



DEMYSTIFYING THE 2018 CHANGES TO CHILLER LEGISLATION

INTRODUCTION

There is no escaping the fact that manufacturing is an energy-intensive process. While energy consumption maybe seen as a necessary evil by some, the fact of the matter is that unless it is controlled, it will have a serious long-term environmental impact.

Process cooling equipment can account for up to 60 per cent of a plant's total life cycle cost, and this has not gone unnoticed by lawmakers. As such, from 1st January 2018 as part of the latest phase of amendments to the European Commission's EcoDesign Directive, industrial cooling and refrigeration equipment will be required to meet new, stringent minimum levels of energy-efficiency.

This guide will demystify the changes in full for UK manufacturers, covering the most important questions, and providing key action points for ease of compliance and minimum disruption to business.

NB The information in this guide is correct and up to date to the best of our knowledge as of 31st October 2017.

WHAT'S ACTUALLY HAPPENING?

AN OVERVIEW OF THE KEY CHANGES

In short, any new industrial cooling equipment entering the market from January 1st 2018 must now meet new minimum energy performance standards (MEPS) depending on chiller type and size.

The changes affect two product groups – known as 'Lots': Lot 1, which covers refrigeration and freezing equipment, including medium and low-temperature process chillers and condensing units; and Lot 21, which include high-temperature 1) process chillers and condensing units, and 2) comfort chillers.

The main products for industrial manufacturers to be aware of are two-fold – process chillers and comfort chillers.

A chiller designed for process cooling applications is used to provide continuous cooling to an appliance, system or application such as a jacketed vessel and the changes surrounding this product category are likely to be the most relevant to industrial end-users.

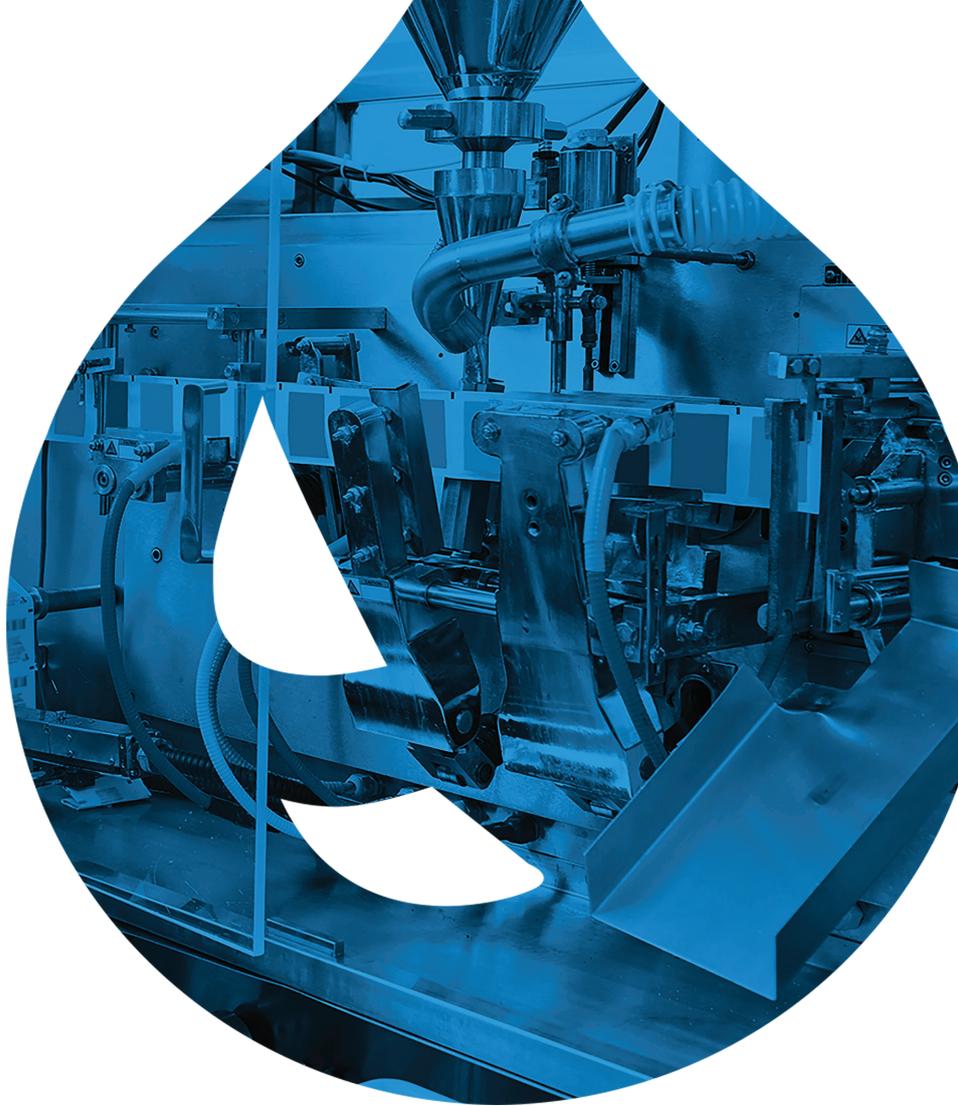
A chiller designed for comfort cooling applications is typically used to provide seasonal cooling to an occupied space, however they can often be utilised to serve process applications.

