

Brochure

## Global MEPS

Energy efficiency regulations for  
low voltage motors around the world

# ABB's broad range covers all MEPS across the globe

Electric motors are so useful that they are found everywhere. With vast numbers of motors in use, they now consume for about 2/3<sup>rd</sup>s of all electricity used in industry. By increasing efficiency – using more efficient motors – it would be possible to realize huge savings in energy and carbon dioxide emissions. This has prompted governments to introduce MEPS (Minimum Energy Performance Standards), setting mandatory minimum efficiency levels for electric motors.

## Harmonized standards make life easier

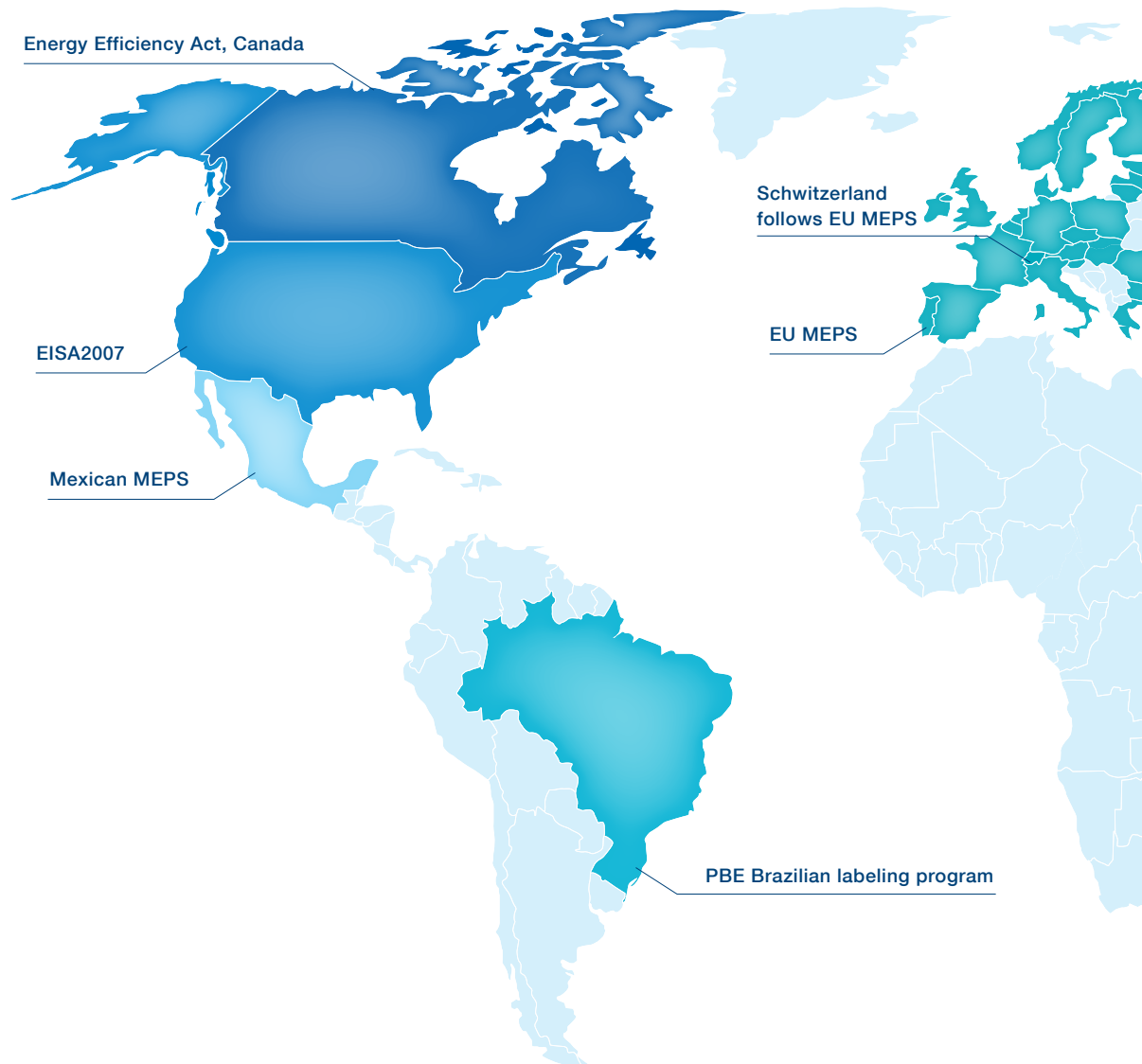
Two important elements of any MEPS are the rules that specify how efficiency should be determined and what efficiency classes should be used. These rules are based on standards, and in the past there was no consistency in the standards followed by different manufacturers. This made it very difficult for users to compare motor efficiency levels. Harmonization of efficiency standards has therefore been a priority for the standards setting organizations.

