Zitrec® FC

1. Description

Zitrec® FC - mixed with the appropriate amount of deionised or distilled water - is a phosphate-based multipurpose heat transfer fluid based on mono propylene glycol and contains only FDA approved ingredients.

Zitrec® FC has been registered by NSF International and concluded as acceptable for use as a heat transfer fluid where there is the possibility of incidental food contact.

2. Application

Many applications in the industry require a fluid to transport heat or cold. This transport medium is usually called secondary refrigerant or secondary coolant. The ideal secondary refrigerant must ensure a good thermal conductivity, have a high specific heat, be non-flammable and compatible with common engineering materials. Preferably the heat transfer fluid is also of low toxicity, which is specifically in the food industry of vital importance.
Defrosting, cooling and freezing are frequently part of an entire food chain process. In these applications, **Zitrec® FC** and its dilutions are especially useful. Some typical examples include the cooling in the beverage industries such as the cooling of wine, beer, milk and juices. But also during the brewing process, the cooling of fermentation and wort tanks is essential and **Zitrec® FC** will provide here the necessary heat transfer. Further in the chain, **Zitrec® FC** can be used in the bottling process of carbonated beverages, such as champagne or beer, preventing as such loss of carbonation.

Other applications include indirect contact freezing. During this process, the product and a heat transfer fluid are separated by means of an interface or barrier between the cooling medium and the product. This interface can be a metal plate or the products packaging material, which prevents direct contact between the product and the cooling medium. Contact freezing is mainly used to cool packed fish and meat products in blocks with pre-set linear dimensions.

Zitrec® FC provides protection against boiling, freezing and corrosion in each application. The dilution is determined by system requirements, mainly freezing requirements. However, to ensure good corrosion protection it is recommended to use at least 30 vol. % of **Zitrec® FC** in the coolant solution. Mixtures with more than 70 vol. % of **Zitrec® FC** in water are not recommended, because some physical properties, such as heat transfer, are no longer sufficient.

Zitrec® FC and its dilutions must be used in a manner which prevents direct or indirect contamination of edible products as they are not suitable for use as a direct food component or additive.

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dilution Zitrec® FC vol %	freezing point °C	dilution Zitrec® FC vol %	freezing point °C
31.6	-15	49.3	- 35
37.3	-20	52.2	-40
42.0	-25	54.7	- 45
46.0	- 30	57.0	- 50

3. Compatibility and mixability

Zitrec® FC is compatible with most other heat transfer fluids based on propylene glycol. However, exclusive use of **Zitrec® FC** is recommended for optimal corrosion protection.
To prepare the ready-to-use dilutions, we strongly recommend the use of deionised or distilled water. This ensures both optimal performance and quality control. The use ofother not-recommended water qualities (e.g. tap water) may result in deposit formation or an inhomogeneous mixture.
We can provide you with ready-to-use product, which excludes any inadvertent contaminations when diluting manually. Contact your local area sales manager for more information.

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

5. Toxicity & safety

Zitrec® FC

Zitrec® FC consists of 100% FDA approved raw materials for heat transfer fluids with incidental food contact. **Zitrec® FC** complies with the requirements of the NSF Nonfood Compounds Registration Program. It is listed in the NSF White Book Listing of Nonfood Compounds (*www.nsf.org - registration number 136845*), in category HT1 - heat transfer fluids with incidental food contact.

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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Chemical and physical properties

Addendum - Technical information

properties	**Zitrec® FC**	method
propylene glycol	96 % w/w typ.	internal
inhibitor content	2 % w/w typ.	internal
water content	5 % w/w max	ASTM D1123
nitrite, amine, nitrate, silicate	nil	IC/EAF
colour	uncoloured	Visual
Appearance*	Slight, hazy liquid	Visual
density, 20°C	1.051 kg/dm^3 typ.	ASTM D5931
equilibrium boiling point	164°C typ.	ASTM D1120
pH, 20°C	9.9 typ.	ASTM D1287
refractive Index, 20°C	1.433 typ.	ASTM D1218

** The end product – diluted **Zitrec® FC** – has a hazy appearance.*

The use of uninhibited MPG as a heat transfer fluid would lead to corrosion problems within the installation, resulting into higher maintenance cost, reduced reliability and loss in overall efficiency. **Zitrec® FC** will protect the metals and alloys in your equipment against all forms of corrosion. The combination of a low toxicity and FDA-approved ingredients, with a high level of corrosion protection, makes **Zitrec® FC** unique on the market.

Competitive products offer often insufficient protection on aluminium and copper. Given the frequent use of copper in the food industry, the excellent protection that **Zitrec® FC** provides on copper alloys makes it a truly remarkable product.

Anti-corrosion performance is demonstrated through standard and specific corrosion testing.

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ASTM D1384 glassware corrosion tests

	weight loss in mg/coupon[1]					
	Brass	Copper	Solder	Steel	Cast iron	Aluminium
'industry' limit (max)	10	10	30	10	10	30
reference product [2]	2	11	2	0	1	24
zitrec® FC	1	2	4	1	1	4

1 : weight loss AFTER chemical cleaning. Weight gain is indicated by a - sign. Test conditions are at 33 vol-%
2 : reference product is a competitive mono propylene glycol based product

Dynamic heat transfer corrosion test (2000W – 48 hrs)

	weight loss in mg/coupon[1] on Copper
Zitrec® FC	
hot coupon	47
top coupon	2
reference product [2]	
hot coupon	109
top coupon	5

1 weight loss AFTER chemical cleaning. Weight gain is indicated by a - sign. Test conditions are 20 vol-%
2 reference product is an industrial mono propylene glycol based product