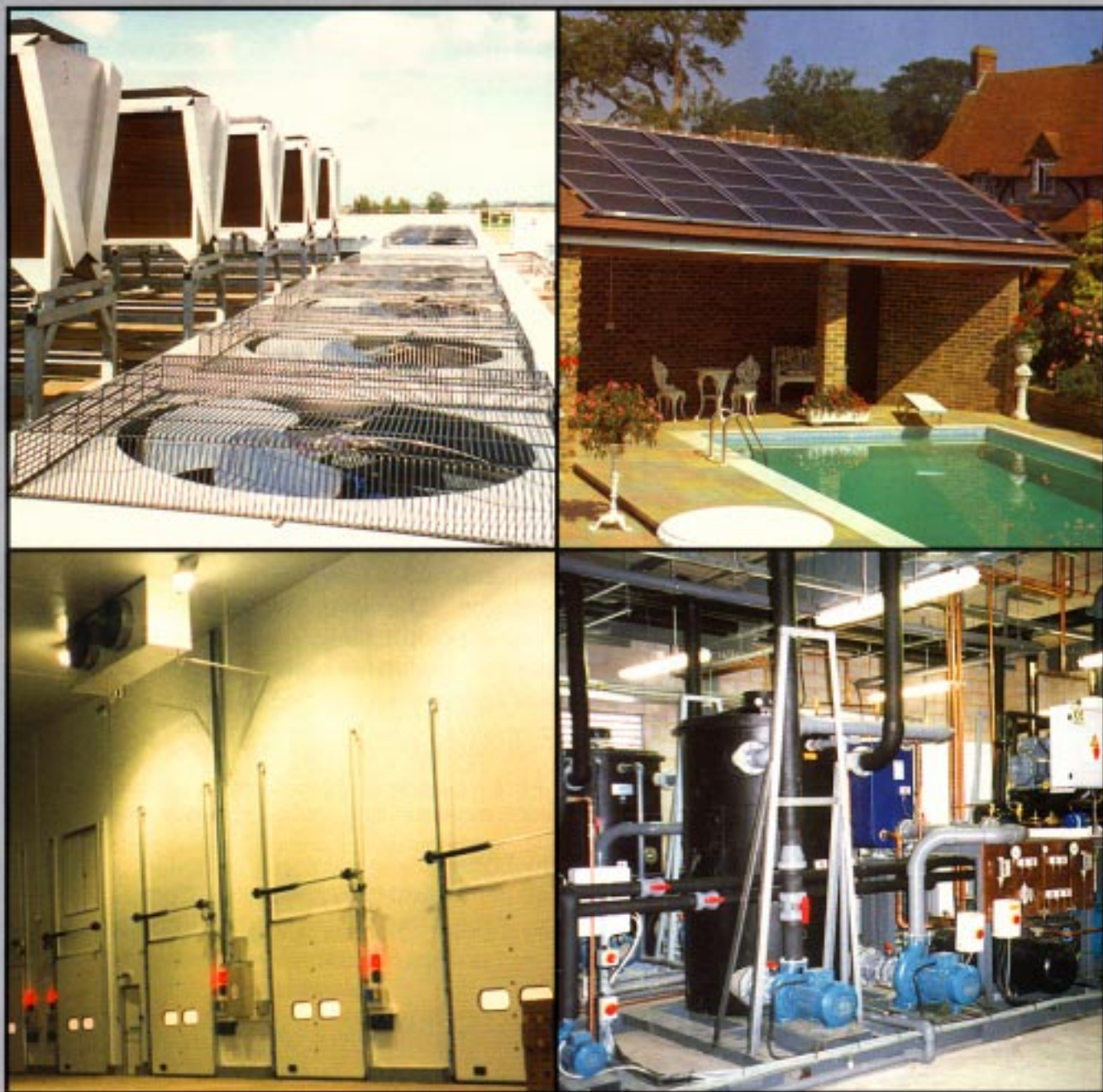




SECONDARY REFRIGERANTS



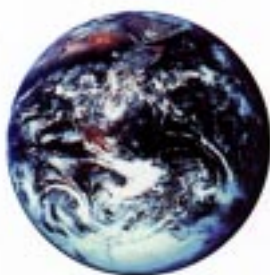
**SINGLE SOURCE
HEAT TRANSFER FLUIDS**



ENVIRONMENTAL PROCESS SYSTEMS LIMITED



SECONDARY REFRIGERANTS & ENVIRONMENTAL ISSUES



Environmental concerns over Ozone Depletion and Global Warming have prompted the search for alternative refrigeration technologies in order to minimise refrigerant usage.