Two standards introduced by the IEC (International Electrotechnical Commission), that are also adopted as EN standards, are specifically designed to harmonize the different requirements, and they represent a major step forward on the road to global harmonization:

- IEC/EN 60034-2-1:2014 specifies efficiency determination methods
- IEC/EN 60034-30-1:2014 specifies International Efficiency classes (IE1, IE2, IE3, IE4)

## Good news for motor users

Harmonization of standards means manufacturers follow the same principles when defining, measuring and publishing motor efficiencies. This makes it much easier to compare efficiency levels, so it is also easier to select the right motors to save energy and cut emissions. Harmonized standards and the increasing adoption of MEPS around the world are therefore good news for motor users.



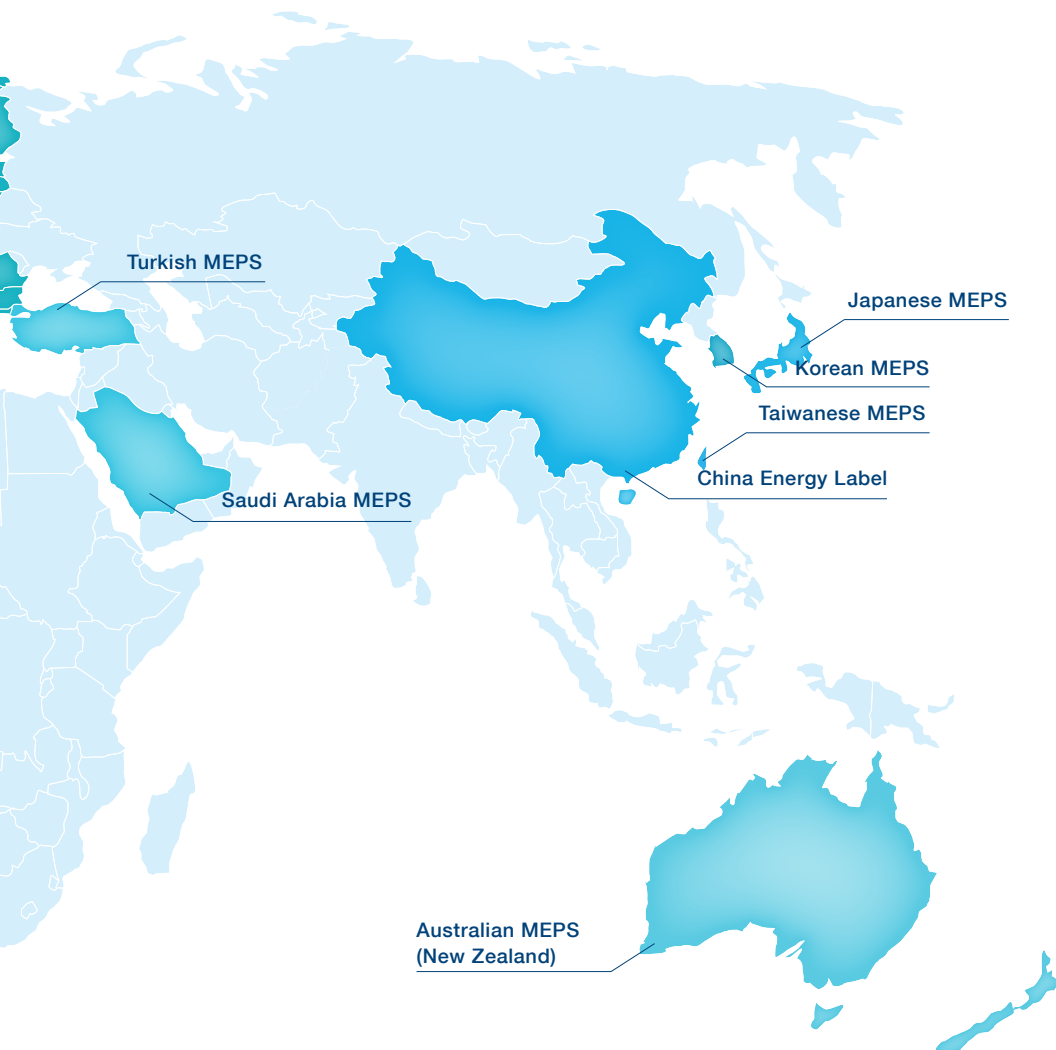
It's important to remember, though, that harmonization is an on-going process. Even though MEPS are already in force in several regions, they are still evolving and they differ in terms of scope and requirements. At the same time, new countries are planning to adopt their own MEPS and others (US, China, EU) have even plans for implementing MEPS for High Voltage motors. One way to get the latest information is to visit [www.abb.com/motors&generators/Cost of ownership/Energy Efficiency](http://www.abb.com/motors&generators/Cost%20of%20ownership/Energy%20Efficiency), which we aim to keep updated as the situation changes.

