

# SECONDARY REFRIGERATION SUPPORT SERVICES

EPS not only supplies almost every type of Secondary Refrigerants as a One Stop Shop for every type of application, but also we provide after sales support services for our in-house fluids as well as other manufacturer's products.

## A) CORROSION ISSUES:

The most critical components of any of heat transfer fluid are the corrosion inhibitors. If uninhibited solutions are used, a system can develop fatal corrosion problems in a surprisingly short period of time (as low as months rather than years).

All TYFO fluids have been specially formulated by our experienced team of chemists to offer excellent corrosion protection against all commonly used metals in refrigeration and air conditioning equipment.

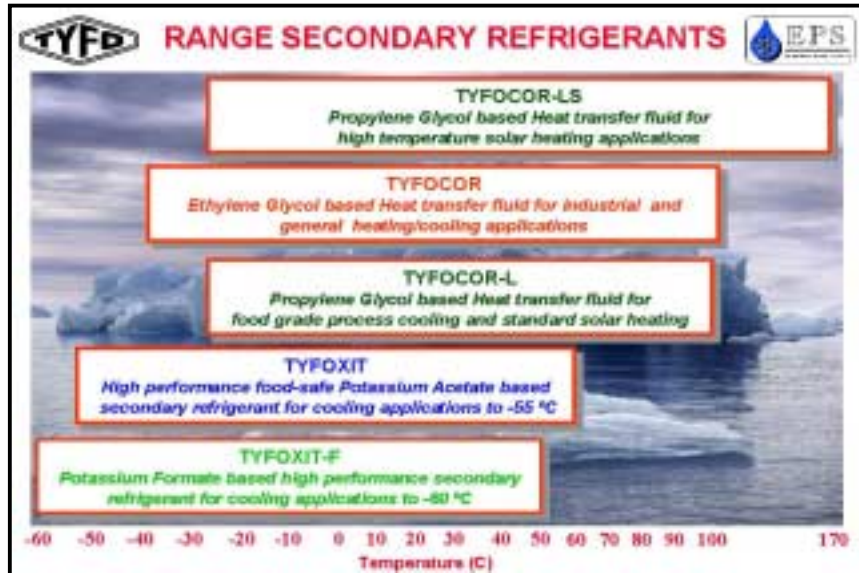
Furthermore, we use the safest and most environmentally benign inhibitors to do the job, in fact most of the inhibitors are classified as food-safe. During our experiences in dealing with many customers and many cooling systems, the most common corrosion or non-microbiological fouling problems we have encountered have been mainly caused by three factors:

### 1) Lack of corrosion inhibitors or insufficient inhibitor concentration

The lack of inhibitor results in excessive corrosion and premature failure. This problem becomes catastrophic in the case of galvanic corrosion, which occurs when two dissimilar metals are in contact with each other in the presence of moisture and air. A typical corrosion study between fully inhibited TYFOCOR-L against UNINHIBITED Propylene Glycol solution is illustrated using copper pipe and mild steel wool.

After only two (2) weeks the UNINHIBITED Glycol solution turns rusty due to reaction with oxygen dissolved in the glycol solution to form iron oxide. The higher the operating temperature the higher the corrosion rate and therefore Heat Recovery and Solar Systems must be properly protected.

### 2) Make up water quality



Even if a glycol solution is fully inhibited against corrosion, some commercially available inhibited glycol solutions are not compatible with hard water, and so specify that demineralised or deionised water must be used to dilute the glycol to the required concentration.

This not only increases the cost and future top up practicality problems, but also has the potential to reduce the effectiveness of the corrosion protection program.

This is because, surprisingly as it may seem, ultra pure demineralised or deionised water is far more corrosive than mains water. Therefore one must add more corrosion inhibitor to offset the aggressive nature of the demineralised water.

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## 3) Use of inadequate & improper corrosion inhibitor package;

Some of the commercially available Potassium Acetate and Formate solutions caused extensive corrosion problems within as little as two months after first charge such that it resulted in major shut-down due to leakage.

A typical improperly inhibited but nevertheless commercially available formate-based solution showing very poor protection against copper corrosion is illustrated. It can be clearly seen that Copper has been dissolved by the solution, turning the originally colourless product bright blue. The same impact generally occurs on larger scale particularly for Cast Iron corrosion.



EPS has been contacted by the customer and consulted in ways of preventing further corrosion or rectifying the problem. To this end, we supplied a concentrated version of custom-made inhibitor packages, which was added to the system to stop further corrosion.

Since these modifications the sites have been running satisfactorily for over a one and half years with no evidence of further corrosion.

## B) BACTERIAL ACTIVITIES;

Both Potassium Formate & Acetate based solutions are relatively safe against any Biological contamination BUT Propylene and Ethylene Glycol Solutions are susceptible to bacterial contamination, in particularly for low concentrations and high operating temperature. Any bacterial activity is significantly reduced below 14 DegC but temperatures above this limit, which generally include the heat recovery, heat rejection and warm defrost circuits, are the most vulnerable part of any refrigeration system.

A major UK distribution centre had a severe biological contamination which resulted in addition of as much as 10% of the system volume on a daily basis by fresh neat Propylene Glycol in order to keep the concentration level above freezing limit. Once the type of Bacteria was identified, EPS supplied a custom-made concentrated Biocide Solution and after two days all bacterial activities ceased. This problem is especially relevant if the glycol is being used in a SlurryICE system where the glycol concentration may be as low as 7-8%. Therefore on all the labels of our glycol solutions there is advice on whether the product may be diluted, and if so, to what degree. This ensures that, if used correctly, optimum corrosion and bacterial protection are always maintained.

## C) MAINTENANCE ISSUES;

### 1) Leak Detection;

Secondary Refrigerants must be maintained to keep the quality, concentration, corrosion inhibition and bacterial activity levels under control. To this end, EPS offers full fluid maintenance back-up to support the contractors and end-users for a successful long term operation.

We have developed a number of special Food Grade Leak Detection Dyes which can be added to any type of fluid. Our Fluorescent Dye option enables to identify any leak even under dark areas such as risers, pipe runs and inline fittings.



### 2) Service Support Products;

A number of testing and analysing kits are available for any type of fluid we sell as well as other commercially available solutions. These products can be considered as the vital tools for service engineers to check the system fluid conditions on a regular basis as part of their regular maintenance programme.

EPS standard kits come with all the necessary manuals and any necessary graphs and tables. These test kits are simple to use and they provide cost effective excellent early warning for any minor problem before it becomes a major and costly maintenance issue.



### 3) Technical Support;

EPS offers full site as well as laboratory back up to assist in proper maintenance and integration of any new or existing installations as part of our customer commitment.

Please consult our technical sales team at [sales@epsLtd.co.uk](mailto:sales@epsLtd.co.uk) for your specific application or visit our web site [www.epsLtd.co.uk](http://www.epsLtd.co.uk).



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