

Fans

Summary of proposed Triple E eligibility criteria changes.

To facilitate a refinement of the eligibility criteria for fans it is proposed to make the following amendments:

Commission Regulation (EU) 327/2011 sets out Ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW. This regulation forms the basis and reasoning for the proposed changes to the Triple E Eligibility Criteria.

- Condition 2 is updated to require products to fall under one of the fan type categories shown in the updated Table 1. The fan must achieve a minimum energy performance as calculated for 'Target energy efficiency'.
- The Triple E target energy efficiency is calculated using the EU methodology used in Commission Regulation (EU) 327/2011, but with Efficiency Grade N exceeding the EU 2015 figure. The resulting proposed Triple E threshold shows an overall increase compared to the existing Triple E target energy efficiency, but with additional fan types specified and a more directed targeting system taking account of fan power bands.
- Table 1 is updated to include additional Fan types and Minimum overall fan energy performance requirements as per Commission Regulation (EU) 327/2011.
- Condition 3 is updated to introduce EU Commission Regulation (EU) 327/2011

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: Process and Heating, Ventilation and Air-conditioning (HVAC) Control Systems Technology: Fans

A fan is defined as a rotary bladed machine designed for the energy-efficient on-site transfer of gas, which works by receiving mechanical energy and utilising it by means of one or more impeller(s) fitted with blades to maintain a continuous flow of air or other gas passing through it and whose work per unit mass does not normally exceed 25 kJ/kg.

Fan equipment is considered to include the following:

Axial flow fan: A fan that propels gas in the direction of the rotational axis of one or more impellers with a swirling tangential motion created by the rotating impellers.

Centrifugal fan: A fan in which the gas enters the impellers in an axial direction and leaves perpendicular to that axis.

Cross flow fan: A fan in which the gas path through the impeller is at right angles to its axis both entering and leaving the impeller at its periphery.

Mixed flow fan: A fan in which the gas path through the impeller is intermediate between the gas path in fans of centrifugal and axial type.

Fan Eligibility Criteria

In order to be included on the Triple E Register a Fan 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.

No.	Condition
1	Have a power rating greater than 1.1kW and with a maximum of 500kW
2	Must fall under one of the fan type categories shown in Table 1. The fan must achieve a minimum energy performance as calculated by 'target energy efficiency' (η_{target}).
3	Fan must comply with the requirements set out in EU Commission Regulation No. 327/2011, implementing Directive: 2009/125/EC. Any technical data sheets should comply with the requirements set out in Regulation 327/2011.

4	All equipment and/or components must be CE marked as required by the relevant EU Directives.
5	Fan curve plots as well as operating and maintenance manuals must be provided with the equipment to allow the user to optimise performance and achieve potential energy savings.

Table 1 : Minimum energy efficiency requirements for fans

Fan type	Power range P kW	Target energy efficiency η_{target} %	Efficiency grade N	Benchmark efficiency grade
Axial fan	$0.125 \leq P \leq 10$	$\eta_{\text{target}} = 2.74 \times \text{LN}(P) - 6.33 + N$	66	75
	$10 < P \leq 500$	$\eta_{\text{target}} = 0.78 \times \text{LN}(P) - 1.88 + N$		
Centrifugal forward curved fan	$0.125 \leq P \leq 10$	$\eta_{\text{target}} = 2.74 \times \text{LN}(P) - 6.33 + N$	57	65
	$10 < P \leq 500$	$\eta_{\text{target}} = 0.78 \times \text{LN}(P) - 1.88 + N$		
Centrifugal backward curved fan	$0.125 \leq P \leq 10$	$\eta_{\text{target}} = 4.56 \times \text{LN}(P) - 10.5 + N$	66	70
	$10 < P \leq 500$	$\eta_{\text{target}} = 1.1 \times \text{LN}(P) - 2.6 + N$		
Mixed flow fan	$0.125 \leq P \leq 10$	$\eta_{\text{target}} = 4.56 \times \text{LN}(P) - 10.5 + N$	63	65
	$10 < P \leq 500$	$\eta_{\text{target}} = 1.1 \times \text{LN}(P) - 2.6 + N$		
Cross flow fan	$0.125 \leq P \leq 10$	$\eta_{\text{target}} = 1.14 \times \text{LN}(P) - 2.6 + N$	26	32
	$10 < P \leq 500$	$\eta_{\text{target}} = N$		

Notes:

LN = Natural Log

The η_{target} is the minimum energy efficiency a fan must achieve in order to meet Triple E requirements. It is based on electrical input power at its point of optimum energy efficiency, where η_{target} is the output value from the appropriate equation in Table 1 and the electrical power input P of the fan expressed in kW at its point of optimum energy efficiency in the applicable energy efficiency formula. Calculation methodology based on Commission Regulation 327/2011 for fans, with Efficiency Grade N increased over the EU 2015 minimum level.

