Energy Technology List

Department for Energy Security & Net Zero

Product application checklist

Please complete in BLOCK CAPITALS

Converter-Fed Motors

Manufacturer/supplier name: .....

Applicant's name: .....

Telephone number: .....

Product information

Product name: .....

Model number: .....

Please complete each section of this form based on your product's characteristics. Incomplete or incorrect data could affect the processing of your product application.

Each product application should be made on a separate form unless a product's design characteristics are common to all the products. In this instance a single application can be made for multiple products.

1. Product testing and certification	No	Yes

Where type testing has been used to demonstrate product performance please ensure that the information supplied is sufficient to demonstrate the performance of all products for which applications are being made.

1.1 Has the product been tested in accordance with a low uncertainty, direct measurement method in accordance with:

a) Method 2-1-2A according to Table4 in section 7 of BS EN 60034-2-1:2014? ☐ ☐

b) Type tests according to clause 7.3 of BS EN 61800-9-2:2017? ☐ ☐

1.2 How was the product(s) performance tested? *(Please select one).*

a) Tested in the manufacturer's in-house laboratory, in accordance with a registered Quality Management System (i.e. 'self-tested'). ☐

b) Tested in the manufacturer's in-house laboratory, in accordance with a registered Quality Management System and a representative sample of the test data has been cross-checked and verified by an independent body (i.e. 'self-tested and verified or cross-checked by an independent body'). ☐

c) Tested in a laboratory either in house or on-site, witnessed by an independent body (i.e. 'witnessed testing'). ☐

d) Tested by an independent laboratory (i.e. 'independent testing'). ☐

e) Representative model/s used. ☐

Please refer to the ETL Testing Framework for details of the requirements that must be satisfied for each of these product testing options.

1.3 Where product testing has been done in accordance with a registered Quality Management System, what is its registration number?

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1. Product testing and certification (continued)

No	Yes

1.4 **Where a representative sample of the test data has been cross-checked and verified by an independent body:**

a) What is the name of the independent laboratory?

b) What is the laboratory's registration number (where accredited)?

1.5 **Where product testing has been witnessed by an independent body, what was the name of the witness?**
(Please include contact details).

1.6 **Where products have been tested by an independent laboratory:**

a) What is the name of the independent laboratory?

b) What is the laboratory's registration number (where accredited)?

1.7 **If representative testing has been used, what are the 'representative models'?**

ETL Product ID number	Product name and model number

See 'Representative Testing' section of criteria for guidance on selection of model.

2. Product type

No	Yes

2.1 **What category of product are you applying for?**

a) Converter fed AC motors (sold without VSD). ☐

b) Integrated converter fed motor-drive units. ☐

c) Matched converter fed motor drive packages. ☐

2.2 **What is the product's maximum continuous speed rating (in RPM)?**

2.	Product type	No	Yes
2.3	**What is the product's electrical power rating in kW?**		

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The power rating is the 'Duty type S1 – Continuous running duty' as defined in Section 4.2.1 of BS EN 60034-1: 2010 (as amended) "Rotating electrical machines – Part 1: Rating and performance" and is determined with the product operating at 100% of its maximum continuous speed rating.

