

Product note

Europe set to introduce mandatory EuP Directive for low voltage motors

The EU has prepared legislation to introduce a mandatory EuP Directive 2005/32/EC Eco-design of Energy using Products for low voltage motors. The draft Regulation has been scrutinized by the European Parliament and the Council and it is scheduled to come into force for formal adoption by the Commission in July, 2009.

The effect of the EuP Directive 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 Regulation will cover almost all 2-, 4- and 6-pole single speed, three-phase induction motors with a power range of 0.75 kW to 375 kW. The three-staged approach allows all manufacturers, in particular small and medium-sized producers, to adapt to the new requirements.

Scheme timetable

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

Phase 1: From 16 June, 2011	Motors must meet the IE2 efficiency level
Phase 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
Phase 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 from the Regulation:

- Explosion proofed motors, which fall under the ATEX directive 94/9/EC
- Brake motors
- Motors designed for temperatures over 400°C (smoke gas)

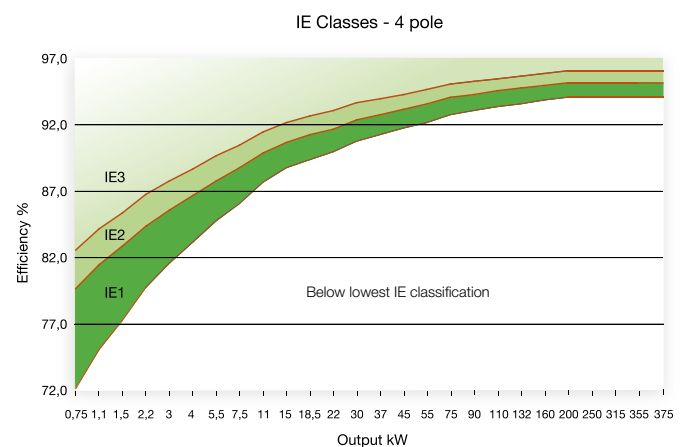
Efficiency measurement methods and IE classes

The legislation 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 RevB 2009; IEC 60034-2-1 (efficiency measurement methods)

TM025 RevA 2009; IEC60034-30 (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 IEC60034-30; 2008 for 2, 4- and 6-pole 50 Hz motors between 0.75 and 375 kW.

Table 1 Table with efficiency classes: IEC60034-30 (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	78.9
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

The lowest efficiency value and the associated IE-code of the motor (see example below) must be shown on the rating plate and in product documentation.

IE3 94.5%

Comparison with other efficiency schemes and standards

IEC standards IEC 60034-30 (efficiency classes) and IEC 60034-2-1 (efficiency measurement methods) harmonize the different requirements for induction motors efficiency levels around the world, making comparison easier. Work to harmonize standards continues.

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

IEC60034-30 EuP Directive 2005/32/EC	Europe (50Hz) CEMEP voluntary agreement	US (60Hz) EPAAct	Others Other efficiency standards with local importance:
IE1 Standard efficiency	Comparable to EFF2	Below standard efficiency	AS in Australia NBR in Brazil GB/T in China IS in India JIS in Japan MEPS in Korea
IE2 High efficiency	Comparable to EFF1	Identical to NEMA Energy efficiency / EPACT	
IE3 Premium efficiency	Extrapolated IE2 with 10 to 15% lower losses	Identical to NEMA Premium efficiency	

ABB motors and the regulation

- ABB has calculated the new efficiency values under the new efficiency testing standard (IEC60034-2-1; 2007) according to indirect method, additional losses determined from measuring.
- ABB has full range of motors in IE2 class. Also Premium efficiency motors in IE3 class are available.

For more information please contact:
www.abb.com/motors&generators

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