AFTER chemical cleaning according to SH/T 0088. Weight gain is indicated by a - sign.

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ASTM D1384: Glassware corrosion test

	Weight loss in mg/coupon ¹					
	Brass	Copper	Solder	Steel	Cast Iron	Aluminium
ASTM D3306 (max)	10	10	30	10	10	30
ASTM D6210 (max)	10	10	30	10	10	30
Freecor[®] HCC (typ.)	1	1	2	1	1	5

¹ Weight loss AFTER chemical cleaning acc. to ASTM D1384. Weight gain is indicated by a - sign.

ASTM D4340: Corrosion of cast Aluminium alloys in engine coolants under heat-rejecting conditions

	Weight loss in mg/cm ² /week ¹
ASTM D3306 (max)	1.0
ASTM D6210 (max)	1.0
Freecor[®] HCC (typ.)	-0.1

¹ Weight loss AFTER chemical cleaning acc. to ASTM D4340. Weight gain is indicated by a - sign.

ASTM D2809 Cavitation corrosion and erosion characteristics of Aluminium pumps

	Visual rating
ASTM D3306	8 min
ASTM D6210	8 min
Freecor[®] HCC (typ.)	8

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ASTM D2570: Simulated Service Corrosion Testing of Engine Coolants

	Weight loss in mg/coupon ¹					
	Brass	Copper	Solder	Steel	Cast Iron	Aluminium
ASTM D3306 (max)	20	20	60	20	20	60
ASTM D6210 (max)	20	20	60	20	20	60
Freecor[®] HCC (typ.)	6	6	4	0	3	1

¹ Weight loss AFTER chemical cleaning according to ASTM D2570. Weight gain is indicated by a - sign.