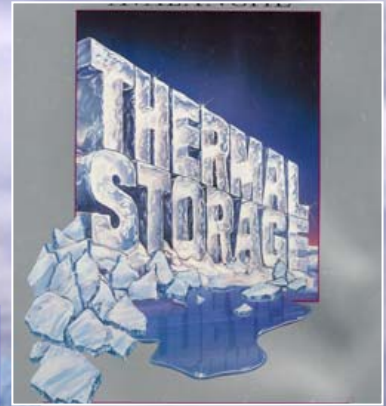
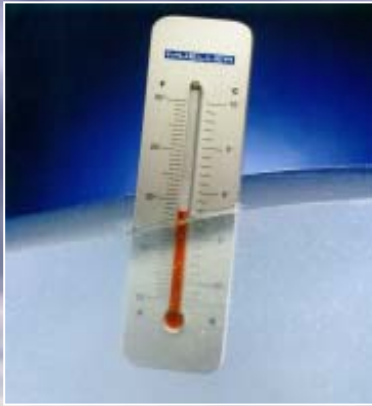


# PRODUCT SUMMARY



ENVIRONMENTAL PROCESS SYSTEMS LIMITED



# WORLD LEADER IN ENERGY SAVING TECHNOLOGIES

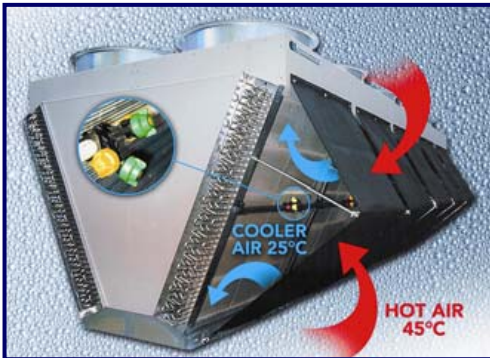
## INTRODUCTION

EPS is a UK based manufacturing and distribution company with an extensive overseas distribution network. We pride ourselves as being one of the leading suppliers of alternative Refrigeration and HVAC technologies helping to minimise the environmental and economical impacts created by these essential services. Our product range covers from low temperature refrigeration to solar heating systems either in the form of in-house production or alternatively by supporting other manufacturer's products. We offer " **Products to reduce Energy Consumption and offer Environmentally Acceptable Alternative Solutions** "

## EcoMESH™ Adiabatic Cooling System

EcoMESH™ concept is based on intermittently and efficiently evaporating water on a large mesh area in front of the heat rejection surface of

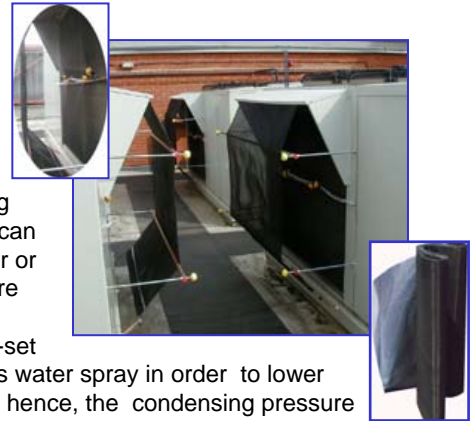
**Mini-Split, Rooftop, Air Cooled Chillers, Condensers and Dry Coolers...**



Water spray provides an adiabatic cooling effect of the incoming air stream and it can be either initiated via an ambient sensor or alternatively by refrigeration head pressure override i.e. condensing pressure limit.

As soon as these settings exceed a pre-set level the EcoMESH™ controller initiates water spray in order to lower the air on temperature for the condenser, hence, the condensing pressure can be lowered in order to save as much as 40% electric energy during high ambient periods.

EcoMESH™ concept can be applied to both **NEW** and **RETROFIT** applications with ease as a Do-It-Yourself (DIY) kit which conforms to suit site and application requirements. Because the water is intermittently sprayed as and when required to match the ambient conditions the overall water consumption could be as low as 10~25% of a comparable water cooling tower operation.