The above figures are based on the fan total pressure

Benchmark efficiency grades are for the best performing fans available on the market in 2011 - the date of entry of Commission Regulation 327/2011

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

Please see next section for technical detail submission and supporting documentation guidance

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 provide assistance with the submission of product details and the provision of the required supporting documentation.

Note: All information contained within this guidance document is subject to change without notice.

Guidance on understanding the criteria and how to obtain values

Fan efficiency guidance

The efficiency table denotes the minimum overall efficiency requirements for a fan which differ according to the fan type, size and configuration. This overcomes difficulties where fans can be sold as bare fan, directly coupled, belted, with or without motors etc., . These values also change according to the size of fan and some require calculations to derive the actual minimum efficiency. Where specific values are not available for a specific fan or fan configuration, e.g. motor not supplied with fan, belt driven, default values are assumed to derive the overall efficiency which is then compared with Table 1 to derive acceptability or otherwise.

Measurement method:

Efficiency of the fan is measured in accordance with Commission Regulation 327/2011 implementing Directive: 2009/125/EC Fans. Where the level of uncertainty for the motor is not supplied, an assumed uncertainty level of 4% must be used, except if the revised standard sets this level specifically. All tolerances in accordance with ISO 13348:2007 standard.

Fans sold with/ without motors:

When a fan product includes the fan, transmission and motor, the product will be measured taking into account the overall static efficiency of the actual product. When a fan is sold alone (without the motor), product efficiency must be calculated with default values as follows:

Motor:

Motor efficiency η_m to be assumed when the motor is not included in the fan product:

- Motor efficiency η_m assumed to be IE1 rating.

Transmission:

If the fan has a direct drive, transmission efficiency η_T of 100 % is to be assumed, If the fan has a belt drive:

- For 1.1 kW < P_{el} < 5 kW: assumed transmission efficiency η_T of 83 %;
- For P_{el} > 5 kW: assumed transmission efficiency η_T of 90 %.

Controls:

- For 1.1 kW < P_{el} < 5 kW: assumed control compensation factor C_c of 1.11;
- For P_{el} > 5 kW: assumed control compensation factor C_c of 1.04.

Losses:

Assumed compensation factor for losses is ($C_m = 0.9$).

Technical information required in product submission

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

Fan type

As part of the product submission you must first select which type of fan your product is. Only one type can be chosen per product.

Input power rating

The input power rating in kW . 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. The figure must comply with the criteria requirements for minimum power rating values.

Efficiency

The efficiency (%) of the fan product. It must be entered as number only (do not include units). There should also be no spaces or full stops after the number submitted. The figure must comply with the criteria requirements for minimum efficiency values.

Supporting documentation required

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

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

Important Notes to Product Providers

You must read this entire document prior to submitting products to the SEAI system, including the "Important Notes to Product Providers" section at the end of this document prior to submitting documentation.

All documentation supporting the product submission must clearly reference the correct product name and/or product code being submitted. The correct page number(s) must be detailed with each document supporting the submission.

No	Condition	Supporting Documentation Requirement
1	Have a power rating greater than 1.1kW and with a maximum of 500kW	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of this condition.
2	Must fall under one of the fan type categories shown in Table 1. The fan must achieve a minimum energy performance as calculated for 'Target energy efficiency'.	<p>Official and published manufacturer's technical data sheet or brochure that demonstrates the requirements of the condition.</p> <p>The product provider should include a product provider note stating the page number on the document supplied where compliance with the condition is demonstrated.</p> <p>AND</p> <p>Accredited certification that the equipment complies with 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 performance standard. Test reports should be of the format described in the 'Important Notes to Product Providers' section of this document.</p> <p>Accepted Standard: Commission Regulation 327/2011 with regard to ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW</p> <p>See note on 'Scientific Equivalence' in 'Important Notes to Product Providers' section at end of this document.</p>
3	Fan must comply with the requirements set out in EU Commission Regulation No. 327/2011 implementing Directive:	Official and published manufacturer's technical data sheet or brochure that demonstrates the requirements of the condition.

	2009/125/EC. Any technical data sheets should comply with the requirements set out in the Implementation Directive.	<p>The product provider should include a product provider note stating the page number on the document supplied where compliance with the condition is demonstrated.</p> <p>AND Accredited certification that the equipment complies with the named standard.</p>
4	All equipment and/or components must be CE marked as requested by the relevant EU Directives.	<p>Official and published manufacturer's technical data sheet or brochure that demonstrates CE marking compliance.</p> <p>OR 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>
5	Fan curve plots as well as operating and maintenance manuals must be provided with the equipment to allow the user to optimise performance and achieve potential energy savings.	<p>A copy of an official signed declaration on headed paper which confirms that the appropriate fan curve plots and operating and maintenance manuals are provided. Where possible, a link to technical documentation available to download online should be included.</p> <p>NB: A signed declaration is required to comply with this condition in all cases. Submitting copies of user manuals and fan curve plots is not sufficient and not required by this condition.</p>

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.