In many cooling applications heat is transferred to a Secondary Refrigerant which can be any fluid cooled by a primary refrigerant and used to transfer heat without a phase change.

These liquids are also called **Brines, Secondary Coolants, Heat Transfer Fluids** and consists of Anti-freeze Solution, Corrosion Inhibitor(s) and Biocides where applicable to satisfy the temperature and application range.

WHY TYFO SECONDARY FLUIDS ?

- * 50 years experience on secondary refrigerants
- * A wide range of **Glycol, Potassium Acetate** and **Potassium Formate** based solutions.
- * **One Stop Shop** for all high, medium and low temperature air conditioning, refrigeration, process cooling and solar energy applications.
- * Ex-stock Supply.
- * Full Maintenance & Technical Support Package.
- * Cost Effective Solution.
- * Full Disposal Capability.



WIDE RANGE OF APPLICATIONS:

We pride ourselves in offering the right product for the right application. Our in-house technical expertise and comprehensive product range provide our customers with a facility whereby the most economical and environmentally beneficial solution can be selected for their applications.

1) OPERATIONAL TEMPERATURE LIMITS

For the majority of applications, the fundamental selection criteria starts with the maximum operational temperature limit and the freezing point.

2) A FOOD GRADE SOLUTION

Food applications require careful consideration against either direct contact or any secondary circuit contamination.

3) THERMODYNAMIC & PHYSICAL PROPERTIES

A careful balance between Low Viscosity and High Specific Heat Capacities leads to less pumping energy which results in less annual overall power consumption and effectively less indirect Global Warming Impact.

4) ENVIRONMENTAL CONCERNS OVER DISPOSAL

Any accidental leakage, drainage and the disposal of the proposed fluids must not damage the environment.

5) MATERIAL COMPATIBILITY

System components in contact with the solution must be compatible not only with the anti-freeze agent but also the solution additives such as inhibitors and biocides.

APPLICATION	TYFOXIT-F	TYFOXIT	TYFOCOR-L	TYFOCOR
Anti-Freeze protection				
Heat Rejection Circuits			✓	✓
HVAC Chilled System	✓	✓	✓	✓
Fire Sprinkler Systems			✓	✓
Chilling				
Process Chilling	✓	✓	✓	✓
Food Products Chilling	✓	✓	✓	
Drinks Cooling	✓	✓	✓	
Fermentation Jacket Cooling	✓	✓	✓	
Ice Market	✓	✓	✓	✓
Food Immersion Freezing	✓	✓	✓	
Chilled Stores	✓	✓	✓	
Retail Chilled Cabinets	✓	✓	✓	
Freezing				
Cold Stores	✓	✓		
Retail Freezer Cabinets	✓	✓		
Food Processing Plants	✓	✓		
Petrochemicals	✓	✓		
Industrial Cooling/Freezing	✓	✓		
Pharmaceuticals	✓	✓		
Defrosting				
Refrigeration Coil Defrosts			✓	
Aviation	✓	✓	✓	✓
Transport	✓	✓	✓	✓
Secondary Coolant				
TES Applications	✓	✓	✓	✓
Heat Recovery	✓	✓	✓	✓
Process Cooling	✓	✓	✓	✓
Cold Stores	✓	✓	✓	✓
Solar Heating			✓	✓
Floor Heating			✓	✓
Preheating			✓	✓
Indirect Heating			✓	✓



SECONDARY REFRIGERANTS DOWN TO -60°C APPLICATIONS

TYFOXIT® Potassium Acetate & TYFOXIT-F® Potassium Formate

Both secondary refrigerants are specially formulated solutions complete with appropriate corrosion inhibitors to satisfy the majority of medium temperature chilling, low temperature freezing and long term storage applications.

Both fluids are designed to offer the most attractive physical and thermodynamic properties to achieve a cost effective and environmentally friendly refrigeration installation.

KEY FEATURES;

* Low Viscosity

Low viscosity decreases pipeline pressure drops and effectively reduces pipe sizing and pump energy.