## EUTECTIC & PCM SOLUTIONS



Granule

Powder



Rubber

PlusICE™ phase change materials comprise both mixtures of non-toxic salts and organic compounds having freezing temperatures higher or lower than water. EPS standard product range covers a wide range from

**+164 °C (+173 °F) down to -114 °C (327°F).**

The latent heat offered by PlusICE solutions reduces the TES volume requirement by factor of 7~10 in comparison with water TES systems. EPS can supply the PCM in pre-filled containers, such as our PlusICE Beam / Ball system, or fill any container to suit customer applications. We also offer the supply of PCM on its own to suit customer equipments.

PCM solutions can be supplied in **Liquid, Gel, Paste, Powder or Granule Formats** to suit almost every application. They have been applied in a variety applications from Passive Cooling to Dry Wall production, domestic refrigeration to Solar Heating Storage applications. EPS also offers confidential product development / consultancy support services to other manufacturers.

PCM Type	Phase Change Temperature (°C)	Phase Change Temperature (°F)
E12	-114	327
E13	-117	243
E14	-118	192
E15	-119	181
E16	-120	170
E17	-121	159
E18	-122	148
E19	-123	137
E20	-124	126
E21	-125	115
E22	-126	104
E23	-127	93
E24	-128	82
E25	-129	71
E26	-130	60
E27	-131	49
E28	-132	38
E29	-133	27
E30	-134	16
E31	-135	5
E32	-136	-6
E33	-137	-17
E34	-138	-28
E35	-139	-39
E36	-140	-50
E37	-141	-61
E38	-142	-72
E39	-143	-83
E40	-144	-94
E41	-145	-105
E42	-146	-116
E43	-147	-127

PCM Type	Phase Change Temperature (°C)	Phase Change Temperature (°F)
A164	164	327
E117	117	243
E99	99	192
E82	82	181
E72	72	170
E71	71	160
E68	68	126
E60	60	122
E48	48	118
E44	44	111
E32	32	90
A32	32	90
E30	30	86
A28	28	82
E23	23	73
E21	21	70
E19	19	66
E17	17	63
E16	16	59
E13	13	55
E10	10	50
A8	8	46
E8	8	46
E7	7	45
A4	4	39

## WIDE RANGE OF APPLICATIONS

Secondary Refrigeration

Free Cooling

Solar Heating

-114°C  
-173°F



164°C  
327°F



Cryogenic

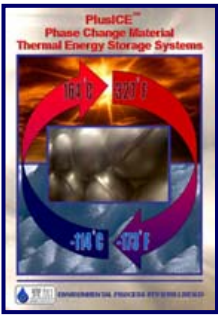
Chilled Water

Heat Recovery

Industrial Heating

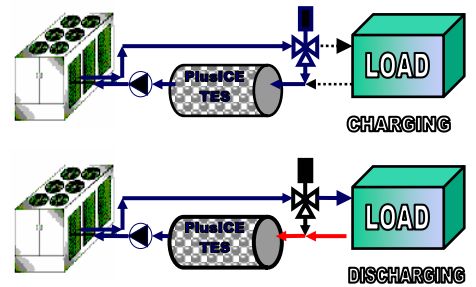


## EUTECTIC & PHASE CHANGE MATERIALS (PCM) THERMAL ENERGY STORAGE SYSTEMS



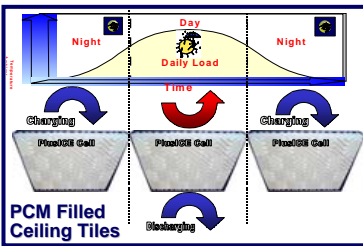
PlusICE balls can be filled with any of the above standard PCM solutions as Stainless Steel Material can stand a wide temperature range well within the PlusICE solution's range.

The standard balls are 100 mm (4") in diameter, can be placed in horizontal or vertical tanks and can stand up to 10 Barg (145 Psig) service pressures.



