

Low voltage motors for hazardous areas

Safe, reliable and highly efficient

Efficient motors deliver huge energy savings and emission reductions

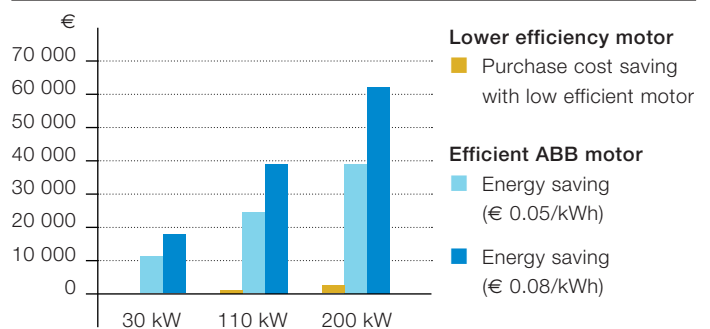
Continuously rising energy prices, the urgent need to cut carbon dioxide emissions, and the introduction of standards and regulations setting minimum efficiency levels have boosted demand for high efficiency motors.

Motors for use in hazardous areas are subject to rigorous safety requirements all over the world. By contrast, efficiency requirements for these motors vary widely between markets: some countries have tough requirements in force but others still do not have mandatory minimum efficiency levels. Nevertheless, motor users in all parts of the world are seeking ways to cut costs and reduce their environmental impact, and this has led to strong demand for efficient motors for applications in hazardous areas. ABB meets this need by supplying a range of high and premium efficiency motors for hazardous areas. Efficient motors cost slightly more to purchase, but the big energy savings that are possible can make payback times very short. Other benefits include cooler running, which helps to cut maintenance requirements and extend the lifetime of key motor components.

With a full range of energy efficient motors for hazardous areas and reliable support services available worldwide, ABB is in a strong position to serve the needs of motor users looking for ways to reduce their operating costs and meet their environmental commitments.

The graph below shows that selecting a lower efficiency motor because it costs less to purchase can be a very expensive mistake. An efficient motor will cost slightly more to buy, but the energy savings achieved over its lifetime outweigh the additional purchase cost many times.

Efficient motors cost slightly more to purchase but produce huge lifetime savings in energy costs and CO₂ emissions.



The graph shows the savings that can typically be achieved by selecting an efficient ABB motor rather than a less efficient product. The calculations assume a running time of 24 h/365 days, motor lifetime of 25 years, purchase price difference of 15% and electricity costs of € 0.05 and € 0.08/kWh.



Exceeding international efficiency requirements

Motors operating in potentially explosive atmospheres are included in the scope of IEC (International Electrotechnical Commission) standard 60034-30, which specifies efficiency classes. These motors can therefore be labeled with the IE (International Efficiency) class code. Hazardous area motors are also covered by many of the MEPS (Minimum Energy Performance Standard) schemes around the world, including those in Australia, Brazil, Canada, China, Korea, and the USA.

In some markets, however, there are no mandatory efficiency requirements for hazardous area motors. In the EU, for example, these motors are excluded from the EU MEPS scheme. As a result there are presently no requirements for manufacturers to improve the efficiency of hazardous area motors supplied to these markets, with the result that many of the motors available in such markets are less efficient.

As a global player committed to supplying safe, reliable and efficient motors, ABB designs and labels its hazardous area motors to comply with the international IEC standards. In addition, motors are naturally supplied to conform to local MEPS requirements where applicable. The table below shows how the IEC's International Efficiency classes compare with MEPS schemes.

IEC International Efficiency classes and MEPS schemes

IEC/EN 60034-30	EU MEPS	US EPAct	Other, similar local regulations	Hazardous area motors included in MEPS
IE3 Premium efficiency	IE3 Premium efficiency	Identical to NEMA Premium efficiency		
IE2 High efficiency (comp. to EFF1)	IE2 High efficiency	Identical to NEMA Energy efficiency/EPACT	Switzerland 2011 Mexico Australia New Zealand Brazil China 2011	- • • • • •
IE1 Standard efficiency (comp. to EFF2)		Below standard efficiency	Switzerland 2010 China Brazil	- • •

IEC/TS 60034-31 proposes IE4 levels for asynchronous and synchronous motors.
IEC standard (IEC 60034-2-1) defines how efficiency is to be measured.

• = included

ABB hazardous area motors meet – and comfortably exceed – the requirements for the IEC's IE2 and IE3 efficiency classes. ABB supplies IE2 (high efficiency) hazardous area motors as standard, available direct from stock; it also supplies an extensive range of IE3 (premium efficiency) hazardous area motors.

