

## TECHNICAL BULLETIN NO. 1 - FREE COOLING

### INTRODUCTION

Protecting the environment and lowering carbon footprint are at the forefront of our mind.

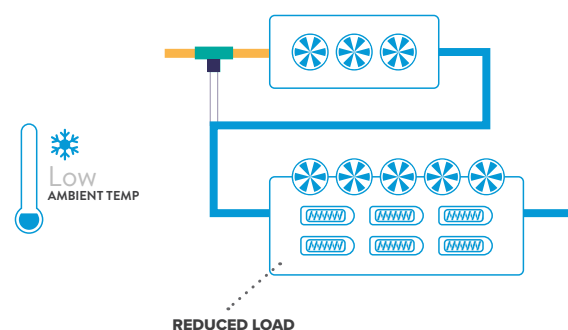
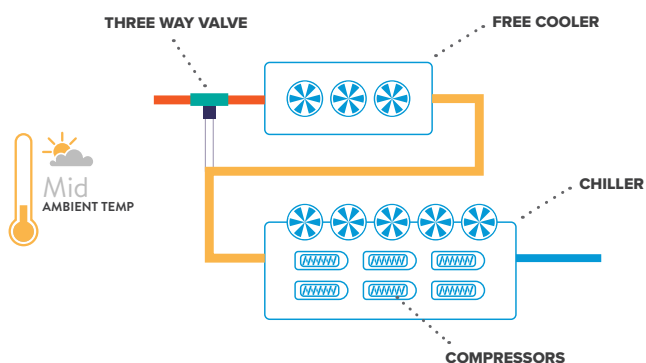
ICS Cool Energy are leaders in the process temperature control market. As proud members of the Carbon Trust, we are able to help businesses across the UK, Ireland and Europe save energy, improve efficiencies, cut costs and reduce their own carbon footprint.

Our "eMission Critical" challenge contributes to reducing one gigaton of carbon emissions (CO<sub>2</sub>e) from our customers' footprint by 2030 by scaling technology, innovation and sustainability strategies including free cooling, free heating and low GWP refrigerants. So far, 20M metric tons of CO<sub>2</sub>e have avoided from our products enterprise wide compared to the 2013 baseline.

### WHAT IS FREE COOLING?

Any company or organisation using an externally sited chiller to cool their process can benefit from free cooling. This can be in the form of partial free cooling (where the chiller's compressors are still doing some of the work to cool) to full free cooling (where the full load on the chiller is offset). In contrast, an externally sited chiller's compressors with no free cooling capabilities will be working flat out to achieve the same.

As the ambient air temperature continues to fall, the amount of process heat taken out of the process fluid by the air increases, progressively reducing the load on the chiller. At 5°C below the process supply fluid temperature, all the process heat is removed by the ambient air in the free cooler – providing full free cooling.



### HOW DOES FREE COOLING WORK?

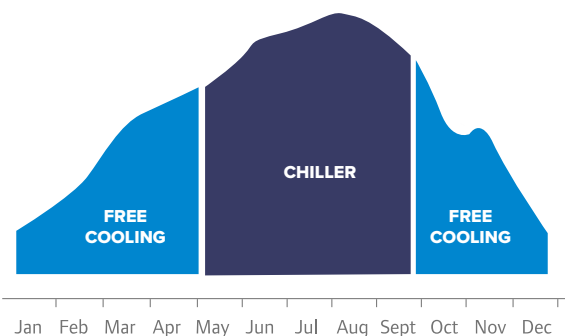
When the ambient air temperature drops just 1°C below the process fluid return temperature, a 3-way valve diverts the returning process fluid through the free cooling coil in which the cooler ambient air removes process heat and cools the returning fluid (partial free cooling), it then flows through the chiller's evaporator where the required set point temperatures are achieved – easing the demand on your chiller's components and extending their operational life.

### WHEN IS FREE COOLING A WORTHY SOLUTION?

In The UK, Ireland and much of Western Europe, our relatively cool climate allows for partial or full free cooling for much of the year.

