

Chillers and Fluid Coolers

Summary of proposed Triple E eligibility criteria changes.

To facilitate a refinement of the eligibility criteria for Chillers and Fluid Coolers it is proposed to make the following amendments:

- Packaged Chillers – Conditions 4,5 and 6 are updated and conditions 7 & 8 are deemed superfluous and are removed.
- Forced-Air Fluid Coolers - Existing conditions are re-numbered and retained.
- Mechanical-Draught Cooling Towers – The existing condition is re-numbered and retained.
- Table 1 is updated to set new minimum cooling performance values in accordance with Commission Regulation (EU) 2016/2281

The proposed eligibility criteria document is contained on the following pages.

Please follow this [link](#) to view the currently published eligibility criteria.

Triple E Eligibility Criteria

Category: Refrigeration & Cooling Systems

Technology: Chillers and Fluid Coolers

Chillers and Fluid Coolers are defined as equipment that is designed to cool liquids by means of a free-cooler or refrigeration system that is packaged within a single factory assembled unit. Such equipment can also have a reverse cycle function to heat liquids.

Chillers and Fluid Coolers equipment is considered to include the following:

Packaged Chillers

Packaged chillers generate chilled fluids that can be used to provide space cooling or process cooling. Reverse cycle packaged chillers are also able to heat fluids. Some air-cooled packaged chillers also incorporate free-cooling mechanisms that can be used to reduce the amount of electricity needed by the product to provide cooling at lower ambient temperatures. Package chillers cover the following types:

1. Air-cooled packaged chillers, which include:
 - a. Air-cooled chillers that provide cooling only
 - b. Air-cooled, reverse cycle, packaged chillers that provide both heating and cooling
2. Water-cooled packaged chillers, which include:
 - a. Water-cooled chillers that provide cooling only
 - b. Water-cooled, reverse cycle, packaged chillers that provide both heating and cooling.

Forced-Air Fluid Coolers

Forced-air fluid coolers are specifically designed to cool water or process liquid by means of a heat exchanger using ambient air. They can be used to reduce the load on refrigeration systems by transferring heat from the fluid by means of fan-induced air forced over a finned tube heat exchanger. They can be used (in suitable ambient conditions) as an alternative to or in parallel or series with packaged chillers as a free cooling system. Some forced-air fluid coolers can incorporate a total-loss water spray system to generate an adiabatic effect to increase cooling efficiency and performance.

Mechanical-Draught Cooling Towers

Forced and induced mechanical-draught cooling towers are wet evaporative systems which transfer heat from water-cooled packaged chillers or a process by means of fan induced air circulation over a wetter surface. They can be used (in suitable ambient conditions) as an alternative to or in parallel or series with packaged chillers as a free cooling system.

Chillers and Fluid Coolers Eligibility Criteria:

In order to be included on the Triple E Register the specific chiller and fluid cooler equipment must meet *all* of the requirements set out below

Note: Supporting documentation that clearly demonstrates Triple E compliance according to the conditions below will be required as part of the Triple E checking process. Detailed information on the types of documents accepted can be found in the separate Supporting Documentation guidelines.

General Eligibility Criteria

(Applicable to all CFC Heat Rejection equipment)

No.	Condition
1	All equipment and/or components must be CE marked as required by the specific EU directive(s)
2	Each system must include the following optimisation functions: <ul style="list-style-type: none"> a. Optimise operating parameters to match changes in load requirements b. Where applicable, be capable of communicating with other control and cooling equipment for the purposes of free cooling.
3	All forced-air heat exchangers (i.e. air-cooled condensers for packaged chillers and forced-air fluid coolers) must: <ul style="list-style-type: none"> a. Have a fin spacing of no less than 2mm b. Have the facility for full coil cleaning from the air-outlet side c. Where a protective coating (e.g. vinyl) option is offered have the performance values corrected for the de-rating effect of the protective coating.