High quality motors from ABB easily exceed International Efficiency class requirements

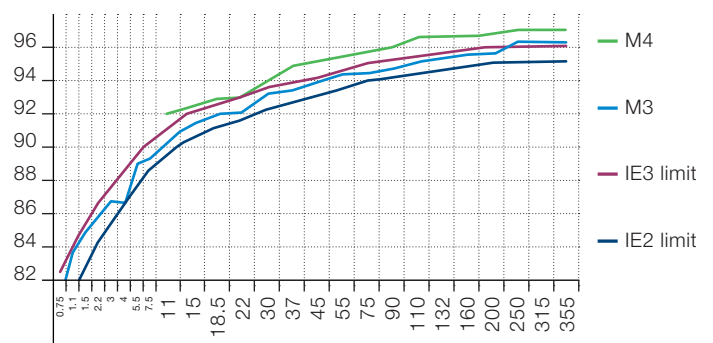


ABB supplies IE2 motors as standard, and also offers an extensive range of IE3 motors.

ABB motors meet – and in many cases comfortably exceed – the requirements for the IE2 and IE3 efficiency classes

ABB supplies IE2 (high efficiency) motors as standard, and many are available direct from stock; it also supplies an extensive range of IE3 (premium efficiency) motors.

The large number of hazardous area motors in use – they represent the majority of motors in the chemical, oil and gas industries – means that global energy consumption and CO₂ emissions could be reduced significantly if all hazardous area motors were high efficiency types.

These clear benefits have prompted regulators in some countries – like Australia, Brazil, Canada, China, Korea and the USA – to include hazardous area motors in their local MEPS schemes. In other markets, however, MEPS schemes do not yet cover hazardous area motors. Given the accelerating pace of climate change, it is inevitable that all markets will eventually have efficiency requirements for all types of motor, including hazardous area products.

By supplying hazardous area motors that meet the requirements of both local MEPS (where applicable) and the IEC's high and premium efficiency classes, ABB is making its own contribution to efforts to reduce global energy consumption and carbon emissions.



Internationally certified safety in hazardous areas

The mandatory requirements for hazardous area motors – such as the ATEX Directives in Europe or NEC in the USA – are complemented by IECEx, a voluntary, international system operated by the IEC.

As the world market leader, ABB welcomes the increasing harmonization provided by international standards and systems like IECEx. ABB was the first motor manufacturer to gain IECEx certification, and all ABB cast iron flameproof and non-sparking low voltage motors are now IECEx certified. In addition, many other types of ABB motor can be supplied with IECEx certification on request.

