



# MEPS for motors

**(MEPS) Minimum Efficiency Performance Standards  
for Australia and New Zealand**

**BROOK  
CROMPTON**

## What are they? Why do we need them?

Along with most other developed countries, Australia and New Zealand are keen to limit the growth in greenhouse gas emissions which are damaging to the environment. Energy use is the dominant source of these emissions with electric motors accounting for almost 30% of these countries electricity use.

From 1 October 2001, all three-phase electric motors from 0.73 to 185kW supplied throughout Australia and New Zealand, must meet minimum energy performance and 'high efficiency' standards. Two minimum efficiency levels have

been set for electric motors, these are:

- MEPS - Minimum Efficiency Performance Standards
- MEPS - High Efficiency Performance Standards

The regulations will save four million tonnes of carbon dioxide of greenhouse gas emissions through reduced power demands associated with more efficient motors. In addition, motor users will save up to \$165 million through lower energy bills over the next 15 years.

## Scheme benefits ...

### ... to motor users

The use of higher efficiency motors is financially beneficial, almost by definition and regardless of any scheme:

- higher efficiency means lower losses resulting in lower running costs
- savings increase with motor use
- short pay-back periods

### ... to motor buyers

You will now be able to class your own equipment into efficiency bands, dependent on the application or customer branch:

- simplifying motor selection procedures where efficiency is an issue
- adding value to certain ranges

### ... to engineers

The scheme provides a reference value, useful for:

- comparing different products from the same base
- establishing manufacturers' guarantees within a band
- evaluating energy consumption using a common base

### ... to Brook Crompton? Certainly!

Brook Crompton has been at the forefront of the development and promotion of more efficient motors for many years, and is proud to participate in this scheme which is advantageous to its user and OEM customers, and highlights its own leading position

**The scheme offers simplification and the opportunity to highlight your 'green' credentials:** categorising motors into two efficiency bands helps in their selection and purchase for particular applications;

- regular use - fit 'minimum efficiency' motors
- continuous use - fit 'high efficiency' motors

## How does it work?

- Applies to all three-phase electric motors from 0.73kW to 185kW
- The new standards are set out in Australian Standard AS/NZS 1359:2000
- All products licensed for sale in Australia will have to be registered on a national database
- The new uniform regulation will also set the Australian/New Zealand standard for minimum energy performance and for labelling of motors as 'high efficiency'
- The data will be validated through testing by independent laboratories

*“MEPS will remove from the market products deemed to be unacceptable because of the level of energy use required to deliver a given level of service” - Australian Government*

## MEPS - Efficiency Levels for three phase electric motors

'Minimum efficiency' levels*				
Rated output kW	Minimum efficiency %			
	2 pole	4 pole	6 pole	8 pole
0.73	74.0	74.4	72.4	68.4
0.75	74.0	74.4	72.4	68.4
1.1	76.2	76.2	85.2	71.5
1.5	78.5	78.5	77.3	74.6
2.2	81.0	81.0	79.6	77.6
3.0	82.6	82.6	81.4	79.7
4.0	84.2	84.2	83.0	81.5
5.5	85.7	85.7	84.6	83.3
7.5	87.0	87.0	86.0	85.0
11	88.4	88.4	87.6	86.8
15	89.4	89.4	88.8	88.2
18.5	90.0	90.0	89.6	89.0
22	90.5	90.5	90.1	89.7
30	91.4	91.4	91.1	90.8
37	92.0	92.0	91.7	91.5
45	92.5	92.5	92.3	92.0
55	93.0	93.0	92.8	92.6
75	93.6	93.6	93.5	93.4
90	94.1	93.9	93.9	93.7
110	94.4	94.4	94.3	94.1
132	94.8	94.7	94.7	94.4
150	95.0	95.0	94.9	94.7
<185	95.0	95.0	94.9	94.7

\* Based on test method B

'High efficiency' levels*				
Rated output kW	Minimum efficiency %			
	2 pole	4 pole	6 pole	8 pole
0.73	80.5	82.2	79.7	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
3.0	86.7	87.4	94.9	82.7
4.0	87.6	88.3	86.1	84.2
5.5	88.5	89.2	87.34	85.8
7.5	89.5	90.1	88.5	87.2
11	90.6	90.1	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

\* Based on test method B

# Brook Crompton motor ranges and MEPS

## Minimum efficiency

Brook Crompton has a full range of motors from 0.75kW to 185kW in 2, 4, 6 and 8 pole, which comply, or in most cases exceed the efficiency levels required by the minimum efficiency performance levels. These are suitable for certain applications where high efficiency is of minor significance, such as single shift or intermittent duty operation.

## The efficiency of electric motors

Electric motors have the job of converting electrical energy directly into rotating mechanical power, at the point where it is required.

Generally, they do this very efficiently but since more than a quarter of industry's electricity consumption is accounted for by motors, even the smallest improvement in motor efficiency (= reduction in losses), can significantly reduce the energy consumed - globally or in a single installation.

It is characteristic of the high efficiencies inherent in electric motors, that a small increase in the efficiency value means a high percentage of energy is being saved.

For a large motor, eg 90kW, a 1% improvement in efficiency means that a 20% reduction in losses has been achieved.

The smaller motors generally have efficiency values more than 10% lower than those at the top of the range, and the loss reductions required to achieve high efficiency can be up to 40%.

