

Variable Speed Drives

Summary of proposed Triple E eligibility criteria changes.

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

Commission Regulation (EU) 2019/1781 sets out Ecodesign requirements for electric motors and variable speed drives. It provides maximum losses that can be permitted for a range of power ratings for a class IE2 variable speed drive.

The proposed qualifying criterion for Triple E is set at 25% below these requirements.

In addition:

- Condition 5 is updated to introduce the requirements of Commission Regulation (EU) 2019/1781 to demonstrate compliance with efficiency requirements and in terms of maximum allowable power losses according to the regulation IEC 61800-3; and
- A new Table 1 - Maximum Power Loss of IE2 VSDs is added for IE2 class of VSDs with rated power from 0.12kW to 1,000kW.

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: Motors and Drives

Technology: Variable Speed Drives

Variable speed drive (VSD): A drive that is specifically designed to drive an AC induction motor in a manner that rotates the motor's drive shaft at a variable speed dictated by an external signal.

Typically, a VSD is a system that uses an external signal to control rotational speed and torque of an AC induction motor by adjusting the frequency of the electrical power supplied to the motor

Variable Speed Drives Eligibility Criteria

In order to be included on the Triple E Register a VSD 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	Drive is specifically designed to drive an AC induction motor in a manner that rotates the motor's drive shaft at a variable speed dictated by an external signal.
2	While in operation the output from the VSD shall be able to be automatically matched to the changing motor load.
3	The VSD must be able to use an appropriate external control signal to vary its output frequency between 50% (or less) and 100% (or more) of the frequency of the alternating current supply, with reference to real time load conditions.
4	Functionality must be capable of being programmed by the user during the commissioning process without recourse to specialist equipment, unless supplied as standard with the drive.
5	Meet the efficiency requirements, in terms of maximum power losses, according to EU Commission Regulation: (EU) 2019/1781, shown in Table 1, for IE2 class of VSD with rated power from 0.12kW to 1,000kW.

6	Appropriate operating and maintenance manuals must be available to the end-user in order to optimise the achievements of any potential energy efficiency gains.
7	Training: For units above 15kW appropriate training must be available to the end-user, such that the end-user can run the system in an energy efficient manner.
8	All products and/or components must be CE marked as required by the specific EU Directive.

Table 1

Maximum power loss of IE2 class VSD

Rated power of Motor (kW) (indicative)	Maximum power losses (kW), at 90 % rated motor stator frequency and 100 % rated torque-producing current
0.12	0.075
0.18	0.078
0.25	0.082
0.37	0.088
0.55	0.097
0.75	0.107
1.1	0.122
1.5	0.141
2.2	0.178
3.0	0.224
4.0	0.281
5.5	0.358
7.5	0.436
11.0	0.59
15.0	0.76
18.5	0.91
22	1.06
30	1.40
37	1.69
45	2.03
55	2.43
75	3.26
90	3.88

110	4.16
132	4.99
160	6.02
200	7.5
250	9.3
315	11.7
355	13.1
400	14.9
500	18.5
560	20.7
630	23.3
710	26.3
800	29.6
900	33.2
1,000	37.0

Maximum power loss is 25% lower than the
reference value for IE2 class of VSD

-----End of Triple E eligibility criteria -----
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Please see next section for technical detail submission and supporting documentation guidance

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:

Nominal Power Output Rating (kVA)

The nominal power output of the VSD, in kW and must be entered as a number only without unit symbols. There should also be no spaces or full stops after the number submitted. The figure must be in the range 0.12kW and 1,000kW.

Supporting documentation required

Described below is the list of documents that are accepted as proof of compliance for the specific Voltage Stabilisation 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 for Product Providers" section at the end of this document prior to submitting documentation

No	Condition	Supporting Documentation Required
1	Drive is specifically designed to drive an AC induction motor in a manner that rotates the motor's drive shaft at a variable speed dictated by an external signal.	Official and published manufacturer's technical data sheet or brochure that demonstrates the requirements of the condition. Information can be in the form of a wiring diagram that shows a suitable digital or analogue signal or communications port for controlling motor speed.
2	While in operation the output from the VSD shall be able to be automatically matched to the changing motor load.	Official and published manufacturer's technical data sheet or brochure which shows evidence of an integrated PID controller or other means of changing VSD output in response to a changing input signal representing changing motor load.
3	The VSD must be able to use an appropriate external control signal to vary its output frequency between 50% (or less) and 100% (or more) of the frequency of the alternating current supply, with reference to real time load conditions.	Official and published manufacturer's technical data sheet or brochure that demonstrates compliance with the requirements of the condition. The output frequency range must be clearly stated.
4	Functionality must be capable of being programmed by the user during the commissioning process without recourse to specialist equipment, unless supplied as standard with the drive.	<p>Official and published manufacturer's technical data sheet or brochure which demonstrates that the drive parameters can be set at the unit itself, typically on an operator interface panel (OIP).</p> <p>OR</p> <p>Where there is no option for an OIP and where specialist software is required for commissioning, a copy of a signed official statement on headed paper is required that confirms that the software is provided as part of the contract of sale.</p>
5	Meet the efficiency requirements, in terms of maximum power losses, according to EU Commission	Official and published manufacturer's technical data sheet or brochure that shows the efficiency value of the motor at full load conforms with the conditions requirements, and that it is according to EU Commission Regulation: (EU) 2019/1781

	<p>Regulation: (EU) 2019/1781, shown in Table 1, for IE2 class of VSD with rated power from 0.12kW to 1,000kW.</p> <p>This requirement under Commission Regulation 2019/1781 applies from 1 July 2021.</p>	
6	<p>Appropriate operating and maintenance manuals must be available to the end-user in order to optimise the achievements of any potential energy efficiency gains.</p>	<p>A copy of an official signed declaration on headed paper which confirms that the appropriate 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 is not sufficient and not required by this condition.</p>
7	<p>For units above 15kW appropriate training must be available to the end-user, such that the end-user can run the system in an energy efficient manner.</p>	<p>Official and published manufacturer's technical data sheet or brochure that confirms training for units above 15kW is available.</p> <p>OR</p> <p>A copy of an official signed declaration on headed paper which confirms training for units above 15kW is available.</p>
8	<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>
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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.