

Feature article

# ABB Ensuring Europe's motor users can minimize their energy costs

***Most low voltage (LV) electric motors introduced into the European market have to meet efficiency criteria specified by the EU authorities. The rules – which are often referred to as EU MEPS (Minimum Energy Performance Standard) - have recently been amended. In this article we describe what has changed and look at how the requirements could be further developed in future.***

EU MEPS came into force in mid-2011 through EU Commission Regulation EC 640 (see Fact Box for details). This specifies that most new induction motors which are introduced into the European market have to meet the IE2 efficiency level. On January 7, 2014 the requirements were amended by Regulation EU 4/2014. The amendment does not change the scope or efficiency requirements of EU MEPS; instead it is intended to ensure that market players comply not only with the letter but also the spirit of the law.

## **Changes to exclusions and rating plate markings**

The amendment mainly affects the detailed rules concerning which motors are excluded from EU MEPS. The changes, which are highlighted in the Fact Box, impact the altitude, temperature and coolant specifications.

These changes have been introduced to close loopholes in the original Regulation that were exploited to contravene the spirit of EU MEPS. Some manufacturers, for example, ensured that their standard motors were excluded from the efficiency requirements by stamping them as if they were designed to operate at altitudes exceeding 1000 meters ASL or at ambient temperatures exceeding +40°C. The amendment has changed the threshold figures from 1000 to 4000 meters ASL and from +40 to +60°C, so all practical motor applications within the EU are now covered.

In addition, the amendment relaxes the original Regulation's rules on rating plate markings. Regulation EC 640 required manufacturers to mark efficiency at 100%, 75% and 50% of rated load. The amendment allows manufacturers to show only the figure for 100% rated load on small motors where the rating plate is too small to accommodate the full set of figures. The amendment does not affect the other requirements regarding markings and documentation.

At ABB we intend to ensure that the rating plates on our motors are large enough to show all the necessary information. In other words, we will continue to show partial load efficiencies on rating plates, so our motors will exceed the requirements of EU MEPS in this respect. In fact we also stamp partial load efficiency values on all motors covered by IEC/EN 60034-30, including motors for explosive atmospheres. We plan to continue following this principle after IEC/EN 60034-30-1 enters into force in early 2014 and expands the range of motors subject to IE class markings.

## EU MEPS

Entered into force on June 16, 2011 through EU Commission Regulation EC 640/2009.

Certain aspects – exclusions and requirements regarding markings – were amended with effect from July 27, 2014 by EU 4/2014.

### Scope

(not amended)

- 2-, 4-, and 6-pole single speed, three-phase induction motors
- 0.75 to 375 kW
- Up to 1000 V
- All duty types (provided that motors are capable of continuous duty operation)

### Exclusions

(showing amendments introduced on January 7, 2014)

2. This Regulation shall not apply to:

(a) motors **specified to operate** wholly immersed in a liquid

(c)	Motors specifically designed to operate	change	motors specified to operate exclusively
(i) at altitudes exceeding 4000 m ASL;	1000 m	change	4000 m
(ii) where ambient air temperatures exceed 60 °C;	40 °C	change	60 °C
(iv) where ambient air temperatures are less than -30 °C for any motor or less than 0 °C for a motor with water cooling;	-15 °C	change	-30 °C
	Air	change	Water
(v) where the water coolant temperature at the inlet to a product is less than 0 °C or exceeding 32 °C;	5 °C	change	0 °C
	25 °C	change	32 °C

### Requirements

**Efficiency** (not amended)

From 16.6.2011: motors must meet IE2 efficiency level.

From 1.1.2015: 7.5-375 kW motors must meet IE3 level, or IE2 if fitted with a VSD.

From 1.1.2017: 0.75-375 kW motors must meet IE3 level, or IE2 if fitted with a VSD.

**Markings and documentation** (amended January 7, 2014)

Rating plate: nominal efficiency at 100%, 75% and 50% load must be marked, except that only the figure for 100% load needs to be marked in the case of small motors ("where the size of the rating plate makes it impossible to mark all the information"). IE class and year of manufacture must be shown.

Free access websites: certain other information is required.



## **Key role for market surveillance**

There is an important difference between EU MEPS and efficiency requirements in the US, for example. In Europe manufacturers can bring products to market without having to put them through an advance registration or qualification process. In the US motors have to be pre-validated before they can be introduced into the market. The manufacturers must either have the motors tested at a facility that is audited and approved by a listed independent laboratory, or calculate the motors' efficiency using a tool that has been qualified as an Alternative Efficiency Determination Method or AEDM. Qualification as an AEDM involves testing and comparison of the calculated results. In both cases the manufacturers have to submit an official statement to the Department of Energy specifying the lowest output power, speed and efficiency combinations that will be introduced into the market.