The initial cost is, therefore, quite a minor factor in the overall lifetime cost. In view of the significance of electricity costs, any motor used greater than 50% would certainly justify the installation of high efficiency motors.

## High efficiency

Brook Crompton has a range of motors from 0.75kW to 185kW in 2, 4, 6 and 8 pole, which meet or in some cases exceed the minimum 'high' efficiency performance levels. These are recommended for use on applications where efficiency is of a major significance, such as continuous duty often found within the major process industries.

## The use of electric motors

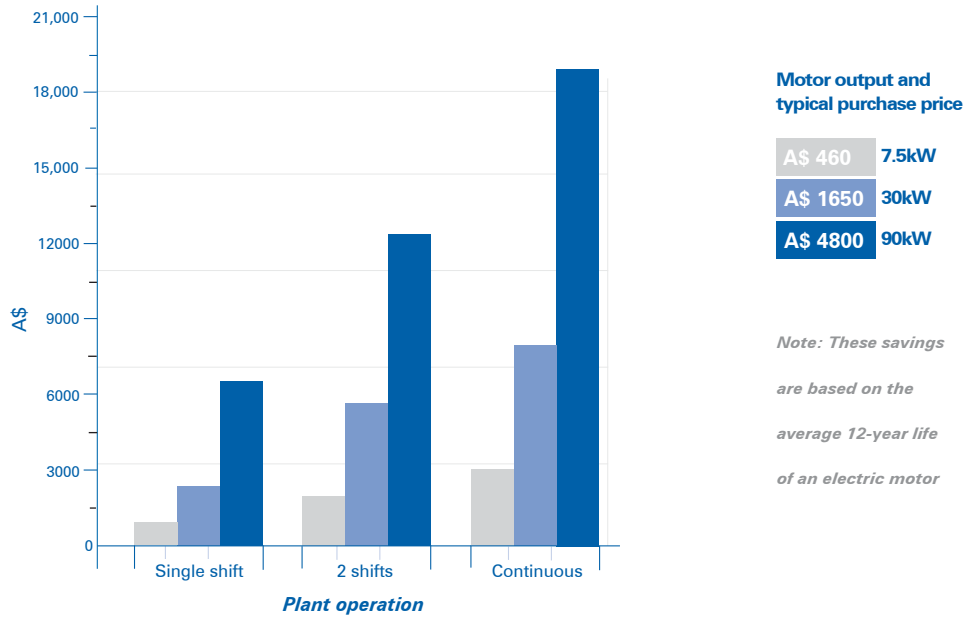
The duty load and the running time of a motor are important factors in assessing the value of its efficiency. If a motor operates continuously at full load, it is likely to use its own purchase cost in electricity charges within approximately one month of installation.

In selecting electric motors for use on original equipment or for direct installation in a handling or processing plant, the following points are worth consideration:

- high efficiency motors run cooler and last longer
- energy costs will increase over and above inflation - this is due to government actions
- The Minimum Efficiency Performance Standards will probably be increased over the next few years, and therefore it could make sense to move to higher efficiency motors in any new installation

***Running costs can be up to  
100 times the purchase price  
of the motor over service  
lifetime***

# Saving money and the environment



*Note: These savings are based on the average 12-year life of an electric motor*

## Motor life savings with MEPS high efficiency motors over typical standard efficiency motors

**Electric motors account for almost one-third of the country’s electricity consumption. Users can cut energy bills and help the environment for little or no additional cost by being careful to specify high efficiency motors.**

**The MEPS scheme for industrial electric motors provides a simple means for users to specify and select motors with efficiencies appropriate for their application.**

### Effect on user costs

The price of the motor to the user, especially if it is fitted to an expensive piece of equipment, should not be the main criterion.

Actual savings for the user in reduced electricity bills are likely to be far more significant. This is because the calculation of such cost reductions has so many variables dependant on the user’s circumstances etc. The accompanying chart simply shows typical lifetime savings compared with the full purchase price of three sizes of motor.

Most of the factors in the cost equation are predetermined, but the motor efficiency and any premium for ‘high’ efficiency for example, do present the user with an area of choice.

### Effect on Australian industry

In Australia, more than 1.7 billion three-phase motors run in industrial and commercial facilities accounting for around 28% of the country’s electricity use. Motors are used to drive compressors, conveyors, refrigeration equipment and other processes requiring motive force. The energy consumed costs Australian industry close to \$3 billion a year and produces 37 million tonnes of carbon dioxide through burning fossil fuels.

Better selection and motor management practices can reduce the amount of energy a motor requires by an estimated 10 to 20% - significantly reducing greenhouse gas emissions. For Australian industry, each percentage point improvement in motor system efficiency translates to savings of about 400,000MWh of electricity and an associated 400,000 tonnes of greenhouse gas emissions.

# Rotating Electrical Machines

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**BROOK  
CROMPTON**

**Brook Crompton**  
St Thomas' Road Huddersfield  
West Yorkshire HD1 3LJ UK  
Tel: +44 (0) 1484 557200  
Fax: +44 (0) 1484 557201  
E-mail: [csc@brookcrompton.com](mailto:csc@brookcrompton.com)  
Internet: [www.brookcrompton.com](http://www.brookcrompton.com)

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