### PlusICE World-wide Application

#### Air Conditioning Application



PlusICE solutions have been successfully applied for passive cooling tiles, plaster boards and heat pipe passive cooling units as a direct passive air cooling application.

PlusICE solutions are also applied for indirect TES applications like chilled ceiling / cooling tower free cooling circuits as well as heat rejection TES applications in a number of formats. Designers around the world have utilised the cooling tower to store free energy over-night and later use the stored energy during day-time for chilled ceiling systems. PlusICE ceiling cells for passive cooling have been successfully applied to telecommunication shelters around the world.

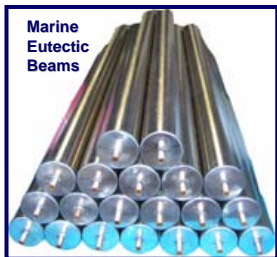
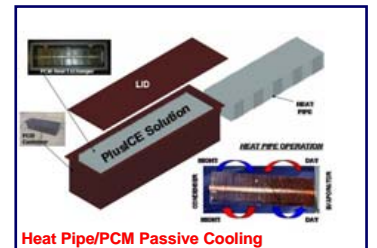


#### Refrigeration Application



TES is applied at both the cold and hot (heat rejection) side of the refrigeration cycle. PlusICE beams are used to provide free sub-cooling for the refrigerating circuit.

Eutectic plates provide ideal low cost and simple refrigeration around the world. EPS offers standard cold boxes to match these plates for medicine, food and other commodity transport applications.



Wide temperature ranges are offered by the PlusICE solution enabling designers around the world to apply this PCM technology in many ways stabilising heat loads and matching the heat load and time balance for an economical and reliable operation.

Loads in dairies, breweries and food factories can be simply balanced by PCM TES systems to suit the operating temperatures of the system.

#### Industrial Process Application



#### Passive Cooling Application



The 21°C (70°F) range offers ideal free passive cooling for air conditioning in many milder climatic countries and the 32°C (90°F) solution offers an ideal solution for electronic chamber and passive cooling shelter applications without any mechanical refrigeration.



Variations such as granules, powder and rubber formats enable designers around the world to apply TES technology in many interesting and challenging ways from drink can cooling sleeve up to space applications.



The passive cooling nature of PCMs has been utilised by the automotive industry for diesel fuel lines, air conditioning boosters, car seat cooling and Formula 1 drink bottle cooling applications.



Later, the stored energy can be released back to the system during early morning or evening when the consumption of energy is required.

#### Solar Heating Application

The time lag between energy availability and consumption between the mid-day sun light and hot water / heating requirements which occurs out of peak sun energy periods. PCM TES particularly suited to store the sun energy for both hot water and heating during mid-day.

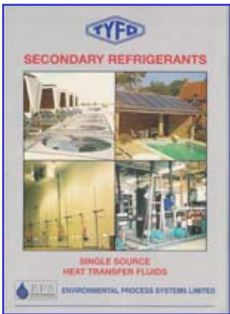


EPS recently extended their PlusICE range down to -114°C (-173°F) which offer the possibility of very low temperature TES and this new range has opened the door for cryogenic / low temperature TES application.