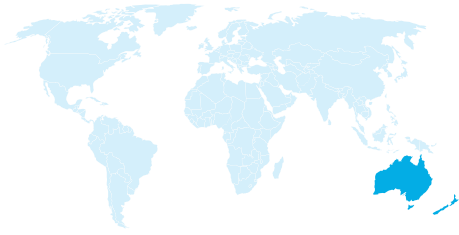
### The right motor for the right region

The changing requirements might make it sound as though the task of selecting the right motor has become much more complicated. Fortunately, ABB offers a special tool called the Optimizer that makes the job very straightforward. Using the Optimizer you can choose the optimal motor for each region utilizing factors like running hours, electricity prices, and CO<sub>2</sub> emissions.

Our motor line-up covers all the world's regions, and they even meet many future requirements. Whatever the region, you can be sure we can offer the optimal motor. ABB Premium and Super Premium efficiency motors meet or exceed the requirements of the major global efficiency standards – IEC 60034-30-1, NEMA-MG-1, AS/NZS 1359.5:2004, NBR 17094-1 and others. Our focus on supplying products that optimize your total cost of ownership means you get motors that deliver not only maximum efficiency, but also reliability and a long operating lifetime, and they are supported by our global service network.

By sourcing your motors from ABB you ensure that they not only comply with the relevant MEPS but also meet the requirements of international standards. In the case of motors for explosive atmospheres, for example, ABB follows the requirements of IEC/EN 60034-30-1. ABB standard motors for explosive atmospheres are therefore provided with IE markings, even though this is not required by EU and certain other MEPS.





### Australian MEPS

The first stage of the Australian MEPS scheme was announced in 2001 by the Australian Greenhouse Office (AGO), and it was revised in 2006. All motors covered by the scheme that will be sold in the Australian and New Zealand markets must be registered in a National online database system, [www.energyrating.gov.au/appsearch/motors.asp](http://www.energyrating.gov.au/appsearch/motors.asp)

Standard AS/NZS 1359.5:2004 stipulates two efficiency levels: the compulsory Minimum Efficiency level is IE2 or better, and the voluntary High Efficiency level is IE3 or better. Two test methods are available: Method A as defined in AS/NZS 1359.102.3 (equivalent to IEC 60034-2-1:2007) and Method B as defined in AS/NZS 1369.102.1 (equivalent to IEC 60034-2).