Chiller Package – specific eligibility criteria

(To be met in addition to the general eligibility criteria)

No.	Condition
4	Meet the cooling performance criteria, for the applicable Thermal Load Capacity, measured by the Seasonal Space Cooling Energy Efficiency ($\eta_{s.c}$). and The Seasonal Energy Efficiency Ratio (SEER) as indicated in table 1
5	Air cooled SEER values must be obtained according to the test procedure stipulated in Commission Regulation (EU) 2016/2281, with standard rating conditions shown in Table 18, or scientific equivalent, as follows: <ul style="list-style-type: none"> a. Outdoor Unit – water entering 12°C, leaving 7°C b. Outdoor Unit – air entering 35°C, dry bulb

6	<p>Water cooled SEER values must be obtained according to the test procedure stipulated in Commission Regulation (EU) 2016/2281, with standard rating conditions shown in Table 17, or scientific equivalent, as follows:</p> <ul style="list-style-type: none"> a. Outdoor Unit – Chilled water side - water entering 12°C, leaving 7°C b. Outdoor Unit – Heat rejection side - water entering 30°C, leaving 35°C
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Forced-Air Fluid Coolers – specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

No	Condition
7	<p>Must incorporate:</p> <ul style="list-style-type: none"> a. a heat exchanger designed to cool water or other process liquids. b. a fan which forces air over the heat exchanger. c. a series of control valves (or ‘by-pass mechanism’) that re-direct the water or other process liquid around the pre-cooler in response to a control signal. d. a controller that operates the by-pass mechanism and controls the fan at times when the ambient air temperature is higher than the water/process liquid inlet temperature
8	<p>Must have a minimum energy efficiency rating (EER) that is greater than or equal to 2.90 across the range of operating conditions where it is designed to provide cooling. (where EER = net cooling capacity (kW) / effective power input (kW))</p>

Mechanical Draught Cooling Towers – specific Eligibility Criteria

(To be met in addition to the general eligibility criteria)

No	Condition
9	<p>Must incorporate a mechanism that continually wets the surface of the fill pack and must include a water pump and a water storage tank.</p>

Table 1: Minimum cooling performance values

Type	Thermal Load Capacity (kW)	$\eta_{s.c}$	SEER
Air-Cooled Chiller Package	< 400	175%	4.10
	\geq 400	190%	4.55
Water-Cooled Chiller Package	< 400	230%	5.20
	400 to <1500	310%	6.50
	\geq 1500	320%	7.00

Notes:

$\eta_{s.c}$ = Seasonal space cooling energy efficiency

SEER = Seasonal cooling energy efficiency ratio

The above figures to be calculated according to EU
Implementing Directive: EU 2009/125/EC
Tier 2 - applicable from January 2021

European Seasonal Energy Efficiency Ratio is calculated as follows:

$$ESEER = A * EER_{100\%} + B * EER_{75\%} + C * EER_{50\%} + D * EER_{25\%}$$

With the following weighting coefficients:

$$A = 0.03; B = 0.33; C = 0.41; D = 0.23$$

Table 2 : ESEER test conditions

Part Load Ratio	Air Temperature °C	Water temperature °C	Weighting Coefficient
100	35	30	3%
75	30	26	33%
50	25	22	41%
25	20	18	23%

----- End of Triple E eligibility criteria -----

Please see next section for guidance on:

- 1. Technical details required in product submission.**
- 2. Supporting documentation required**

Guidance on product details and supporting documentation

NOTE: The following information is not part of the official criteria document published within the relevant Statutory Instrument. It has been added here for guidance purposes only in order to help you to provide (a) product details and (b) the required supporting documentation.

All information contained in this guidance document is subject to change without notice.

Technical information required in product submission

The following are the specific technical values required as part of the product submission for this technology:

Product type

You must first select which type your product is. Only one type can be chosen per product.

Thermal capacity

The thermal capacity in kW of the heat rejection product is required as a value f. It must be entered as whole number only (do not include kW symbol). There should also be no spaces or full stops after the number submitted.

SEER

The SEER for the product is required as a value . It must be entered as number only without units. There should also be no spaces or full stops after the number submitted. The figure must comply with the criteria requirements for minimum SEER values.

