

Three-Phase Electric Motors

How to meet energy efficiency regulation requirements

Three-phase cage induction electric motors (Motors) sold or hired in New Zealand must, by law, comply with [minimum energy performance standards \(MEPS\)](#) requirements. This document outlines the requirements and how to meet them if you import or manufacture three-phase cage induction electric motors in New Zealand.

Why have MEPS for electric motors?

Motors are typically purchased based on capital costs and technical specifications rather than lifetime energy costs. Minimum energy performance standards (MEPS) ensures that end-users have better performing systems, saving on running costs and reducing greenhouse gas emissions over the life of the product.

Three-phase motors represent around 50% of the commercial and industrial sector's electricity costs. This means even small improvements in the energy efficiency of motors have a significant impact on the electrical energy costs in New Zealand.

Which electric motors are included?

MEPS covers New Zealand new motors and motors incorporated into machines with:

- with rated output $\geq 0.73\text{kW}$ & $< 185\text{kW}$,
- in 2, 4, 6 and 8-pole configurations, and
- with voltages rated up to 1100 V AC

What do I need to do to comply with the law?

Importers and manufacturers of three phase electric motors, are required to:

- [Step-1](#) Ensure each motor model has been tested to **AS/NZS 1359.5:2004 (test method A or B)** and ensure each motor model meets or exceed the minimum energy performance levels specified in **AS/NZS 1359.5:2004**.
- [Step-2](#) Energy Rating Labelling: **N/A**
- [Step-3](#) Register each motor model through the energy rating website.
- [Step-4](#) Provide EECA with product sales, import and export data each year.

Retailers are required to check their products are registered on the [energy rating website](#).

See the questions and answers below for more information

Which electric motors are excluded?

MEPS does ***not*** apply to;

- motors normally submersed in a liquid,
- motors integral with the equipment that cannot be separated, for example some gear motors,
- motors that run on different speeds by using switchgear to reconfigure the connection of windings (variable or multi-speed motors),
- motors rated 'S2' for short duty applications, such as hoists and roller doors, or
- rewound motors (except when the supplier claims it meets one of the efficiency levels in the standard).

Which standards apply?

AS/NZS 1359.5:2004: Rotating electrical machines—General requirements—Three-phase cage induction motors—High efficiency and minimum energy performance standards requirements.

There are two distinct test methods, test method A or test method B in AS/NZS 1359.5:2004 specified in the regulations:

Method A: AS/NZS 1359.102.3 or IEC 61972 Method 1 or IEEE 112-B or technically equivalent methods. (These test methods require direct measurement of additional load losses).

Method B: AS 1359.102.1 or IEC 60034.2 or technically equivalent methods. (These test methods give an allowance for additional load losses).

Standards are available for purchase from www.standards.co.nz and for inspection at [EECA's head office](#).

What are the minimum test report requirements?

A test report will not be accepted if it does not identify the following or cannot be clearly understood in English:

- Test standard including version (year) of test standard.
- Test report on test lab letter-head, dated and signed.
- Brand and model number of motor tested (as on the rating plate).
- 75% and/or 100% load efficiency.
- Number of poles.
- kW rating.
- Voltage.
- Duty – type of motor.
- Rated frequency Hz (50 Hz in NZ).

What are the minimum energy performance levels?

There are different MEPS levels depending on the test method used.

Motors tested to Method A - The minimum energy efficiency levels that must be met are specified in AS/NZS1359.5:2004 table A2 as per the table below:

Table A2: Efficiency levels for three-phase electric motors - test method A

Rated output kW	Minimum efficiency %			
	2-pole	4-pole	6-pole	8-pole
0.73	78.8	80.5	76.0	71.8
0.75	78.8	80.5	76.0	71.8
1.1	80.6	82.2	78.3	74.7
1.5	82.6	83.5	79.9	76.8
2.2	84.0	84.9	81.9	79.4
3	85.3	86.0	83.5	81.3
4	86.3	87.0	84.7	82.8
5.5	87.2	87.9	86.1	84.5
7.5	88.3	88.9	87.3	86.0
11	89.5	89.9	88.7	87.7
15	90.3	90.8	89.6	88.9
18.5	90.8	91.2	90.3	89.7
22	91.2	91.6	90.8	90.2
30	92.0	92.3	91.6	91.2
37	92.5	92.8	92.2	91.8
45	92.9	93.1	92.7	92.4
55	93.2	93.5	93.1	92.9
75	93.9	94.0	93.7	93.7
90	94.2	94.4	94.2	94.1
110	94.5	94.7	94.5	94.5
132	94.8	94.9	94.8	94.8
150	95.0	95.2	95.1	95.2
<185	95.0	95.2	95.2	95.2

Notes:
1. For intermediate vales of rated output, the efficiency shall be determined by linear interpolation.

