

Product note

European MEPS for low voltage motors

The EU MEPS (European Minimum Energy Performance Standard) scheme sets mandatory minimum efficiency levels for electric motors introduced into the European market. It is part of the EU's eco-design project, and its effect is to forbid the introduction of inefficient motors into the European market. This will reduce electricity consumption and therefore cut energy costs and carbon dioxide emissions.



The MEPS scheme covers almost all 2-, 4- and 6-pole single speed, three-phase induction motors with a power range of 0.75 to 375 kW, rated up to 1000V and on the basis of continuous duty operation. The scheme will be introduced in three stages to allow all manufacturers, in particular small and medium-sized producers, to adapt to the new requirements.

Scheme timetable

The new requirements will be applied according to the following timetable:

Stage 1: From 16 June, 2011	Motors must meet the IE2 efficiency level
Stage 2: From 1 January, 2015	Motors with a rated output of 7.5 – 375 kW must meet EITHER the IE3 efficiency level OR the IE2 level if fitted with a variable speed drive
Stage 3: From 1 January, 2017	Motors with a rated output of 0.75 – 375 kW must meet EITHER the IE3 efficiency level OR the IE2 level if fitted with a variable speed drive

Exemptions

The following motors are excluded:

- motors designed to operate wholly immersed in a liquid;
- motors completely integrated into a product (e.g. pump or fan) where the motors energy performance cannot be tested independently from the product;
- motors specifically designed to operate:
 - at altitudes exceeding 1000 meters ASL;
 - where ambient air temperatures exceed 40°C;
 - in maximum operating temperatures above 400°C;
 - where ambient air temperatures are less than -15°C (any motor) or less than 0°C (air-cooled motors);
 - where the water coolant temperature at the inlet to a product is less than 5°C or exceeds 25°C;
 - in potentially explosive atmospheres as defined in Directive 94/9/EC;
- brake motors.

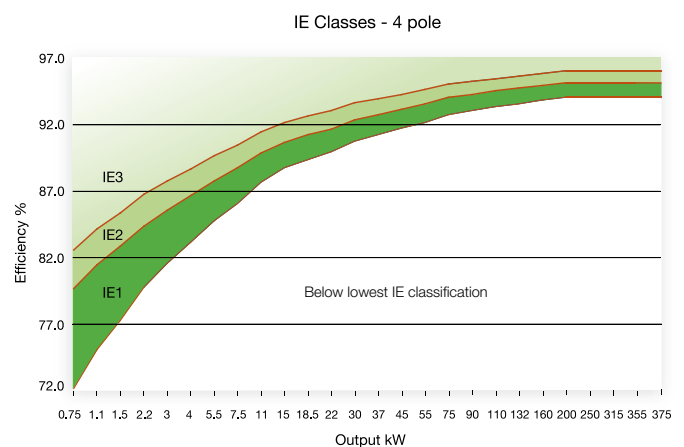
Efficiency measurement methods and IE classes

The scheme is based on two IEC (International Electrotechnical Commission) standards. Motor losses and efficiency values must be determined using the methods specified in standard IEC 60034-2-1: 2007. International Efficiency classes (IE3, IE2 and IE1) are defined in standard IEC 60034-30. The graph below shows the IE classes for 50Hz 4-pole motors.

More detailed information on the IEC standards is available from two ABB Technical notes:

TM018 RevC 2009; IEC 60034-2-1 (efficiency measurement methods).

TM025 RevB 2009; IEC 60034-30 (efficiency classes).



IE efficiency classes for 50 Hz 4-pole motors

Efficiency values and IE classes

The table below shows the minimum efficiency levels for the efficiency classes defined in IEC 60034-30: 2008 for 2-, 4- and 6-pole 50 Hz motors between 0.75 and 375 kW.

