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Energy efficiency in electric motors

Minimum standards resolved to relieve environment and save electricity

As of 16 June 2011 only highly efficient three-phase asynchronous motors with a performance range of 0.75 - 375 kilowatts (kW) may be put on the market. The Ecodesign Regulatory Committee endorsed these standards for electric motors in the EU Member States and issued them in the Official Journal of the EU as Regulation 640/2009, thereby establishing minimum standards in energy efficiency for three-phase asynchronous motors. This type of motor is in use mainly in industry and trade and accounted for nearly 90 percent of the power consumption in electric motors in all 27 EU Member States in 2005. It is estimated that 135 billion kWh and 63 million tonnes of carbon dioxide (CO₂) could be saved throughout the EU by 2020. "This will also pay off for Germany", said UBA Vice President Dr. Thomas Holzmann, "as nearly 27 billion kilowatt hours of electricity less, and thus 16 million tonnes of CO₂ emissions, could be avoided in Germany alone by the year 2020. By way of comparison: We could do without the construction of eight large power plants with an electricity output of 700 megawatts each."

Efficiency classes make it possible to classify electric drives according to their power consumption and energy efficiency. After a period of transition, the European efficiency classes in effect to date (EFF) will be substituted and amplified by universally applicable efficiency classes IE1 (previously EFF2), IE2 (previously EFF1) as well as IE3 and then IE4. The use of IE2 and the even more efficient IE3 motors, as well as variable speed drive, is highly profitable in most cases. A variable speed drive enables greater electricity savings than merely an increase in motor efficiency. In just a few years' time the new efficiency standards will add up to financial savings for businesses. In addition, they will boost European motor manufacturers' competitiveness and secure jobs for the longer term.

The increased use of high efficiency electric motors with longer service life will also present great energy savings potential after 2020. This level of power savings would not be possible without the introduction of obligatory compliance with these minimum standards.

The proportion in sales of high efficiency motors in Europe, despite their profitability, has risen from two percent to about nine percent in ten years, and this ratio is expected to rise in future. According to EU regulation, from 2011 onwards, motors in the efficiency level heretofore known as EFF2 may no longer be marketed. Moreover, EU sales of three-phase asynchronous motors in the performance range between 0.75 kW and 375 kW will only be allowed if they comply with

the future IE2 efficiency class. The next phase to increase the energy efficiency of electric motors will occur in January 2015, whereupon only IE2 efficiency level electric motors with variable speed drive and a performance range between 7.5 kW and 375 kW may be put on the market. The exception is that they comply with the (higher) premium efficiency level IE3. As of January 2017 the regulation will also apply to electric motors in the 0.75 kW to 7.5 kW performance range.

Minimum efficiency standards have been in effect in the USA for years, where high efficiency motors (IE2) already enjoy a market share of 54 percent, and premium efficiency IE3 motors a 16 percent share. The proportion of IE3 motors in Germany and Europe is still under one percent.

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