The scheme is monitored by a regulatory body which conducts random testing to ensure compliance. Importing unregistered motors is subject to strict penalties.

Australia	
reference	AS/NZS 1359.5:2004
voltage	up to 1100 V
frequency	50 Hz
speed	2, 4, 6 & 8 poles
minimum efficiency	- since 2001 (2002 in New Zealand), revision in both countries 2006 - compulsory MEPS level IE2 or higher, 0.73kW to < 185kW
main exclusions	- submersible motors - integral motor-gear systems - variable or multispeed motors - motors rated for only short duty cycles, e.g. S2
testing method	Method A (equivalent to IEC 60034-2-1:2007 and IEEE 112-B) or Method B (equivalent to the old IEC 60034-2)
future	discussion about changing the MEPS limits to match IEC 60034-30-1 efficiency classes and making IE3 compulsory



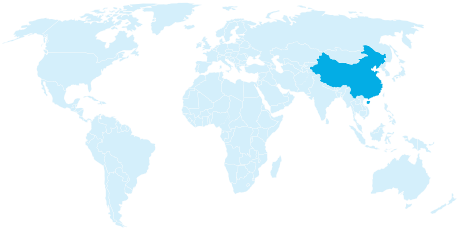
### PBE Brazilian Labeling Program

The PBE Brazilian Labeling Program has been in force since December 2009 and is overseen by INMETRO. From 2012 the minimum efficiency level is IE2.

All motors covered by the NBR standards must be provided with specific rating plate markings and additional stickers depending on the degree of protection.

All motors must be registered on the INMETRO website at [www.inmetro.gov.br](http://www.inmetro.gov.br). Prior to registration of products, the manufacturer's test laboratories must be calibrated and approved by INMETRO. This includes annual rechecking of registered products.

Brazil	
reference	NBR 17094-1
voltage	up to 1000 V
frequency	60 Hz
speed	2, 4, 6 & 8 poles
minimum efficiency	since Dec. 2009 (IE2 minimum from 2012) - 0.75kW–185kW, 2 & 4 poles - 0.75kW–150kW, 6 poles - 0.75kW–110kW, 8 poles
main exclusions	- servomotors - permanent magnet motors - S2-S10 according to NBR 7094.2000 - (Ex d(e)), (Ex e), (DIP)
testing method	NBR 17094
future	Preliminary new revision of NBR is expected for 2017.



### China Energy Label

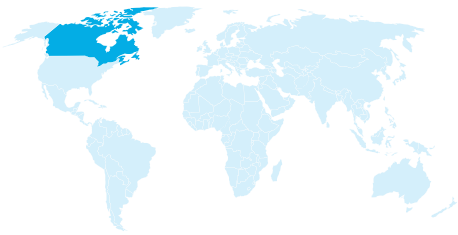
The China Energy Label scheme has been mandatory since 1.9.2008 and was revised in 2012. From 1.9.2012 motors must meet Grade 3 (IE2) requirements.

China has taken a major step towards harmonizing its national standards with IEC standards.

Standard GB/T1032, which defines the efficiency measuring method, has been updated. The testing method is now identical to IEC 60034-2-1 and the grades are in line with the efficiency classes defined in IEC/EN 60034-30.

In addition to energy efficiency requirements, low power motors are subject to CCC-certification.