3.	Product features	No	Yes
3.1	**Does the product incorporate a converter fed motor that:**		
	a) Has a rated operating voltage between 200 and 700 volts AC.	☐	☐
	b) Has an appropriate Conformity Assessment mark.	☐	☐
3.2	**Does the product incorporate any type of mechanical apparatus that derives its motive force from the product's motor, except for fans or pumps incorporated solely for the purposes of product cooling or lubrication, integrated torque couplings, and position encoding mechanisms?**	☐	☐
3.3	**Does the product include a mechanically commutated DC motor?**	☐	☐
3.4	**For category 1 (convertor-fed AC motor) products:**		
	a) Is the product designed to operate with an electronic variable speed drive providing a non-sinusoidal multi-phase AC electrical power supply to the motor?	☐	☐
	For category 2 and 3 (convertor-fed motor drive unit and package) products:		
	a) Is the product configured for direct connection to the UK public electricity supply system, or a private alternating current supply of nominally fixed frequency and voltage?	☐	☐
	b) Does the electronic VSD provide a non-sinusoidal multi-phase electrical power supply to the motor?	☐	☐
3.5	**Does the product include an electronic variable speed drive (VSD)?** *If no, proceed to question 4.*	☐	☐
3.6	**Does the product provide an adjustable variable-voltage, variable-frequency output that can be matched to the torque-speed characteristic of the load (being driven by the motor), including both loads with a quadratic torque-speed and linear torque-speed characteristics?**	☐	☐
3.7	**How is the relationship between the voltage and frequency of the product's output determined:** *(Select all that apply).*		
	a) Predefined prior to sale to match a number of specific motor loads, which can be selected during commissioning.		☐
	b) Programmed into the product during installation using a multi-point approximation or parametric motor model as part of a clearly defined commissioning procedure.		☐
	c) Determined during commissioning by a self-tuning algorithm or automatic model identification that automatically minimises the energy consumption of the drive.		☐
	d) Automatically adjusted during operation as part of a control algorithm in a manner that ensures the product's output matches the characteristics of the motor and its load and minimises energy consumption of the drive.		☐
3.8	**Where the relationship between the voltage and frequency of the products output is determined by a multi-point approximation, is the flux optimisation adjustable at a minimum of five points?**	☐	☐
3.9	**Is the product able to vary, in response to an external control signal, the frequency of its output between 5% (or less) and 100% (or greater) of the frequency of its alternating current supply?**	☐	☐
3.10	**Is the product configured for direct connection to the UK public electricity supply system, or a private alternating current supply of nominally fixed frequency and voltage?**	☐	☐
3.11	**Is the product designed to make smooth controlled transitions between speed changes by the use of predefined, programmable, or automatically adjusted, acceleration and deceleration ramps?**	☐	☐
3.12	**Does the VSD have an appropriate Conformity Assessment mark or otherwise demonstrated conformity with the requirements of the EU EMC Directive 89/336/EEC (as amended), or its replacement EU EMC Directive 2004/108/EC?**	☐	☐

4.	Product performance	No	Yes
4.1	**Does the product meet the relevant performance threshold in Table 1?**	☐	☐

Table 1 *Performance thresholds for converter-fed motors and motor drive units*

Rated Power of motor, PN (kW)	Efficiency at full load of motor and VSD combined (%)			
	2 Pole	4 Pole	6 Pole	8 Pole
0.12	≥ 60.8	≥ 64.8	≥ 57.7	≥ 50.7
0.18	≥ 65.9	≥ 69.9	≥ 63.9	≥ 58.7
0.2	≥ 67.2	≥ 71.1	≥ 65.4	≥ 60.6
0.25	≥ 69.7	≥ 73.5	≥ 68.6	≥ 64.1
0.37	≥ 73.8	≥ 77.3	≥ 73.5	≥ 69.3
0.40	≥ 74.6	≥ 78.0	≥ 74.4	≥ 70.1
0.55	≥ 77.8	≥ 80.8	≥ 77.2	≥ 73.0
0.75	≥ 75.0	≥ 78.9	≥ 82.5	≥ 80.7
1.1	≥ 77.7	≥ 81.0	≥ 84.1	≥ 82.7
1.5	≥ 79.7	≥ 82.5	≥ 85.3	≥ 84.2
2.2	≥ 81.9	≥ 84.3	≥ 86.7	≥ 85.9
3.0	≥ 83.5	≥ 85.6	≥ 87.7	≥ 87.1
4.0	≥ 84.8	≥ 86.8	≥ 88.6	≥ 88.1
5.5	≥ 86.2	≥ 88.0	≥ 89.6	≥ 89.2
7.5	≥ 87.7	≥ 90.0	≥ 91.5	≥ 90.5
11.0	≥ 89.0	≥ 91.1	≥ 92.3	≥ 91.5
15.0	≥ 89.9	≥ 91.8	≥ 93.0	≥ 92.3
18.5	≥ 90.5	≥ 92.4	≥ 93.3	≥ 92.8
22.0	≥ 90.9	≥ 92.8	≥ 93.7	≥ 93.1
30.0	≥ 91.6	≥ 93.3	≥ 94.1	≥ 93.7
37.0	≥ 92.1	≥ 93.7	≥ 94.5	≥ 94.0
45.0	≥ 92.4	≥ 94.0	≥ 94.7	≥ 94.3
55.0	≥ 92.8	≥ 94.4	≥ 95.1	≥ 94.6
75.0	≥ 93.3	≥ 94.7	≥ 95.4	≥ 94.9
90.0	≥ 93.6	≥ 94.9	≥ 95.5	≥ 95.2
110.0	≥ 93.9	≥ 95.2	≥ 95.7	≥ 95.4
132.0	≥ 94.1	≥ 95.4	≥ 95.9	≥ 95.6
160.0	≥ 94.4	≥ 95.6	≥ 96.1	≥ 95.7
200	≥ 94.7	≥ 95.7	≥ 96.2	≥ 96.0
250	≥ 94.7	≥ 96.0	≥ 96.2	≥ 96.0
315 up to 1,0400	≥ 94.7	≥ 96.0	≥ 96.2	≥ 96.0