Supporting documentation required

Described below is the list of documents that are accepted as proof of compliance for the specific condition.

Note: This information will only be requested AFTER you submit your product's basic details online

Important Notes to Product Providers

Please ensure that you read the "Important Notes to Product Providers" section at the end of this document prior to submitting documentation.

	Condition	Supporting Documentation Requirements
1	<p>All products and/or components must be CE marked as required by the specific EU Directive.</p>	<p>Official and published manufacturer’s technical data sheet or brochure that demonstrates CE marking compliance.</p> <p>OR</p> <p>A copy of an official signed declaration on headed paper which confirms CE marking compliance.</p> <p>Official declarations should explicitly state the product for which CE marking is being confirmed (i.e. do not provide a letter simply stating general compliance with the relevant Triple E Condition).</p> <p>Where a document is used to demonstrate conformance for a number of products or range of products it should clearly specify each individual product covered by that document.</p>
2	<p>Each system must include the following optimisation functions:</p> <ul style="list-style-type: none"> a. Optimise operating parameters to match changes in load requirements b. Where applicable, be capable of communicating with other control and cooling equipment for the purposes of free cooling. 	<p>Official and published manufacturer’s technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition.</p>
3	<p>All forced-air heat exchangers (i.e. air-cooled condensers for packaged chillers and forced-air fluid coolers) must:</p> <ul style="list-style-type: none"> a. Have a fin spacing of no less than 2mm b. Have the facility for full coil cleaning from the air-outlet side 	<p>Official and published manufacturer’s technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition.</p>

	<p>c. Where a protective coating (e.g. vinyl) option is offered have the performance values corrected for the de-rating effect of the protective coating.</p>	
4	<p>Meet the cooling performance criteria, for the applicable Thermal Load Capacity, measured by the Seasonal Space Cooling Energy Efficiency ($\eta_{s.c}$) and The Seasonal Energy Efficiency Ratio (SEER) as indicated in table 1</p>	<p>Accredited certification that the equipment EER values have been obtained by testing according to the named standard.</p> <p>OR</p> <p>Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the 'Important notes to Product Providers' section of this document. Accepted Standard: Commission Regulation (EU) 2016/2281</p> <p>See note on 'Scientific Equivalence' in the Important notes to Product Providers section of this document</p>
5	<p>Air cooled SEER values must be obtained according to the test procedure stipulated Commission Regulation (EU) 2016/2281, with standard rating conditions shown in Table 18, or scientific equivalent, as follows:</p> <ul style="list-style-type: none"> a. Outdoor Unit – water entering 12°C, leaving 7°C b. Outdoor Unit – air entering 35°C, dry bulb 	<p>Accredited certification that the equipment SEER values have been obtained by testing according to the named standard.</p> <p>OR</p> <p>Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the 'Important notes to Product Providers' section of this document. Accepted Standard: EU 2009/125/EC</p> <p>See note on 'Scientific Equivalence' in the Important notes to Product Providers section of this document</p>
6	<p>Water cooled SEER values must be obtained according to the test procedure stipulated in</p>	<p>Accredited certification that the equipment EER values have been obtained by testing according to the named standard.</p>

	<p>Commission Regulation (EU) 2016/2281 with standard rating conditions shown in Table 17, or scientific equivalent, as follows:</p> <ul style="list-style-type: none"> a. Outdoor Unit – Chilled water side - water entering 12°C, leaving 7°C b. Outdoor Unit – Heat rejection side - water entering 30°C, leaving 35°C 	<p>OR</p> <p>Evidence of official testing by manufacturer or independent test lab carried out according to the principles outlined in the named standard. Test reports should be of the format described in the ‘Important notes to Product Providers’ section of this document.</p> <p>Accepted Standard: EU Commission Regulation (EU) 2016/2281</p> <p>See note on ‘Scientific Equivalence’ in the Important notes to Product Providers section of this document</p>
7	<p>Must incorporate:</p> <ul style="list-style-type: none"> a. a heat exchanger designed to cool water or other process liquids. b. a fan which forces air over the heat exchanger. c. a series of control valves (or ‘by-pass mechanism’) that re-direct the water or other process liquid around the pre-cooler in response to a control signal. d. a controller that operates the by-pass mechanism and controls the fan at times when the ambient air temperature is higher than the water/process liquid inlet temperature 	<p>Official and published manufacturer’s technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition.</p>
8	<p>Must have a minimum energy efficiency rating (EER) that is greater than or equal to 2.90 across the range of operating conditions where it is designed to provide cooling. (where EER = net cooling capacity (kW) / effective power input (kW))</p>	<p>Evidence of official testing by manufacturer or independent test lab carried out to determine the EER according to a relevant standard and demonstrating that the EER complies with the requirements of the condition.</p> <p>Test reports should be of the format described in the ‘Important notes to Product Providers’ section of this document.</p>