One of the key differences between the two is that cooling demands can significantly vary between chillers used for process and comfort applications. Process loads are typically more intense and occur during production. Comfort loads are seasonal, with the chiller only likely to be in operation when ambient air temperatures are high enough to require it.

However, these will not be the only long-term changes to affect process cooling equipment, as the new MEPS which come into effect in January 2018 are set to become even more stringent in January 2021.



WHAT ARE **MEPS**, AND WHY ARE THEY IMPORTANT?



Industrial cooling and refrigeration systems can often account for 60% of a manufacturing plant's total life cost, easily running in to the five figure sums over the course of a year. Operational costs are exacerbated by old or inefficient equipment, many of which would not come near the efficiency standards due to come into force in January 2018.

While the average life of a chiller ranges anywhere from 8-15 years, if the product is in constant use at full operational capacity and, not maintained frequently, the lifespan could be even shorter.

MEPS are split into two main categories, one for process chillers and one for comfort chillers.

PROCESS CHILLERS

Process chillers must meet new Seasonal Energy Performance Ratio (SEPR) metrics. This is calculated based on the below part load efficiency levels, and expressed as a ratio.

Reference	Ambient temperature (Air cooled)	Source fluid inlet temperature (Water cooled)	Cooling fluid outlet temperature	Load
A	35 °C	30 °C	7 °C	100%
B	30 °C	23 °C	7 °C	93%
C	25 °C	16 °C	7 °C	87%
D	20 °C	9 °C	7 °C	80%

SEPRs are the most relevant values for manufacturers and industrial end-users to be aware of. The minimum efficiency levels products need to achieve are as follows. However, they may differ depending on the type of chiller (air or water cooled) and the rated cooling capacity:

Source	Cooling capacity	Minimum SEPR value
Air cooled	<400 kW	4.5
Air cooled	≥400 kW	5.0
Water cooled	<400 kW	6.5
Water cooled	400 kW ≤ 1,500 kW	7.5
Water cooled	≥1,500 kW	8.0

COMFORT CHILLERS

Comfort chillers must meet new Seasonal Energy Efficiency Ratio (SEER) values. This is the overall energy efficiency ratio of the comfort chiller for the cooling season, and is calculated as using the below part load efficiency expressed as a percentage.

Reference	Ambient temperature (Air cooled)	Source fluid inlet temperature (Water cooled)	Cooling fluid outlet temperature	Load
A	35 °C	30 °C	7 °C	100%
B	30 °C	26 °C	7 °C	74%
C	25 °C	22 °C	7 °C	47%
D	20 °C	18 °C	7 °C	21%

Again, the minimum efficiency levels products need to achieve differ depending on whether it is an air or water cooled chiller, as well as the rated cooling capacity and the Global Warming Potential (GWP) of the refrigerant used. Common refrigerants such as R410A and R134A have a GWP well above 150.

Source	Cooling capacity	Minimum efficiency GWP > 150	Minimum efficiency GWP ≤ 150
Air cooled	<400 kW	149%	134%
Air cooled	≥400 kW	161%	145%
Water cooled	<400 kW	196%	179%
Water cooled	400 kW ≤ 1,500 kW	227%	204%
Water cooled	≥1,500 kW	245%	220%

Ultimately, the main difference between the two values is how the two ratios are calculated and weighted. SEER places a greater emphasis on partial load performance at higher operating ambient temperatures; while SEPR places less emphasis on partial load performance, however focuses on a wider operating ambient temperature range.

There is a potential grey area which could arise within certain space cooling applications – however we believe these should still be defined as ‘process’ cooling applications if the primary purpose of cooling the space is not for human comfort:

'Comfort' space cooling examples	'Process' cooling examples
Offices	Jacketed vessels
Hotels	Chilled stores
Gyms	Test cells
Hospitals	Data centres

It is important to be aware that the new comfort cooling regulations are more stringent than their process counter parts. As such, if a chiller designed for comfort cooling meets minimum SEER level, it will also meet minimum SEPR level, and so can be used for industrial process cooling. However, a chiller designed for industrial process cooling with a compliant SEPR does not automatically meet SEER standards, and so cannot be used for HVAC purposes.

WHY ARE THEY COMING INTO EFFECT NOW?

The 2018 changes are the latest to come into effect under the European Commission's EcoDesign Directive since it came into force in 2009. The Directive sets out minimum mandatory requirements for the energy efficiency of various energy-using product categories across all elements of society, from industrial process chillers to domestic vacuums, fridges and even hairdryers.

Its overarching aim is to eliminate energy-intensive products throughout Europe, ultimately culminating in a target to reduce European carbon emissions by 30% by 2030 (revised in 2016 from original target of 20% by 2020).



WILL BREXIT CHANGE COMPLIANCE?

In short, no. Brexit won't come into effect until 2019, and the current plan is that all existing EU legislation will already be enshrined in UK law.