# INNOVATION FOR ALTERNATIVE TECHNOLOGIES

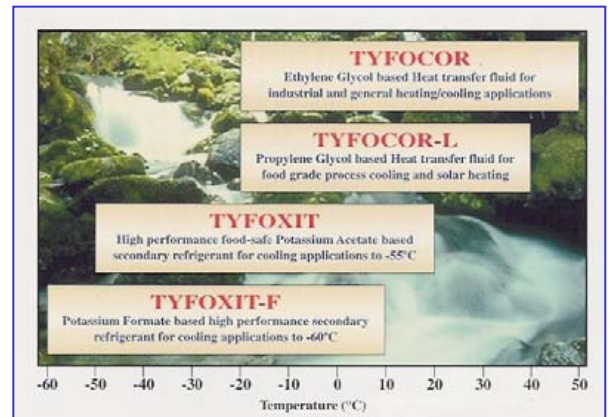
## SECONDARY REFRIGERANTS



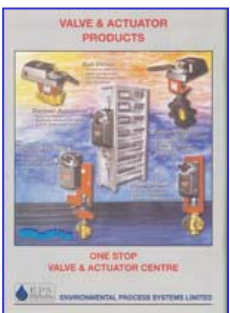
TYFO® range high efficiency heat transfer fluids offers a realistic alternative to reduce the primary refrigerant charge.

A wide range of **Glycol, Potassium Acetate and Potassium Formate** based solutions enable us to offer a **One Stop Shop** supply to cover any application from Solar Heating down to -60 °C low temperature Refrigeration applications.

We offer Ex-Stock supply and full in-house maintenance capability to support our customers for any type of applications. We also offer advice and solutions for any corrosion and bacterial problems for existing systems using any Secondary Heat Transfer fluid.



## INLINE COMPONENTS



Our experiences throughout the world have resulted in the development of a wide range of line components and control valves to satisfy all types of HVAC, Building Services and Refrigeration applications.

Furthermore, a wide range of specialised pipeline components have been developed in order to support our client for a wide range of in-house technologies from Solar Heating, HVAC and SlurryICE systems down to -40 °C low temperature Secondary Refrigeration applications.

We offer **2 & 3-way Manual and Actuated Control Valves, Check, Regulating / Balancing Valves** from **1/4" (8mm) up to 12" (300 mm)** for both HVAC Building Services and Refrigeration services.



# ICE TECHNOLOGIES & SYSTEMS

## SlurryICE Technologies



**Slurry-ICE™** is a crystallised water-based ice solution which can be pumped. At 20-25% ice concentration, it flows like conventional chilled water whilst providing 5 times the cooling capacity.

EPS offers Ice Makers only or complete as a package including refrigeration systems between **3 TR (12 kW) and 400 TR (1,400 kW)** capacities for any type of primary refrigerant including Ammonia.

## Ice Harvester Technologies



**AVALANCHE®** ice harvester / chillers are dynamic ice makers. Ice is built on evaporator plates which are positioned above the storage tank. Periodically as the ice reaches 8mm, it is released into the tank.

Ice harvester can be used with common HCFC, HFC and Natural refrigerants. EPS offers Ice Harvester Assembly only or complete as a package including refrigeration systems between **35 TR (123 kW) and 550 TR (1,936 kW)** capacities.

## Flake Ice Technologies



Sea or Fresh water is fed into the top via a distribution header and the cooling effect of primary refrigerant forms a solid ice layer inside the drum. The rotating scrapers harvest the ice, which collects at the bottom of the machine.

EPS offers either Ice Maker only or complete as a package including refrigeration systems between **0.8 Tons / day and 15 Tons / day** capacities using any type of primary refrigerant including Ammonia for both sea and fresh water applications.

## Block Ice Technologies



**BlockICE™** machines are based on utilising a Primary Chiller unit, which cools a brine solution and this cold fluid is circulated around the freezing cans whereby the water is frozen.

The handling system together with thawing units provide a continuous ice harvesting operation.