* High Thermal Conductivity

High thermal conductivity increases heat transfer coefficient and results in smaller heat exchanger design.

* High Specific Heat Capacity

High heat capacity for a given volume means smaller volume circulation requirement and effectively smaller pipe and pump selection.

* Cost Effective Solution

Carefully selected corrosion inhibitors, stabilisers and buffering agents offer extended life, effective corrosion protection and lower maintenance cost.

* Safe & Stable

Non-flammable, non-toxic, no flash point. Accidental or operational service discharge does not damage the delicate environmental balance. Disposal of these fluids can be handled safely in a cost effective way.

BENEFITS;

For the majority of cooling / freezing refrigeration and process applications, the combination of the above qualities enables the designer to achieve:-

* Reduced Line Pressure Drop.

* Reduction in Pipe Sizing.

* Low Pumping Energy.

* Cost Effective Design.

* Environmentally Friendly Installation.

Product	Temp (°C)	Specific Heat Capacity (KJ/kg.K)	Thermal Conductivity (W/m.K)	Viscosity		Density (kg/m ³)
				(mm ² /s)	(cP)	
TYFOXIT® 1.10 Cooling limit -10 °C	+20	3.55	0.531	1.67	1.84	1,100
	+10	3.52	0.524	2.13	2.36	1,104
	±00	3.50	0.517	2.79	3.10	1,108
	-10	3.48	0.510	3.98	4.43	1,112
TYFOXIT® 1.15 Cooling limit -20 °C	+20	3.30	0.499	2.10	2.42	1,150
	+10	3.27	0.492	2.75	3.17	1,154
	±00	3.25	0.485	3.64	4.22	1,158
	-10	3.23	0.478	5.47	6.36	1,162
TYFOXIT® 1.20 Cooling limit -40 °C	+20	3.08	0.468	2.82	3.39	1,200
	+10	3.05	0.461	3.66	4.41	1,204
	±00	3.03	0.455	5.13	6.26	1,208
	-10	3.01	0.448	7.62	9.24	1,212
TYFOXIT® 1.24 Cooling limit -65 °C	+20	2.99	0.441	12.75	15.50	1,216
	+10	2.96	0.435	23.89	29.19	1,220
	±00	2.94	0.428	54.88	67.28	1,224
	-10	2.94	0.428	54.88	67.28	1,224
TYFOXIT® 1.24 Cooling limit -55 °C	+20	2.95	0.442	3.65	4.53	1,240
	+10	2.92	0.435	4.92	6.12	1,244
	±00	2.90	0.429	7.25	9.05	1,248
	-10	2.86	0.423	10.82	13.55	1,252
TYFOXIT® F 20 Cooling limit -25 °C	+20	2.83	0.417	18.57	23.32	1,256
	+10	2.80	0.411	35.78	45.06	1,260
	±00	2.77	0.404	63.85	80.83	1,264
	-10	2.74	0.398	169.88	215.41	1,268
TYFOXIT® F 30 Cooling limit -35 °C	+20	2.73	0.395	275.59	349.99	1,270
	+20	2.95	0.531	1.73	2.18	1,262
	+10	2.94	0.519	2.06	2.61	1,266
	±00	2.93	0.508	2.58	3.28	1,270
TYFOXIT® F 30 Cooling limit -35 °C	+10	2.92	0.497	3.57	4.55	1,274
	±00	2.91	0.486	5.00	6.39	1,278
	-10	2.82	0.511	1.79	2.29	1,284
	+10	2.81	0.498	2.20	2.83	1,288
TYFOXIT® F 40 Cooling limit -45 °C	±00	2.80	0.485	2.74	3.54	1,292
	-10	2.79	0.472	3.77	4.89	1,296
	-20	2.78	0.459	5.36	6.97	1,300
	-30	2.77	0.446	8.35	10.89	1,304
TYFOXIT® F 40 Cooling limit -45 °C	+20	2.70	0.491	2.05	2.74	1,336
	+10	2.69	0.480	2.58	3.46	1,340
	±00	2.68	0.469	3.25	4.37	1,344
	-10	2.67	0.458	4.55	6.13	1,348
TYFOXIT® F 50 Cooling limit -55 °C	-20	2.66	0.447	6.57	8.88	1,352
	-30	2.65	0.436	10.30	13.98	1,356
	-40	2.64	0.425	19.06	25.92	1,360
	+20	2.62	0.468	2.36	3.20	1,358
TYFOXIT® F 50 Cooling limit -55 °C	+10	2.61	0.455	2.92	3.96	1,362
	±00	2.60	0.443	3.87	5.29	1,366
	-10	2.59	0.431	5.30	7.26	1,370
	-20	2.58	0.418	8.67	11.89	1,374
TYFOXIT® F 60 Cooling limit -65 °C	-30	2.57	0.405	12.89	17.89	1,378
	-40	2.56	0.392	24.19	33.43	1,382
	-50	2.55	0.379	54.96	76.17	1,386
	+20	2.52	0.460	2.68	4.01	1,394
TYFOXIT® F 60 Cooling limit -65 °C	+10	2.51	0.447	3.65	5.10	1,398
	±00	2.50	0.434	4.85	6.79	1,402
	-10	2.49	0.421	7.08	9.95	1,406
	-20	2.48	0.408	10.79	15.21	1,410
TYFOXIT® F 60 Cooling limit -65 °C	-30	2.47	0.395	18.22	25.76	1,414
	-40	2.46	0.382	37.94	53.79	1,418
	-50	2.45	0.369	93.08	132.35	1,422
	-60	2.44	0.356	271.28	386.85	1,426