In Europe manufacturers bear the responsibility for ensuring that only MEPS compliant motors are introduced into the market. As a result effective market surveillance is essential. Responsibility for organizing surveillance lies with the EU member states, which have nominated official bodies to perform the actual surveillance work. In practice, surveillance involves arranging for motors to be tested to ensure they are in compliance.

ABB regards market surveillance as a crucial aspect of any MEPS. If the surveillance regime is inadequate then some manufacturers will inevitably try to take advantage of the situation by supplying non-compliant motors. This will result in motor users getting less efficient motors and having to pay higher energy costs. At the same time, governments will not be able to realize their energy savings and emissions reduction targets.

## **Taking EU MEPS to the next level**

EU MEPS has been amended just three years after the original Regulation came into force, showing that the regulatory regime is flexible. The main factor driving the amendment was feedback from market participants concerning a minority of manufacturers who were bending the rules to their own advantage.

The introduction of the amendment should be seen as part of a dynamic process, where future changes will be implemented through amendments or new regulations. The EU Commission has already started consulting with stakeholders on the entire EcoDesign Directive – the original legislation underlying EU MEPS - to assess whether there is a need for it to be significantly recast.

In addition the Commission has launched a preparatory study to investigate how much energy could be saved by bringing the scope of EU MEPS into line with IEC/EN 60034-30-1. This involves both low and high voltage motors and would extend the scope to cover output powers in the range of 0.12 – 1000 kW. It would also include 8-pole motors and motors for explosive atmospheres.

ABB welcomes these initiatives, and we also see the potential for even greater energy savings through a relatively easy update to the current Regulation. The present rules stipulate that from the beginning of 2015 IE2 motors can be used if fitted with a variable speed drive (VSD). However, the rapid development of motor technology during the last few years means that IE3 and even IE4 motors are now easily available. It should therefore be possible to set IE3 as the minimum efficiency level for all motors regardless of whether a VSD is used or not.

## **MEPS drive down energy costs and emissions**

At ABB we have long spoken out in favor of efforts to boost energy efficiency and reduce emissions. We play an active role in organizations that set efficiency standards, and we are happy to see MEPS being adopted in more and more countries around the world. We hope the authorities will maintain the momentum and take MEPS forward.

The main objective of any MEPS has to be improved efficiency. At the same time there is a trend towards harmonization between the different standards and MEPS, and we believe this trend could be accelerated. As well as making life easier for manufacturers, greater harmonization increases competition in the market – which means more choice for motor users.



We are pleased that the EU authorities have acted quickly to amend the original MEPS Regulation, as any loopholes in the legislation should be blocked as soon as possible. The authorities could also tackle the issue of rewinding. This is not regulated in the EU, and it is still seen as a repair option for larger motors. The fact is that rewinding a motor can reduce its efficiency by 3% or even more. As lifetime energy costs typically make up 95% or more of the total cost of ownership of a motor, with the initial purchase cost generally representing only 1 - 2%, a small difference in efficiency can make a huge difference in costs over a motor's lifetime. In fact, the payback period for a new, more efficient motor is often less than two years. There are very few, if any, cases where rewinding could actually make economic sense.

### **EU MEPS helps Europe to compete**

A comparison of energy prices in World Energy Outlook 2013, published by the IEA (International Energy Agency), shows that most industrial companies in Europe pay about twice as much for their electricity as their counterparts in the US and other parts of the world. This price differential highlights how important it is for European industry to use the most energy efficient equipment. Electric motors consume around two-thirds of all electricity used in industry, so it is essential that Europe's industrial companies use efficient motors in order to be competitive in the global markets. Seen in this light, EU MEPS has an important role to play in helping European industry to maintain and grow its competitiveness.

#### **Selecting the right motor with the Optimizer**

ABB's electronic catalogue contains thousands of LV motors. With a number of different MEPS in force around the world, choosing the right motor can be a difficult task.

Motor selection is much easier with the Optimizer, an on-line tool from ABB that splits the process down into a series of intuitive steps. In addition to picking a short list of motors, it computes the cost of ownership and gives access to drawings, test reports and data sheets.

The Optimizer can be downloaded as an iPad app or used in the browser of a regular PC.

Try the Optimizer at [www.abb.com/motors&generators](http://www.abb.com/motors&generators)

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