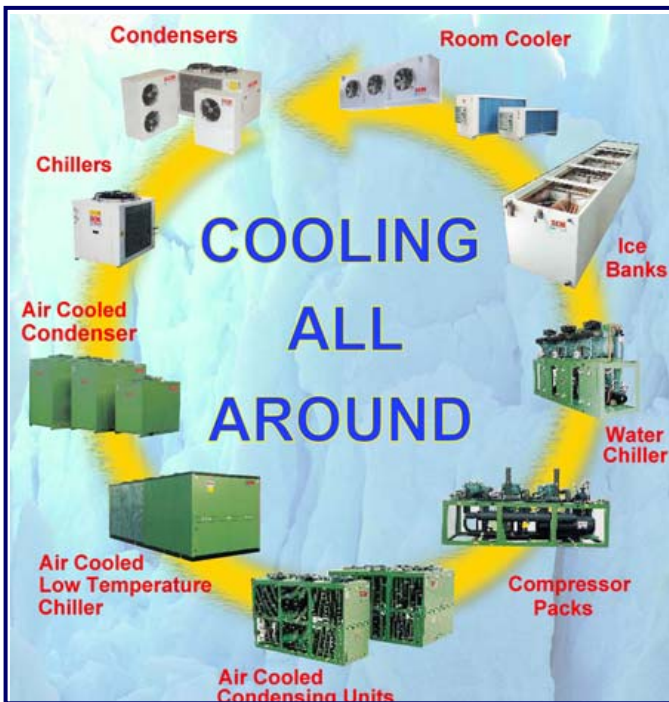
We offer turn-key plants using any type of primary refrigerant including Ammonia. System capacities can be between **0.5 and 100 Tonnes / day** ice production.





# WORLD LEADER IN ALTERNATIVE TECHNOLOGIES

## REFRIGERATION MACHINERY



SCM range refrigeration machinery covers a wide range of standard as well as custom-made condensing units, low temperature chillers and associated system components as a one-stop shop utilising any type of environmentally friendly refrigerants.

Standard air cooled condensing units can be furnished with full inline components complete with control / starter panels to suit the site requirements and comes complete with PED and CE certifications.

A wide range of standard water cooled / remote condenser refrigeration machinery covers the majority of conventional refrigeration applications, including supermarket multi-compressor packages, but if custom-made units are required we pride ourselves to be one of the most flexible suppliers to accommodate any site and customer requirement.

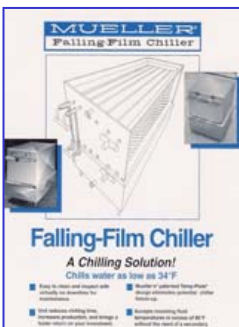


Air Cooled Condensing Units



Multi-Compressor Packages

## FALLING FILM CHILLERS



Mueller's falling film chiller cools food grade liquids that will become an ingredient of a food product, or that will come in contact with a food product. Other applications include cooling of fluids that have an initial temperature of more than 35 °C. This task can not be handled using conventional chillers.

Falling film chillers are manufactured using Stainless Steel plates suitable for any type of HCFC, HFC and Ammonia refrigerants. Units can be supplied with or without refrigeration packages to suit both contractors and end-users needs. A full set of matching air and water cooled SCM range condensing units are available for both 50Hz and 60Hz applications.



## MAINS WATER COOLERS



Traditional Potable Water and Juice Cooling systems rely on either Direct Expansion or Secondary Heat Transfer Fluid to cool the product. Many food processes such as Mixing Dough, Fruit Salads and Vegetable cooling require potable water as cold as **10°C** which can only be achieved using lower evaporation temperatures

The standard batch cooler is based on a Glass-Lined Stainless Steel tank surrounded with external stainless steel jacketed refrigeration plates and therefore the risk of cross contamination between the refrigerant and water is completely eliminated.

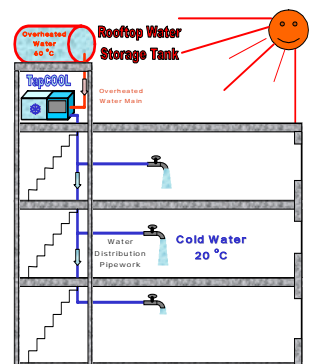
Batch Coolers come with standard matching indoor, as well as outdoor condensing units using environmentally friendly refrigerants for both water and air cooled applications.



High ambient together with solar gains cause excessively high temperatures within the roof level water storage tank during the summer season and it results in unacceptably high tap water supply temperatures.

**TapCOOL™** unit offers a simple, reliable and cost effective solution to overcome this problem. It offers a new way of providing refreshing **Cool Water** on demand without the need for expensive and inefficient continuous cooling methods.