ONE STOP SECONDARY REFRIGERANT CENTRE

GLYCOL BASED SOLUTIONS;

TYFO Ready-To-Use Glycol based heat transfer solutions are specially formulated with appropriate Corrosion Inhibitors for high demand Cooling, Heating and Solar Heating applications. They can be supplied at various concentration levels to match the application and they offer attractive Physical and Thermodynamic properties for a cost effective design.



* SAFE & STABLE

TYFO range solutions do not contain any Nitrites, Phosphates or Amines. Sustained exposure to high temperatures can cause Glycol solutions to age prematurely but the specially formulated **TYFO** range provides optimum protection against this undesirable response particularly for high temperature applications such as Solar Heating systems.

* COST EFFECTIVE SOLUTION

The corrosion inhibitors and stabilisers offer long term reliable corrosion protection for the commonly used metallic and non-metallic system components.

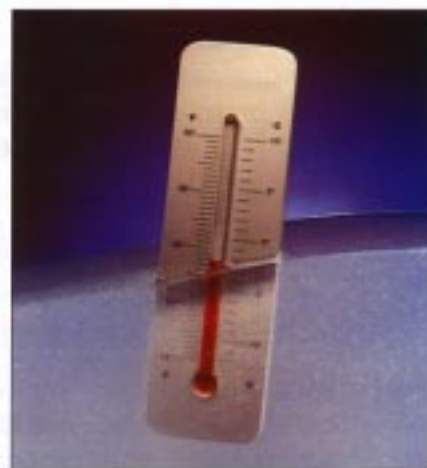
- TYFOCOR®** - **Ethylene Glycol** based solution which is specially inhibited for conventional chilling, heat rejection, solar panels, heat pumps and anti-freeze applications.
- TYFOCOR-L®** - **Mono-Propylene Glycol** based solution specially inhibited for conventional chilling and anti-freeze applications. Furthermore, it is a **Food Grade** solution and can be applied for immersion freezing of wrapped foods.
- TYFOCOR-HTL®** - **Propylene Glycol** based solution which is a Nitrite Free Ready-To-Use heat transfer fluid for Solar Heating equipment under elevated high temperature conditions.

SlurryICE SOLUTIONS;

Binary Ice is a phase change secondary refrigerant which is subject to repeated phase changes during operation and therefore requires special consideration.

EPS has developed a stable glycol based solution complete with stabilisers, anti-corrosion agents and biocides for every type of SlurryICE application including food grade solutions.

Calcium Chloride and Alcohol based binary ice solutions are also available for specific applications.



TECHNICAL SUPPORT;

EPS offers full technical application guides including software packages to calculate all **TYFO** Secondary Refrigerant's essential physical and thermodynamic properties.

Full system design support is available to assist in proper selection, integration of existing and new installations together with full in-house maintenance capability.

Please consult our technical sales team for your specific application.

For additional information contact:

Distributor/Installer Stamp:



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