China		
<b>reference</b>	GB25958-2010	GB18613-2012
<b>voltage</b>	up to 690 V	up to 1000 V
<b>frequency</b>	50 Hz	
<b>speed</b>	2,4 & 6 poles	
<b>minimum efficiency</b>	since 1.7.2011 low-power three-phase asynchronous motors 2W–2.2kW (identical to IE2 0.75kW -->)	since 1.9.2008 (revised 2012) update of GB18613-2006 and GB/T1032 0.75kW–375kW (identical to IE2)
<b>main exclusions</b>		
<ul style="list-style-type: none"> <li>- marine</li> <li>- brake motors</li> <li>- motors completely integrated into a machine</li> <li>- conical rotor motors for electrical hoist and construction machinery</li> <li>- motors with electro-magnetic braking inside</li> <li>- motors with a duty type other than S1 or S3 with a rated cyclic duration factor of 80% or higher</li> <li>- wound-rotor induction motors</li> <li>- two-/multispeed motors</li> <li>- VSD motors</li> </ul>		
<b>testing method</b>	under GB/T1032 the testing method is identical to IEC 60034-2-1 and the grades are in line with the classes in IEC 60034-30-1 (IE2/IE3)	
<b>future</b>	Preliminary dates for IE3 implementation: 1.9.2016: 7.5kW–375kW (IE3) 1.9.2017: 0.75kW–375kW (IE3)	



### Energy Efficiency Act, Canada

In Canada the requirements came into force in 1997 and were revised in 1999 and 2012. Motors must be qualified by NRCan, a regulatory body.

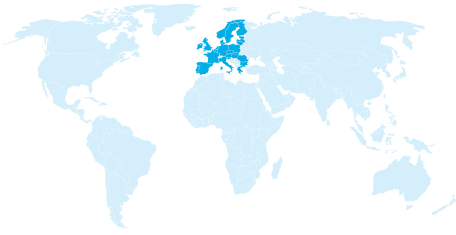
The rating plate must show NEMA nominal efficiency at 100% load together with the safety certificate marking, such as CSA. The compulsory efficiency level is either IE3 or IE2 depending on the output power or mounting position. Before the motors are sold, the manufacturer's test laboratory must be calibrated and the products approved.

Canada	
<b>reference</b>	EEA C390-10
<b>voltage</b>	up to 600 V
<b>frequency</b>	60 Hz
<b>speed</b>	2, 4, 6 & 8 poles
<b>minimum efficiency</b>	12.4.2012 - 1–200 HP (IE3) - foot, foot & flange, or flange mounted with provision for feet 201–500 HP (IE2) - footless: 1–500 HP (IE2) - all 8 poles 1–500 HP (IE2)
<b>main exclusions</b>	- inverter duty motors - IEC frame size 80 and below
<b>testing method</b>	CSA C390-10
<b>future</b>	as the latest changes were implemented in April 2012, no further changes to the regulations are expected in the near future



### EU MEPS (EC 640/2009, EU 4/2014)

The regulation behind EU MEPS EC 640/ 2009 and its Amending Regulation EU 4/2014 comes into force in stages between 2011 and 2017.



EU MEPS stipulates that motors for DOL operation between 7.5-375kW need to meet IE3 efficiency levels. Additionally IE2 motors can be placed on the market if they are driven by variable speed drive. Motors smaller than 7.5kW can be IE2 until 1.1.2017.



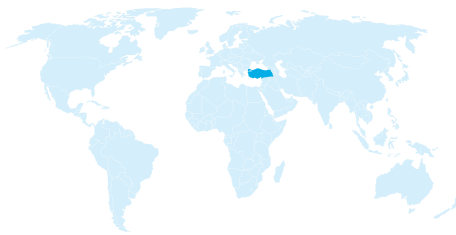
Switzerland follows the EC 640/2009 Regulation.

EU / Switzerland	
reference	EC 640/2009 EU 4/2014
voltage	up to 1000 V
frequency	50 Hz
speed	2, 4 & 6 poles
minimum efficiency	since 16.6.2011 IE2 for 0.75kW < 7.5kW since 1.1.2015 IE3 for 7.5kW-375kW IE2 allowed also for bigger output powers when used with a variable speed drive.
main exclusions	- motors for explosive atmospheres - brake motors
testing method	IEC 60034-2-1: 2007
future:	- IE3 from 1.1.2017 > 0.75kW-375kW



### Turkish MEPS

Regulation SGM-2012/2, which came into force on 18.6.2012, is identical to EC640/2009. Therefore minimum efficiency requirements and time lines are identical to EU MEPS.