This means that substantial energy savings can be achieved particularly between the months of October and April, in some cases up to 80% electricity savings.

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### DO YOU REQUIRE A NEW CHILLER OR CAN A FREE COOLING SOLUTION BE ADDED TO EXISTING PLANT?

Free cooling works with either a chiller with a built-in free cooling coil or a free cooler working in series with a chiller. The latter is more efficient, due to the larger surface area provided by the air cooler and we are able to offer both options.

A remote free cooler is designed to do nothing but provide free cooling and has its own purpose built control system and 3-way valve and bypass system and therefore is a simple and reliable way to give maximum savings and quick payback.

As the system is fully packaged, complete with integral controls, 3-way valve & actuator and bypass pipe work, they can be easily installed on existing systems as well as new builds.

No communication between the free cooler and chiller is necessary. In typical process cooling systems, chillers can be offloaded for up to 90% of the year.

### WHAT ARE THE OTHER BENEFITS OF FREE COOLING?

Free cooling will reduce mechanical energy consumption, improved carbon footprint, reduce load on mechanical parts & therefore reduce maintenance cost and extend life of equipment, smaller load demands can lessen the depreciation value of the chiller over its lifetime. It is easy to retrofit (space permitting) and payback for any new equipment can be quick.

### HOW CAN ICS COOL ENERGY HELP BUSINESSES COMMITTED TO DRIVING DOWN THEIR CARBON FOOTPRINT?

Our i-FC free coolers can be used as a cooling solution in their own right or to provide free cooling for a significant proportion of the year when used in conjunction with a chiller.

**PROCESS TEMPERATURE CONTROL SPECIALISTS.  
SALES. HIRE. SERVICE.**

Our International Offices: England and Wales: 0800 774 7426 | Ireland: 04692 52934 | Scotland: 01698 7445 40 | France: 01 60 66 80 83  
Germany: 0800 0116 0117 | Netherlands: 088 258 2580 | Belgium: 0800 29 110 | Austria: 01236 81 73 | Switzerland: 055 505 66 22

Our new range is available with multiple fixed fan speeds, inverter speed control and EC fans for varying noise applications as well as on low energy systems.

The units control panels are designed to offer ease of use with a 'plug and play' solution and 4G connectivity. They can be configured to meet your individual project requirements such as low noise, space restrictions and aesthetics and integrate with BMS.

Our free cooling range covers from 18kW up to 908kW of cooling at nominal process conditions (15/20/10degC).

### WHAT REAL TIME FREE COOLING SAVINGS EXAMPLES CAN YOU SHARE?

Three recent examples we have offered include:

- 1) The supply of a new chiller and free cooler installation for a printing press leads to savings of 43% on energy costs for a manufacturer in the gaming industry
- 2) Three air cooled chillers and a 360kW free cooler system resulting in 42% annual energy savings for a chemical manufacturer. This means a return on investment in 6-9 months and prolonged chiller lifetime as a result of reduction in use and a comprehensive PPM contract
- 3) £17,500 annual savings for a CNC and Wire EDM company who purchased a chiller and 140kW free cooler, equating to a huge 71% annual energy saving

### IS THERE A WAY TO BENEFIT FROM FREE COOLING WITH NO NEED FOR CAPITAL INVESTMENT?

ICS Cool Energy offer the FLEX program, comprising a monthly package which provides you with running cost reductions versus your existing plant running costs.

This long-term solution is a fixed, hard-piped install to your process, offering energy savings, maintenance and annual cooling circuit fluid analysis and the option to upgrade as technologies improve. This minimum 5 year contract option is the answer if capital investment is not available and can be paid in monthly or quarterly rental payments.

### I WOULD LIKE TO SAVE ENERGY & REDUCE MY CARBON FOOTPRINT, WHAT NEXT?

Please contact us today and we will be able discuss your process cooling in further detail. We are able to offer a secure site survey and provide a detailed chiller energy analysis, including comparisons between your current cooling costs vs. projected cooling costs with free cooling.

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