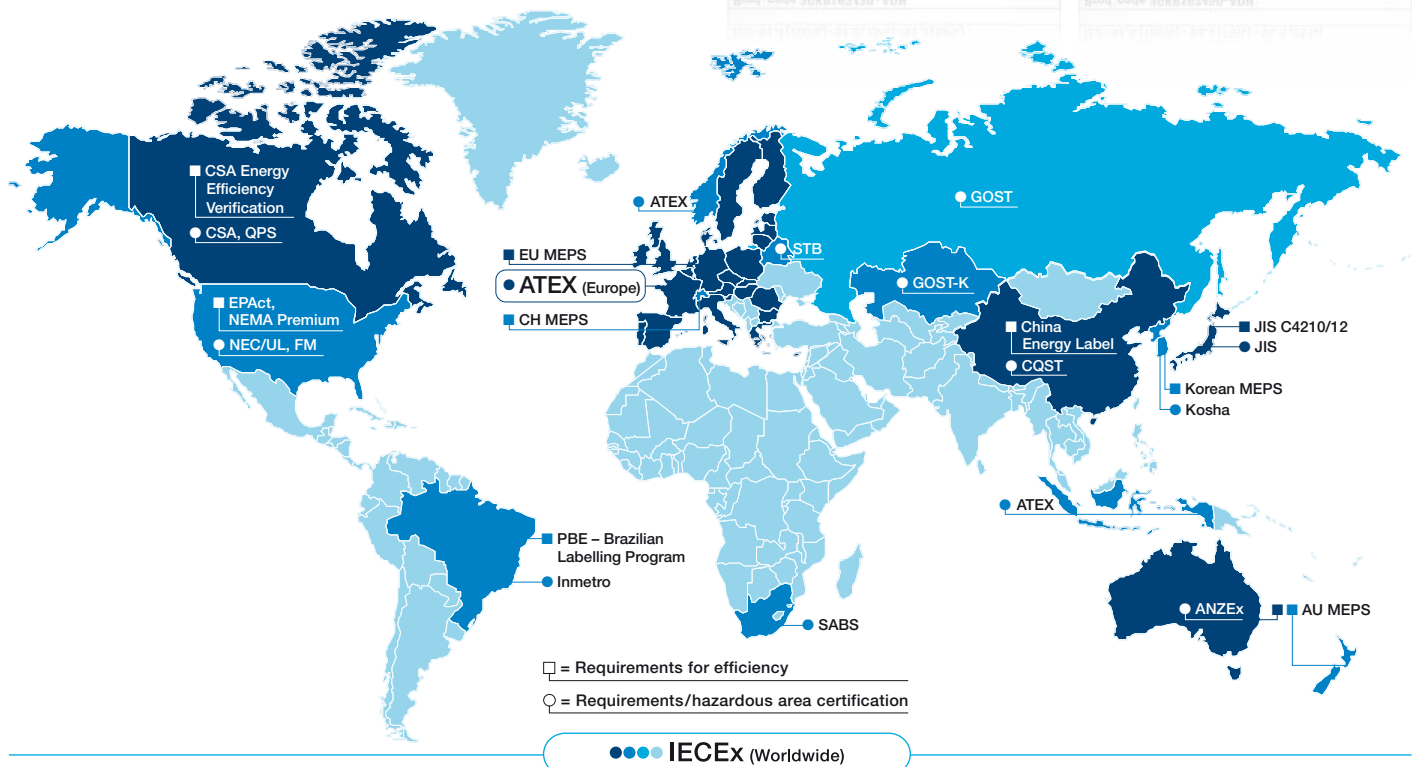
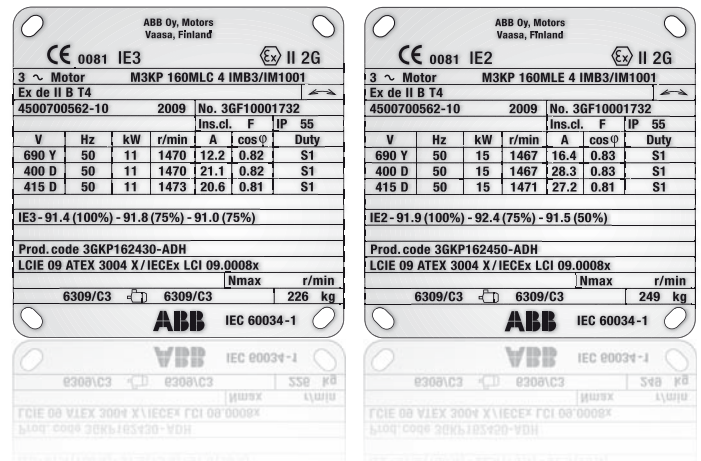
IECEx is a conformity assessment system which provides an internationally accepted means of proving that products and services are in compliance with IEC and ISO standards relating to hazardous areas. The IECEx system comprises certification schemes for equipment, service facilities, conformity mark licenses and personnel.

IECEx certification is a quality based system and involves – in addition to product tests – assessment of quality control procedures and testing plans, audits of manufacturing plants, and routine on-going surveillance and inspections. A significant advantage of IECEx is that vendor certificates are available for inspection on the IECEx website. End users can therefore confirm the validity of IECEx certificates at any time – which is not possible with ATEX, for example. This

increases end user confidence that the motor vendor will be committed to maintaining the necessary quality systems.

The quality based approach of IECEx can be contrasted with ATEX, which is based on type testing. ATEX certification allows Notified Bodies to make their own individual interpretations of the standards, whereas under IECEx certification the same interpretation is shared throughout the 31 participating countries and individual interpretations by Notified Bodies are not allowed. Another advantage of IECEx is that the Certificate of Conformity also covers Zone 2, whereas Zone 2 coverage is voluntary with ATEX.

In addition to local approvals, many of ABB's hazardous area products – including all LV cast iron motors – have been tested and certified under IECEx.