'≥ ' means 'greater than or equal to'

Note: where the rated power (PN) is that of the motor, for 'Duty type S1 – Continuous running duty' as defined in Section 4.2.1 of BS EN 60034-1: 2010 "Rotating electrical machines – Part 1: Rating and performance", and is determined with the product operating at 100 % of its maximum continuous speed rating.

The efficiency at full load refers to the overall efficiency of the motor and VSD combined.

5. Summary of documents to be included

No	Yes

Please send ONE copy of each of the following documents:

If the relevant information in support of the questions above is contained within a larger document, please indicate the location of the relevant information. Note that all documentation submitted must directly refer to the model numbers for which you are making this application. Documentation should be added to your online application.

a) A technical sales brochure or leaflet for the product clearly summarising:

i) The key features of the product (ideally including photographs of the product's exterior). ☐

ii) The product's operation (i.e. in-built functionality) and intended applications (i.e. usage). ☐

iii) Any product selection options (including optional extras, alternative configurations etc.). ☐

This documentation should contain sufficient detail to enable the assessor to confirm that the proposed entry on the Energy Technology List (ETL) is correct, and uniquely represents a single product of fixed design (as defined by the rules of the ETL). If the model names contain any "wild cards" in respect of cosmetic variations please check with ETL@ICF.com that this is permitted before submitting your application.

b) A technical specification for the product, including:

i) Details of the model numbers covered (including individual features of each model). ☐

ii) The product's design ratings (electrical, mechanical, thermal, flow rates, energy use etc.). ☐

iii) A description of how to install the product including connection/wiring diagrams. ☐

Where the product must be assembled, configured and/or commissioned on site before use, please include instructions.

This documentation should contain sufficient detail to enable the assessor to confirm that each product entry on the ETL has the design features specified in the eligibility criteria for that category of product. Please indicate on the checklist where information on specific design features is located in the documentation.

c) Please ensure that this documentation includes details of:

i) The product's control input/output signals, and requirements for sensors or control valves. ☐

ii) The product's automatic control strategies, mechanisms, and configuration settings. ☐

d) Evidence that the product meets the performance criteria, including:

i) Test reports showing product performance at the standard rating/test conditions. ☐

ii) Details of the test procedures/standards used to determine product performance. ☐

iii) A declaration certifying the accuracy of the test reports and confirming that:

- The test facilities complied with the minimum specifications outlined in the test standard, and the required test conditions where applied during testing. ☐
- All measurement equipment used in testing was calibrated by an accredited laboratory, or its calibration is otherwise traceable back to national standards. ☐
- Appropriate quality assurance procedures have been used to verify or cross-check the accuracy and repeatability of the test procedures and test results ☐

Please refer to the ETL Testing Framework for further guidance on the submission of test results, and minimum information requirements.

e) A Declaration of Conformity with UK/EU Directives on product safety, including:

i) An appropriate Conformity Assessment mark. ☐

f) Evidence that a quality assurance system/procedures is/are in place to control the specification, design, manufacturing and testing of the products. ☐

g) Signed application checklist. ☐

Please note that all product documentation provided must be written in, or translated into, English.

6. Declaration

I confirm that the information given above is correct to the best of my knowledge and that I have read and agree to the terms and conditions governing the management of the Energy Technology List.
A copy of the terms and conditions can be found **here**.

Signature: ..... Date: .....

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ETL781 v15