**TapCOOL™** Domestic Water Cooling is based on a relatively small thermal energy storage volume which can be generated overnight using lower ambient and electricity prices to store sufficient energy for use during day peak periods.





# WORLD LEADER IN ENERGY SAVING TECHNOLOGIES

## EcoCOMFORT™ Adiabatic Cooling Air Handling Units



Conventional rooftop units at best utilise minimum fresh air recirculation to improve the summer peak ambient operation but the heat rejection system still relies on peak ambient air. If the hidden evaporative energy of water is introduced as part of an adiabatic system, the overall energy consumption can be significantly reduced.

**EcoComfort™** units optimise this hidden energy both directly and indirectly via a heat recovery unit between the supply and extract air streams. The overall C.O.P. is further improved by placing the mechanical refrigeration condenser within the extract air stream after the adiabatic indirect cooling operation which provides lower air-on temperatures, hence, lower condensing pressures.



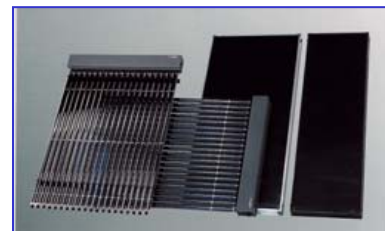
## SOLAR ENERGY SYSTEMS



EPS offers a full range of Flat or Vacuum type Solar Collectors for Hot Water / Heating applications complete with associated components such as heat exchangers, tank, solar / electric powered circulation pumps for a complete system solution.

Suncell solar panels have been specifically designed to suit swimming pool heating. Relatively low temperatures together with the corrosive nature of pool water offer an ideal opportunity to utilise glass free, non-metallic solar collector for a cost effective option.

We also offer Photovoltaic (PV) collectors, which convert light energy into electricity. They are constructed using Single, Poly, Amorphous Silicones, Copper Indium Diselenide or Cadmium Telluride materials for different efficiency applications.



Tyfoxit  
Low Temperature  
Chiller Package  
Aventis, UK

## CUSTOM-MADE REFRIGERATION SYSTEMS



Compressed  
Air Cooled  
Hazardous Area  
Storage Cabinet, Agra, UK

Over the years we have developed many custom-made products either in-house or in collaboration with our impressive client base. We have provided product development support for industry giants like British Gas Plc., WS Atkins, LEC, Mitsubishi Electric (Japan), Ferrari, Saab, BMW, IR Powerworks, Diageo, Philips, Aventis, IMI Cornelius and many others down to small and medium size companies around the world.

Our in-house team is specialised to manufacture one off products for specific applications. These products could be either in the form of alternative solutions for the existing technologies or, if a standard product does not exist, the development of an original solution.



Hydrofreezer  
Machine Development  
Leuven University, Belgium

## CONSULTANCY SERVICES

EPS is actively involved on R&D projects with many Industrial and Academic institutions. Many UK and EEC funded projects have been undertaken either as a lead partner or supporting partner. We specialise in Refrigeration and Air Conditioning technologies and offer design, or application advice for a wide range of industries in the form of a technical support team.



Free  
Cooling  
PCM Development  
Melbourne City Council, Australia

We have extensive in-house mechanical and chemical know-how built around our product range and we would be happy to share our experiences with any company who is willing to explore any energy efficient and environmentally friendly option, either for their specific application, or any specific product development on a confidential basis.



High  
Humidity  
Coolers

For additional information contact;

Distributor / Installer Stamp



## ENVIRONMENTAL PROCESS SYSTEMS LIMITED

Unit 32, Mere View Industrial Estate, Yaxley, Cambridgeshire, PE7 3HS, United Kingdom  
Tel: +44-(0)-1733 243400 Fax: +44-(0)-1733 243344 e-mail: info@epsLtd.co.uk [www.epsLtd.co.uk](http://www.epsLtd.co.uk)