



ELECTRIFIED®



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GLYSANTIN® FC G20® Ready Mix ELECTRIFIED®

GLYSANTIN® FC G20® Ready mix ELECTRIFIED® is a corrosion inhibited ready-to-use coolant based on ethylene glycol, exhibiting a very low electrical conductivity.

Properties

GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® has been developed especially for the fuel cell systems like PEMFC. It must not be used as engine coolant in conventional combustion engines. Conventional engine coolants having a very high electrical conductivity are not allowed in fuel cell cooling circuits.

Due to the selected non-ionic inhibitors used in GLYSANTIN® FC G20® Ready Mix ELECTRIFIED®, it exhibits a very low long-term stable electrical conductivity. This assures safe operation of the fuel cell power unit.

GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® offers a safe freeze protection down to -36°C and good heat dissipation. Metals, which are currently employed in the construction of PEMFC cooling systems are well protected against corrosion.

GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® meets the requirements of ASTM D8565.

Miscibility	Mixing, even with small amounts of conventional coolant/antifreeze or other ion-containing fluids disables the fuel cell coolant's function. Scrupulous cleanliness in terms of handling and application of GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® is indispensable to maintain the quality of the coolant. Close the GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® container tightly after usage.		
Chemical nature	Monoethylene glycol with corrosion inhibitors		
Appearance	Clear colorless liquid without solid contaminants		
Typical physical data	Density at 20 °C	1.065 g/cm ³	DIN 51 757
	Boiling point	108 °C	ASTM D1120
	Flash point	None up to 108 °C	DIN ISO 2592
	pH value	5-6	ASTM D1287
	Water content	48 – 52 %	DIN 51 777
	Refractive index	1.383	DIN 51 423
	Ash content	max 2.5 %	ASTM D1119

Viscosity			ASTM D445
	At 0 °C	7.55 mm ² /s	
	At 20 °C	3.52 mm ² /s	
	At 40 °C	1.98 mm ² /s	
	At 60 °C	1.29 mm ² /s	
	At 80 °C	0.91 mm ² /s	
Frost protection	Freezing Point	-36 °C	ASTM D1177
Foaming characteristics	33 vol % solution	max 60 mL / 1 s	ASTM D1881
Electrical conductivity	In contrast to deionized water (DI-water), GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® protects the system from frost. The electrical conductivity of GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® in comparison to non-inhibited ethylene glycol-water mixtures, remains steadily low. As a result, the product secures the electrical safety of the system and avoids loss of energy. This performance is illustrated by the following test. The electrical conductivity of the system after addition of GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® has remained low compared to ethylene glycol-water mixture. The long-term protection of GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® may be prolonged by using a suitable mixed-bed ion exchanger in the coolant circuit.		
	without temperature compensation		ASTM D1125
	At 25 °C	1.1 µS/cm	
	At 50 °C	2.0 µS/cm	
	At 90 °C	3.6 µS/cm	
Glassware corrosion test	Modified ASTM D1384 (GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® used as-is)		
	Metal coupons	Typical weight loss (mg/coupon)	ASTM D3306 limit (mg/coupon)
	Copper	-1.5	10 max
	Solder	25.3	30 max
	Brass	-1.3	10 max
	Steel	124.6	10 max
	Cast Iron	163.2	10 max
	Aluminum	-4.5	30 max

Glassware corrosion test	ASTM D8485		
	Metal coupons	Typical weight loss (mg/coupon)	ASTM D8565 limit (mg/coupon)
	Steel	0.3	10 max
	Aluminum A3003	-0.3	30 max
	Copper	2.5	report
	Fluid data		
	Electrical conductivity before	1.1 $\mu\text{S}/\text{cm}$	ASTM D1125
	Electrical conductivity after	3.1 $\mu\text{S}/\text{cm}$	ASTM D1125
	Al after test	<3 mg/kg	ICP
	Cu after test	<3 mg/kg	ICP
	Fe after test	<3 mg/kg	ICP
Heat transfer corrosion test	Modified ASTM D4340 (GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® used as-is)		
	Metal coupon	Typical weight change (mg/cm ² /week)	ASTM D 3306 limit (mg/cm ² /week)
	Cast aluminum	0.02	1.0 max
Stability	GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® operates at temperatures between -30°C and +90°C. In temperature range of -10°C to 90°C for 100 days resp. 2,500 h does not lead to any sediment, haze, or other negative changes of the fluid in our tests. Please consider that the stability of the electrical conductivity depends on the materials used in the fuel cell cooling system and should be individually checked.		
Application	GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® is ready-to-use and does not need any make- up water. It contains 48 % (vol/vol) ethylene glycol. Further dilution with distilled or demineralized water does not result in electrical conductivity above 2 $\mu\text{S}/\text{cm}$ at 25°C. However, the addition of water will weaken the corrosion protection. The amount of water should be less than 10%. Addition of extra ethylene glycol slightly improves the frost protection but impairs the corrosion protection as well.		
Material compatibility	As the development of fuel cell systems is a novel approach rather innovative, the compatibility of the coolant with actual components and used materials must be tested for individual application.		
	The following types of materials have been tested with GLYSANTIN® FC G20® Ready Mix ELECTRIFIED®:		
	• <u>Compatible</u>: Stainless steel, titanium, aluminum, copper, brass, graphite, PTFE, PE • <u>Not compatible</u>: Zinc, galvanized steel, cast iron, carbon steel Polymer materials and elastomers often contain considerable amounts of fillers and additives, which might impact the electrical conductivity of the coolant. Examples are EPDM, PVC, PA 66, silicone rubber, Viton, etc.		

Quality control	The above-listed data represent average values at the time of releasing this data sheet. They are intended as a guideline to facilitate handling of this product and cannot be regarded as specified data. Specified product data are issued as a separate product specification.
Storage stability	GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® has a shelf life of two years when stored in originally closed, airtight containers at temperatures of maximum 30 °C. After two years, the applicability should be tested by determining electrical conductivity and pH. Do not use galvanized containers for storage, because they may corrode.
Color	GLYSANTIN® FC G20® Ready Mix ELECTRIFIED® is usually available colorless.
Safety	When using this product, the information and advice given in our Safety Data Sheet should be observed. Due attention should also be given to the precautions necessary for handling chemicals.
Note	The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed. May 2025

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