9	Must incorporate a mechanism that continually wets the surface of the fill pack and must include a water pump and a water storage tank.	Official and published manufacturer's technical data sheet, or brochure, that demonstrates compliance with the requirements of the condition
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Important Notes to Product Providers

General

There should be a clear link between all supporting documentation supplied and the product being submitted. This will typically take the form of a product code or product name that can be cross referenced between the submitted product and relevant supporting documentation. If product codes / names have been changed since publication of the supporting documentation, then official evidence of this must be provided with the supporting documentation supplied.

Any deviation from these requirements will result in the supporting documentation not being considered adequate for the purposes of demonstrating compliance with the criteria conditions. This will in turn delay the submission and/or result in the product not being considered eligible.

Where the Triple E criteria or help documentation references compliance to appropriate rather than specific standards, the onus is on the product provider to ensure that supporting documentation supplied references recognised standards that apply to the submitted product, i.e. the product must be covered under the scope of a recognised standard.

If any product submitted is later found not to meet the performance or specification criteria, then this product will cease to be considered eligible for the Triple E.

Note: When supplying the supporting documentation through the online process you must ensure that the correct page number(s) of the document is referenced when demonstrating compliance with the relevant condition. An explanatory note should also be given where more than one page number is referenced.

Test Report

A test report must include an outline of the complete test, including:

- √ Introduction
- √ Details on test conditions
- √ The specific model details of the product tested
- √ The steps taken in the test
- √ The results
- √ Graphical representations
- √ Conclusion

All documents should be on headed paper and the document should be officially signed off.

All documentation must be in English or include adequate translation.

Certification

Where certificates are provided, all tests must be carried out by an organisation that is accredited by a national accreditation body recognised via the European Cooperation for Accreditation (preferred) or the International Accreditation Forum. **All documentation must be in English** or include adequate translation.

Scientific Equivalence

Some Triple E criteria conditions allow for scientifically equivalent tests and/or standards to be used. In the event that a product has not been designed, manufactured or tested to the specific standard named, then documentation relating to an equivalent internationally recognised standard may be used (where the phrase 'Or scientific equivalent' is included in the Triple E condition or help documentation). In such applications, the onus will be on the product submitter to demonstrate satisfactory equivalence of the standards. However, submissions which reference such supporting documentation may take longer to process, and if the product provider does not provide satisfactory evidence of equivalence, then the product will not be considered eligible for the Triple E register.

All documentation must be in English or include adequate translation.

Note: Where specific standards are cited in a condition or in the Triple E help documentation, then documentation demonstrating that the relevant products have been designed, manufactured or tested to these specific standards is preferred. Scientific equivalence is considered the exception rather than the norm.

Representative testing

Where test information is required for a range of technically similar products (e.g. configurations of one base product) then in exceptional instances a form of representative testing may be utilised once agreed in advance with SEI. Such testing is where only representative products are tested from a technically similar group or range of products. Provided a clear correlation can be demonstrated between the tested product and technically similar non-tested product, and that such a correlation clearly demonstrates the compliance of the non-tested product, representative testing may form an acceptable basis for supporting documentation.

Note: Where representative testing is used for a group or range of products, if the tested or representative product is removed from the list of eligible products then all related products are also removed.