

Capability & Capacity Statement

JANUARY 2011

INTRODUCTION

Greener Cooling specialises in improving and optimising the performance of chilling systems. This is done by the re-engineering, i.e. retro fitting proven patented equipment, and re-balancing the operating parameters of all types of cooling systems.

We also supply our products for fitting into factory manufactured cooling units and to HVAC design specialists to optimise bespoke systems.

We have a number of joint ventures, and are establishing a distribution network throughout the United Kingdom, Europe, Middle East and Africa.

So whether you use a refrigeration, water chilling or air conditioning system, our processes optimise cooling performance such that the system operates with both **reduced energy consumption and increased cooling capacity**. The physical and setting changes we make to your cooling system allow that system to **use less energy when it runs and run for less time**.

“Providing More For Less”

Greener Cooling supply and fit energy efficiency equipment to the condenser and/or evaporator. **Our products** (detailed below) **are completely passive**. They require **no energy source** of their own, have **no moving parts**, require **no maintenance** and have at least a thirty year life.

Greener Cooling Ltd launched into the public arena in the United Kingdom and Europe in July 2010 at the Plant and Works Show 2010 at Birmingham’s National Exhibition Centre. Prior to the launch we conducted several fully monitored energy management projects for a number of different cooling applications. Our goal was that future clients might fully comprehend the benefits available to them, and be able to see well documented, data rich Case Studies.

“Reduce Running Costs”

“Increase Cooling Capacity”

“Extend Asset Life”

The Greener Cooling optimisation process is suitable for most chillers and gases and delivers significant “like for like” demand energy savings. Our Case Studies highlight real energy efficiencies for a variety of systems and applications.

So whether your system is air or water cooled, new or old, the Greener Cooling Optimisation System is an ideal solution for today’s age where system performance, sustainable reduced costs and environment factors are vital.

Secure all three with the Greener Cooling optimization process.



Satisfying Clients needs and requirements

Greener Cooling knows that every business is faced with at least one of the following challenges:-

- **Needs to increase cooling capacity**, without the cost and disruption of replacing an existing cooling plant.
- **Wishes to reduce costs** without the expense of buying new, replacement equipment when the existing equipment is fully depreciated but still has many, many years of good operational life remaining.
- **Wants** or must **reduce CO2 emissions** to meet Carbon Reduction Commitment requirements in a cost and operationally effective manner.
- **Has to optimise** existing or new **Chilling equipment** with no additional energy and/or maintenance costs
- **Is faced with having to suffer the energy penalty** associated with changing the R22 refrigerant to one of the newer but less efficient gases.

The Greener Cooling Optimisation Process, which is precisely defined, closely controlled and monitored, has been shown to be very successful in the general cooling industry. It is fulfilling customers' needs to reduce energy costs and reduce CO2 emissions, and/or increase cooling capacity.



Using Proven Technology

- At the heart of the Greener Cooling Optimisation Process are two products which are long established. Each is a proven energy saving device which "do what they say on the tin". The ArticMaster Product range originated in the innovative West Coast of America and was conceived to reduce the cost of operating all-day air conditioning.
- Subsequently, the patented and proven ArticMaster and RMS1 units have been installed as retrofits on package and split cooling systems in most climates in the world. In the US **TXU have endorsed the products as "proven energy efficiency devices", Silicon Valley Power Utility offer cash rebates** to clients who fit these products and they have been **tested by NASA** and many other organizations.
- Both products are manufactured in the US to the highest standards including ISO and ASHRAE standards, by a world leading provider of refrigeration system pressure vessels.
- Britain and the EU are providing International leadership to meet the Global CO2 challenge. More recently, the rise in energy prices and the intergovernmental agreements and legislation to reduce CO2 emissions has led to general demand to reduce energy consumed in refrigeration and chilling.
- It is against this background that Greener Cooling have recognised the need to develop a process using the core ArticMaster products and have carefully redefined the specification, installation and commissioning processes to ensure repeatability of proven efficiencies on a wide range of cooling applications.

ARTICMASTER

The ArticMaster Refrigeration Management System (RMS) is a patented energy saving device that is designed to increase the efficiency of the condenser, and significantly reduce the energy consumption of a modern air conditioning or refrigeration system.