Worldwide network of authorized hazardous area service facilities

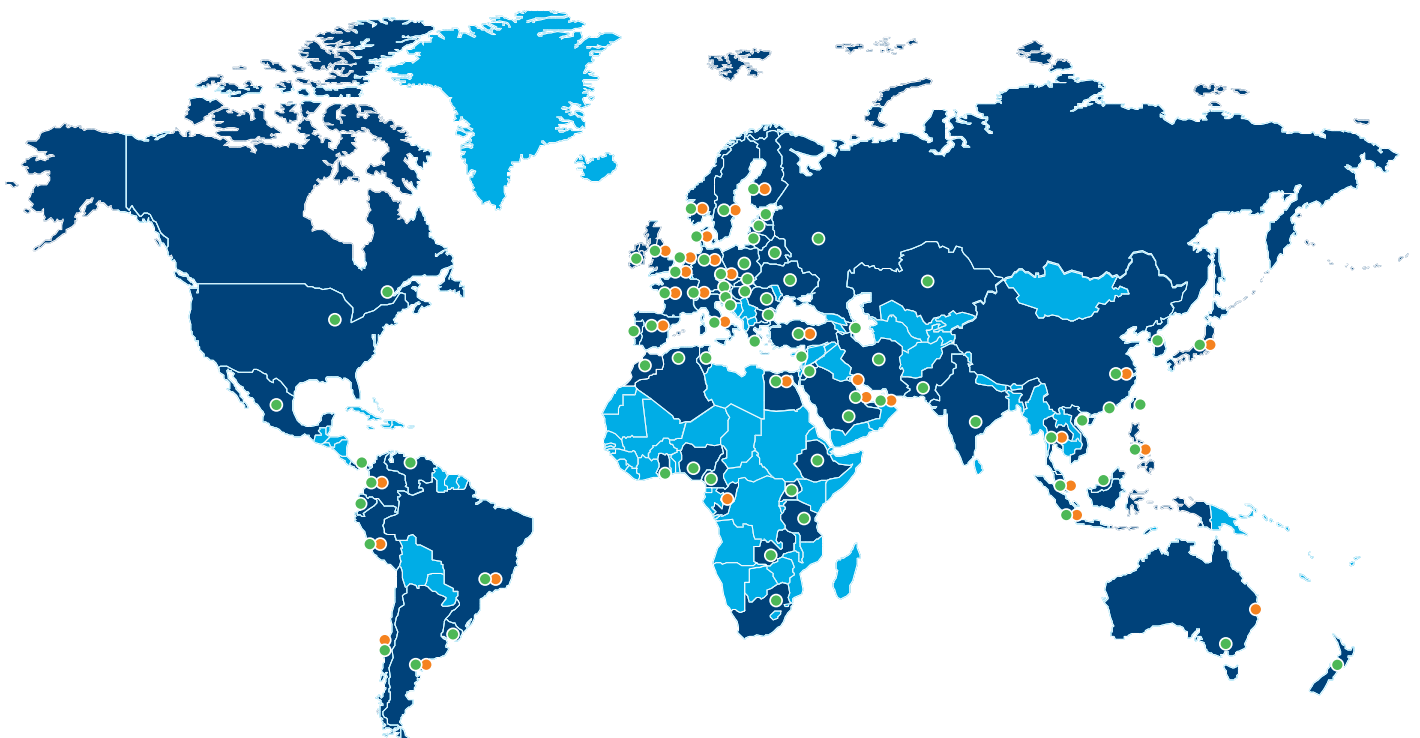


Servicing hazardous area motors is a specialized task because the motors must continue to meet rigorous safety requirements when they are returned into use. This means that service personnel must be thoroughly trained, and both the personnel and premises must be audited and certified.

As part of its commitment to safety, ABB has built up a network of authorized service facilities. It has its own qualification program to ensure that hazardous area service facilities meet strict acceptance criteria, and ABB was the first motor manufacturer to receive IEC certification for its program.

This means that ABB can issue certificates of authorization to hazardous area workshops that comply with the qualification program, which includes the requirements of IEC 60079-19 (Ex equipment repair, overhaul and reclamation). The certificate confirms that the facility has been audited by ABB and that ABB motors repaired or overhauled there are safe and their original ABB declaration of conformity remains valid.

- ABB Low voltage sales network
- ABB's network of certified hazardous area service shops for low voltage motors



Energy appraisals deliver big savings for motor users

Specifying high efficiency motors for new applications makes sound economic sense: the energy savings provide short payback times. Big savings can also be achieved by replacing older motors in existing applications: after their short payback time, the motors will continue to deliver savings over their entire lifetime.

Major refineries and other large-scale plants have thousands of motors in operation. Which motors should be replaced first? ABB can perform energy appraisals, assessing the motors in operation at a site and drawing up a plan for the replacement of less efficient units. Created in direct response to customer requests, the service delivers a motor upgrade roadmap for the specific site.

Our team visits the site and the team members apply their experience and technical know-how to select the most cost-effective solution. We begin by focusing on certain sections of the plant, or on large pumps or fans, in order to identify the biggest potential savings in the shortest time.



Contact us

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