While there is then some potential for those laws to be amended, altered or scrapped altogether, energy efficiency legislation is likely to be kept given its positive environmental impact and to benefit UK manufacturers with significant presence in European markets.

CAN I MAKE MY EXISTING COOLING EQUIPMENT MORE ENERGY-EFFICIENT?

Ultimately, the decision as to 'repair' or 'replace' depends on the age and condition of the current process cooling equipment. If the chiller in question is fairly new, then immediately replacing it is likely to be out of the question. Here, the best policy would be to implement a Planned Preventative Maintenance (PPM) contract to pick up any red flags and ensure the chiller is kept at maximum operational efficiency for its full working life. This will not only minimise the risk to downtime, but also reactive maintenance costs.

However, if the chiller is of a certain age or reaching the end of its operational life, it may be a long-term false economy to implement an on going repair and maintenance plan as the lower material cost of replacement parts would be offset by sustained high running costs.

While an end-user may be able to ask the manufacturer for the SEPRs of their existing equipment, it could be more effective to look at running costs (especially if the chiller is over eight years old) and compare them against projected savings of new equipment. If the projected savings cover the cost of new equipment then making a change is a viable option.



IS THE LEGISLATION GOING TO **INCREASE** EQUIPMENT **COST?**





More often than not, there is a perception among manufacturers that high efficiency equipment equates to a high cost, but that is not always the case and opinions need to be shifted.

For SMEs, accessing the necessary capital has often been difficult, however there are initiatives in place which are dedicated to providing financial support to fund energy-efficient equipment. One such example is the Carbon Trust's Green Business Fund, which can offer grants to cover up to 15% of the equipment cost, up to the value of £5,000. As a Carbon Trust accredited supplier, 2018-compliant process cooling equipment from ICS Cool Energy can be purchased using Green Business Funding.

For non-SMEs, financing new process cooling equipment can be undertaken in several manageable ways.

An option is to undertake an equipment hire agreement. Contracts range from a short-term basis, to long term hire. This option allows all costs to be managed through one monthly all-inclusive payment, which not only covers the cost of the process cooling equipment, but on-going maintenance costs and contingency breakdown cover.

One significant benefit of a long-term hire agreement is that responsibility of compliance lies with the company providing the cooling equipment, rather than the end-user. However, as with a capital sales purchase, compliance only affects new products manufactured from 1st January 2018. ICS Cool Energy is well known for having one of the most comprehensive hire fleets of process cooling chillers on the market, and will be expertly placed to provide solutions compliant with the 2018 legislative changes when they come into effect.

Asset finance provides an alternative to hiring – giving you the option to own the equipment at the end of the term.

ECODESIGN COMPLIANT SOLUTIONS



Since the first proposals for the 2018 legislative changes came to light, ICS Cool Energy has been working hard to develop and deliver robust and reliable process cooling solutions that can not only stand-up to the intense load demands, but do so in line with the new 2018 SEPRs.

The manufacturer boasts a broad portfolio of process cooling chillers, ranging in size from 1kW to 2.4MW, and will be able to provide a fully compliant solution to meet changes that come into effect as of 1st January 2018, and deliver long-lasting and reliable cooling over and above the mandated efficiency levels.

From small, one-site production to global manufacturing operations, ICS Cool Energy's breadth of application expertise and process cooling solutions will ensure any production temperature control support is efficient and optimised.

ICS Cool Energy's portfolio of compliant process cooling chillers are available as full turn-key and standard 'off the shelf' packages. Equipment can be purchased outright or hired. Units are also eligible for discounts through the Carbon Trust's Green Business Fund. For manufacturers interested in hire options, a wide variety of process cooling equipment is available as both a short and long-term hire contract.



LONG-TERM BENEFITS

Ultimately, the EcoDesign Directive's main aim is to reduce energy consumption. Energy consumption equates not only to carbon, but money; and the bottom line is that a reduction in energy consumption will directly reduce monthly operating costs for manufacturers.

Given the size and energy-intensive nature of process cooling equipment, it comes as no surprise that they are being subjected to stringent minimum energy performance standards (MEPS).

While the cost of new equipment must come into the equation when judging when to replace, there are a wide variety of finance options – regardless of whether the end-user wants to own or hire the equipment. As such, the upfront cost for financing new and efficient process cooling equipment should no longer be viewed with the same trepidation as it has been in the past. What's more, the long-term reduction in operating and maintenance costs will also go a long way towards recovering any further capital outlay.

From a sustainability point of view, reducing a process cooling system's energy consumption can not only help manufacturers to meet their Carbon Reduction Commitment targets, but can also contribute towards achieving ISO 14001.

In short, the enforced changes to industrial cooling may seem steep, but there are many far-reaching long-term benefits from a financial, environmental, and sustainability perspective. While, on the face of it, there is a lot of information to digest; in reality, the changes can be broken down in to a manageable plan of action. By working closely with a temperature control specialist such as ICS Cool Energy, UK manufacturers can navigate any uncertainty and start reaping the rewards that the new legislative changes will offer.

 HIRE: 0800 840 4210

 SALES AND SERVICE: 0800 774 7426

 info@icscoolenergy.com

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