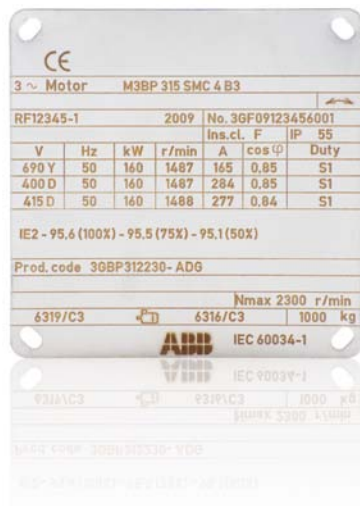
Table 1 Efficiency classes specified in IEC 60034-30: 2008

kW	IE-1 - Standard efficiency			IE2 - High efficiency			IE3 - Premium efficiency		
	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole	2 pole	4 pole	6 pole
	0.75	72.1	72.1	70.0	77.4	79.6	75.9	80.7	82.5
1.1	75.0	75.0	72.9	79.6	81.4	78.1	82.7	84.1	81.0
1.5	77.2	77.2	75.2	81.3	82.8	79.8	84.2	85.3	82.5
2.2	79.7	79.7	77.7	83.2	84.3	81.8	85.9	86.7	84.3
3	81.5	81.5	79.7	84.6	85.5	83.3	87.1	87.7	85.6
3.7	-	-	-	-	-	-	-	-	-
4	83.1	83.1	81.4	85.8	86.6	84.6	88.1	88.6	86.8
5.5	84.7	84.7	83.1	87.0	87.7	86.0	89.2	89.6	88.0
7.5	86.0	86.0	84.7	88.1	88.7	87.2	90.1	90.4	89.1
11	87.6	87.6	86.4	89.4	89.8	88.7	91.2	91.4	90.3
15	88.7	88.7	87.7	90.3	90.6	89.7	91.9	92.1	91.2
18.5	89.3	89.3	88.6	90.9	91.2	90.4	92.4	92.6	91.7
22	89.9	89.9	89.2	91.3	91.6	90.9	92.7	93.0	92.2
30	90.7	90.7	90.2	92.0	92.3	91.7	93.3	93.6	92.9
37	91.2	91.2	90.8	92.5	92.7	92.2	93.7	93.9	93.3
45	91.7	91.7	91.4	92.9	93.1	92.7	94.0	94.2	93.7
55	92.1	92.1	91.9	93.2	93.5	93.1	94.3	94.6	94.1
75	92.7	92.7	92.6	93.8	94.0	93.7	94.7	95.0	94.6
90	93.0	93.0	92.9	94.1	94.2	94.0	95.0	95.2	94.9
110	93.3	93.3	93.3	94.3	94.5	94.3	95.2	95.4	95.1
132	93.5	93.5	93.5	94.6	94.7	94.6	95.4	95.6	95.4
150	-	-	-	-	-	-	-	-	-
160	93.8	93.8	93.8	94.8	94.9	94.8	95.6	95.8	95.6
185	-	-	-	-	-	-	-	-	-
200	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
220	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
250	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
300	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
330	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8
375	94.0	94.0	94.0	95.0	95.1	95.0	95.8	96.0	95.8

Rating plate marking

From 16 June 2011, the following information must be shown on the motor rating plate and in motor documentation:

- Lowest nominal efficiency at 100%, 75% and 50% rated load
- Efficiency level (IE2 or IE3)
- Year of manufacture



Comparison with other efficiency schemes and standards

IEC standards IEC 60034-30 (efficiency classes) and IEC 60034-2-1 (efficiency measurement methods) represent an important step on the road to global harmonization of requirements relating to induction motor efficiency levels, making comparison easier. Work to achieve harmonized standards continues.

Table 2 below shows a comparison between IEC 60034-30 and other voluntary and mandatory efficiency schemes.

Table 2

IEC 60034-30	EU MEPS	CEMCP European voluntary agreement	US EPAct	Local regulations
IE3 Premium efficiency	IE3 Premium efficiency		Identical to NEMA Premium efficiency	
IE2 High efficiency	IE2 High efficiency	Comparable to EFF1	Identical to NEMA Energy efficiency / EPACT	Canada Mexico Australia New Zealand Brazil 2009 China 2011 Switzerland 2012
IE1 Standard efficiency		Comparable to EFF2	Below standard efficiency	China Brazil Costa Rica Israel Taiwan Switzerland 2010

ABB motors and EU MEPS

- ABB has calculated the new efficiency values for its motors as specified in the efficiency testing standard (IEC 60034-2-1: 2007), using the indirect method with additional losses determined by measurement.
- ABB has a full range of IE2 motors available immediately, as it has been supplying high efficiency motors (EFF1 in the former European classification scheme) as standard products for many years. A broad range of IE3 Premium efficiency motors is also available from ABB.

For more information please contact:

www.abb.com/motors&generators

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