

Zitrec™ FC



1. Description

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

Zitrec FC is found acceptable by NSF International 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 during 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 preset 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 the physical properties like 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. Exclusive use of **Zitrec FC** is recommended for optimal corrosion protection.

Zitrec FC should only be mixed with soft distilled water. To prevent any contamination, we will provide you with ready-to-use dilutions. Contact us for more information.

Zitrec FC should only be diluted with clear, uncoloured and odourless water that meets following requirements :

- total water hardness: max. 2,8 °dH (German hardness degrees)
- chlorides (Cl⁻) : max. 50 mg/l
- Iron and Copper content: max 0.5 mg/l
- electrical conductivity: max 10 µS/cm
- pH at 20°C : 5 – 7

4. Storage requirements

The product should be stored at ambient temperatures and periods of exposure to temperatures above 35°C should be minimized. As with any antifreeze coolant, the use of galvanized steel is not

recommended for pipes or any other part of the storage/mixing installation. It is strongly recommended to use new containers and not recycled ones.

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5. Toxicity & safety

Zitrec FC consists for 100% of FDA approved raw materials for heat transfer fluids with incidental food contact. **Zitrec FC** is conform to 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.

Neither the concentrated **Zitrec FC**, nor any dilution, is classified according to the European dangerous preparations directive. The transport is not regulated.

For detailed toxicity and safety data we refer to the material safety data sheet.

All information contained in this product information leaflet is accurate to the best of our knowledge and belief as at the date of issue specified. However, the Company makes no warranty or representation, express or implied, as to the accuracy or completeness of such information.

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Addendum - Technical information

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

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 aluminum 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.

ASTM D1384 glassware corrosion tests

| | weight loss in mg/coupon ¹ | | | | | |
|--------------------------------|---------------------------------------|--------|--------|-------|-----------|----------|
| | Brass | Copper | Solder | Steel | Cast iron | Aluminum |
| '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

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Corrosion protection

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