How it works

It is designed and engineered to utilise internal system fluid pressure to create a rotating fluid motion. The contoured flow of the liquid refrigerant reduces system compression pressure and enhances the efficiency of the system condenser. The device is attached to either air and/or water cooled systems (except centrifugal chillers) between the condenser and the expansion valve. ***It has no moving parts and operates without a power source.***

The Benefits

- Inside the Articmaster a vortex or whirlpool is created. This change in liquid flow reduces the head pressure thus allowing the system to run using fewer amps, and secondly, increases cooling capacity thus causing the system to run for less time to achieve the same cooling demand.

“It is much like gaining the benefit of a following wind”

- The reengineered system increases the condensing volume by approximately 20 per cent thus increasing the condenser’s cooling capacity and reducing the refrigerant temperature, i.e. sub-cooling it. A vortical (i.e. whirling) stream of sub-cooled, fully condensed (i.e. containing fewer gas voids) refrigerant is supplied to the TXV

- The vortical stream removes any oils that may have built up on the inner pipe walls and improve heat rejection by reducing the boundary layer normally associated with laminar flows. This is particularly helpful in split systems with longer runs of liquid line, such as exist in freezers and cold rooms.

The complete installation results in Increased Heat Rejection, Reduced Head Pressure, Lower Suction Pressure, Reduced Compressor Amp Draw, Reduced System Run Time, Increased Dehumidification, Extended Compressor Life, Reduced Maintenance Costs, Reduced Operating Costs and Reduced Electricity/Energy Demand.



What’s more !!

The ArticMaster RMS offers a significant number of benefits over any other energy saving device currently offered. These include:-

- Increasing the efficiency of air conditioning systems as the ambient temperature rises;
- It can be combined with motor controllers and other energy saving devices.

Articmaster units are available for systems up to 3500 kWR.

RMS1

The RMS1 is a proven patented energy saving device that is designed to increase the efficiency of the evaporator, thereby reducing the amount of energy consumed by the air conditioning, or refrigeration system. This is achieved by:-

- Ensuring that the refrigerant gas entering the evaporator is evenly dispersed over the entire evaporator which-
- Creates a larger total surface area of vapour and increasing the capacity to absorb heat, and
- Reduces system energy demand by between 8 and 15 per cent.

The Key to Improvement

The RMS1 boasts no moving parts and operates without a power source. The device is installed as close as possible to the DX, TX or Capillary expansion device and can be attached to either air and/or water cooled systems (with the exception of centrifugal chillers). The device accelerates the change of state from liquid to gas by causing chaotic turbulent flow, and increasing the refrigerant gas entering the evaporator. The improved supply of gas to the evaporator and its full utilization improves its heat exchange capability and reduces the energy demanded by the compressor driving the system. The RMS1 improves efficiencies in any ambient conditions.

Installation of the RMS1

Measuring less than 20 cm in length and matching the suction pipe diameter, the RMS1 unit can be attached to any size evaporator whether serving an air conditioner, or a refrigeration system. It can be mounted vertically or horizontally,

The Benefits

The complete installation reduces system run time, lower compressor demand, increased oil migration, prolonged equipment life, reduced maintenance costs, enhanced dehumidification, reduced defrost time and reduced energy demand.

The RMS1 can be installed in conjunction with the Articmaster RMS system and provide even larger energy efficiencies. The RMS1 produces no emissions, is reliable and trouble free, has no moving parts, extends compressor life, runs silently, and can be combined with motor controllers and other energy saving devices. Once installed, the RMS1 requires no calibration. Just install and switch the system on . . . energy efficiency gains follow.



Tested To BS EN ISO Standards

- ***Defrost Recovery reduced by over one third***
- ***Cooling Capacity increased 8.3 per cent, and***
- ***Daily Running time reduced by 65 minutes, or 7.4 per cent.***

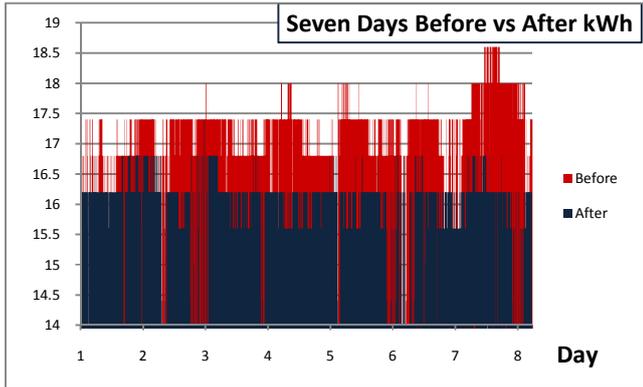
CASE STUDIES

Case Study 1: Process Chiller

A UK based plastics manufacturer installed six Articmaster units on a number of their water chillers. Their chillers served a variety of thermoforming and extrusion functions. Each was electronically monitored before and after the Greener Cooling process was applied to them.