Motors tested to **Method B** - The minimum energy efficiency levels that must be met are specified in AS/NZS1359.5:2004 table B2 as per the table below:

Table B2: Efficiency levels for three-phase electric motors - test method B

Rated output kW	Minimum efficiency %			
	2-pole	4-pole	6-pole	8-pole
0.73	80.5	82.2	77.7	73.5
0.75	80.5	82.2	77.7	73.5
1.1	82.2	83.8	79.9	76.3
1.5	84.1	85.0	81.5	78.4
2.2	85.6	86.4	83.4	80.9
3	86.7	87.4	84.9	82.7
4	87.6	88.3	86.1	84.2
5.5	88.5	89.2	87.4	85.8
7.5	89.5	90.1	88.5	87.2
11	90.6	91.0	89.8	88.8
15	91.3	91.8	90.7	90.0
18.5	91.8	92.2	91.3	90.7
22	92.2	92.6	91.8	91.2
30	92.9	93.2	92.5	92.1
37	93.3	93.6	93.0	92.7
45	93.7	93.9	93.5	93.2
55	94.0	94.2	93.9	93.7
75	94.6	94.7	94.4	94.4
90	94.8	95.0	94.8	94.7
110	95.1	95.3	95.1	95.1
132	95.4	95.5	95.4	95.4
150	95.5	95.7	95.6	95.7
<185	95.5	95.7	95.6	95.7

Notes:

1. For intermediate vales of rated output, the efficiency shall be determined by linear interpolation.

What are the electric motor rating plate requirements?

AS/NZS1359.5:2004 section 1.5 requires motor rating plates to be marked in accordance with Section 9 of AS/NZS 1359.101.

EECA will be inspecting marking plates to ensure they contain the following as a minimum:

- manufacturers name or mark,
- manufacturers serial number, or identification mark,
- rated output(s),
- rated voltage(s) range of voltages,
- rated speed(s) range of rated speeds,
- IP code,
- number of phases,
- class(es) of rating of the machine if designed for other than rating for continuous running S1, or
- rated frequency or range of rated frequency.

For a full list of marking requirements see the standards referred to above.

How do I register an electric motor on the energy rating website?

If the motor you are about to register is already registered you are not required to register it. To check, search for the model at:

reg.energyrating.gov.au/comparator/product_types.

If it is not already registered download our quick start guide at:

www.eeca.govt.nz/resource/online-product-registration-guide.

If you haven't used the energyrating.gov.au website before, follow these instructions:

Step 1 Open the registration page: reg.energyrating.gov.au/accounts/register.

Step 2 Create an account and log in.

Step 3 Create an applicant, add contact people etc. as required.

Step 4 Create a new product registration (you will need a test report).

Step 5 Select 'Electric Motor (EM)'.

Step 6 Follow the steps until all fields are complete.

Step 7 Once submitted you will be e-mailed a Registration ID. Record this as you will need it to provide sales data each year.

What information do I need to provide to EECA each year and how do I do it?

Importers and manufacturers are required, by law, to provide statistical information on sales, import and export data annually to EECA.

Data needs to be submitted every year by 1 August, for the period 1 April to 31 March. For example, data from 1 April 2013 to 31 March 2014 must be received by 1 August 2014. The information is submitted through the EECA website where you need to:

Step 1 Set up a user account at www.eeca.govt.nz/webform/request-user-account.

Step 2 Once approved, log in at www.eeca.govt.nz/user/register/supplier/login.

Step 3 When logged in follow the links and instructions for the EECA sales data return tool.

Step 4 Enter your product data - you will need your Registration ID number - the following information is required for each registered model:

- Sales in New Zealand between 1 April and 31 March.
- Imports into New Zealand between 1 April and 31 March.
- Exports from New Zealand between 1 April and 31 March.

Where do I get additional information?

More information about regulated products and how to meet your legal obligations can be found at www.eeca.govt.nz/product-standards.

See the [running costs calculator](#) to find out how choosing a higher star rating can reduce the running costs of products.

There is also information on the energy rating website at www.energyrating.gov.au.

If you have any questions, please email us at compliance@eeca.govt.nz, or phone EECA on **0800 358 676**.