Articmaster Installation at Plastics Manufacturer

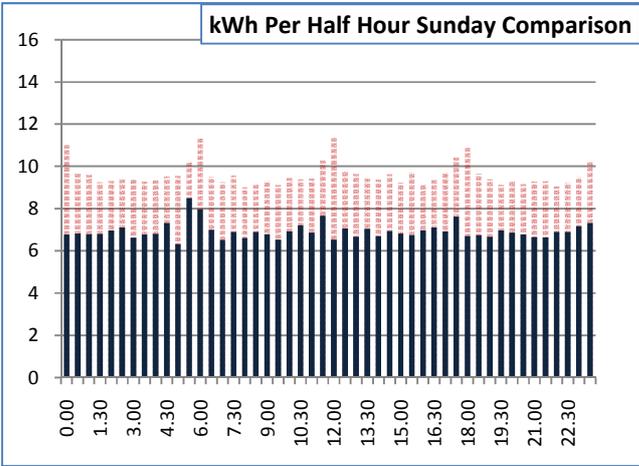


Before and After Energy Comparison

Energy Use Down 25.7 %
Cooling Capacity Up 20.0%

Case Study 2: Frozen Food Store

A UK based frozen food distribution business installed five Articmaster and RMS1 units on five separate Bitzer condenser packs. Electronic monitoring and final meter monitoring showed energy reductions of well over 20 per cent.



Condenser Pack Installation

The Sunday chart clearly shows the before and after difference in energy use across an entire day. Sunday was un-affected by door openings or other factors.



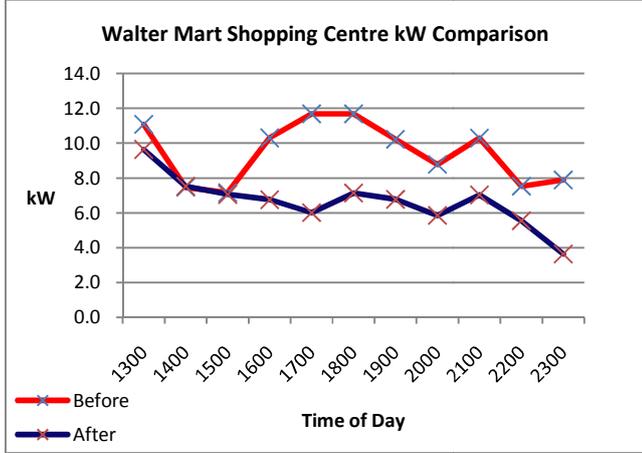
Energy Use Down 24.5 %
Annual Savings of £5,400 plus

Case Study 3: Air Conditioning

A Philippines based shopping centre installed a single Articmaster unit on an air conditioning system serving a “common” use circulation area of the mall.



WalterMart Shopping Centre



Energy Use Down 26.8 %
Running Amps reduced 12 %
“Off Time” increased 280 %
Less than 18 month payback

Other Case Studies:

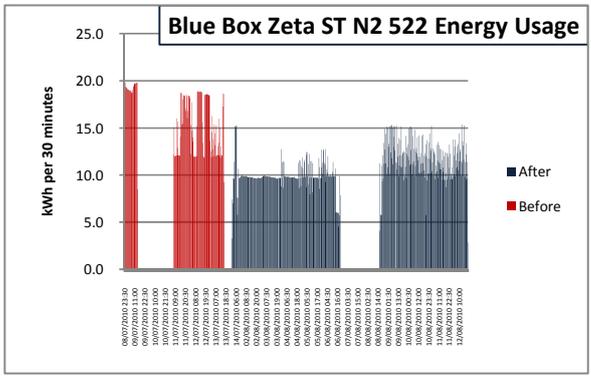
Flooring Manufacturer (UK)

13.4 % energy efficiency gained on continuously running under sized chiller.



Plastic Bottle Manufacturer (UK)

Reduction of 38,500 kWh per year & Delta T increased 60%



“Energy Efficiency from the power of the vortex”