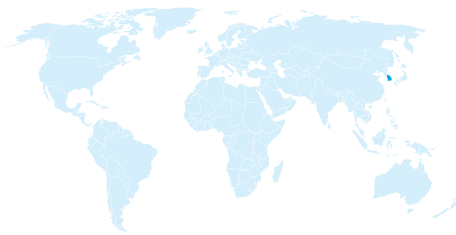
Requirements for rating plate markings are identical to EU MEPS. Market surveillance is carried out by the Ministry of Science, Industry and Technology.

Turkey	
regulation / standard	SMG-2012/2
validity	IE3 from 1.1.2017 0.75kW-375kW



### Korean MEPS

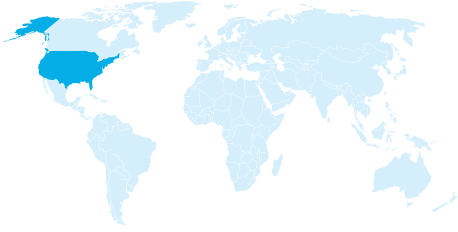
The Korean MEPS scheme was announced on 1.7.2008 by the Ministry of Commerce, Industry and Energy (MOCIE) and is being implemented in three phases. Certificates are granted by the Korea Energy Management Corporation (KEMCO).



Korean MEPS is currently identical to IE2 (60 Hz) for motors below 37kW and IE3 for motors from 37kW upwards. A specific MEPS sticker is required and all motors must be registered with the authorities to pass through customs. Motors that do not have the MEPS label will not be allowed through customs.

Korea	
reference	MKE 2011-263
voltage	up to 600 V
frequency	60 Hz
speed	2, 4, 6 & 8 poles
minimum efficiency	introduced in 3 phases from 1.7.2008 - IE2 since 2008 0.75kW-200kW - IE3 since 1.10.2015 37kW-200kW
main exclusions	- TENV* - TEAO* - permanent magnet motors
testing method	IEC 60034-2-1 or IEEE 112
future	IE3 time line set as follows: - 1.10.2015 Output powers from 37 up to 200kW (2, 4, 6 and 8 poles) - 1.10.2016 Output powers from 200kW up to 375kW (only 4 and 6 poles) - 1.10.2018 Output powers from 0.75kW up to 37kW (2, 4, 6 and 8 poles)

\*) TENV = Totally Enclosed Not Ventilated  
TEAO = Totally Enclosed Air Over



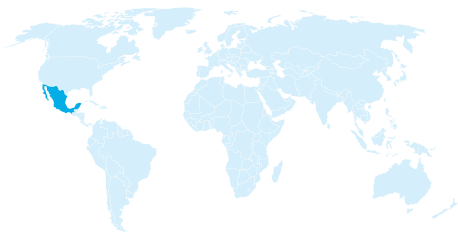
### EISA2007, USA

EISA – the Energy Independence and Security Act – was signed into law on 19.12.2007 and revised in 2010. Recently published Small Motor Rule (1.9.2015) brought new requirements for open type of motors.

General purpose motors rated 1–200 HP (Subtype I, previously covered by EPAAct92) must meet NEMA Premium efficiency levels, which are identical to IE3 at 60 Hz. General purpose motors rated 201–500 HP (Subtype II, not covered by EPAAct92) must meet NEMA Energy efficient levels, which are identical to IE2 at 60 Hz. The rating plate must be marked with the motor's nominal full load efficiency (NEMA nominal efficiency) and the manufacturer's compliance certificate number, known as the CC-number.

USA	
<b>reference</b>	EISA2007 + small motor rule
<b>voltage</b>	up to 600 V
<b>frequency</b>	60 Hz
<b>speed</b>	2, 4, 6 & 8 poles
<b>minimum efficiency</b>	since 19.12.2010 - Subtype I (NEMA Premium efficiency identical to IE3) 1–200 HP, 2,4 & 6 poles - Subtype II (Energy efficient identical to IE2) 201–500 HP, 2,4,6 poles 1–500 HP 8 poles - Specific limits for ODP (Open Drip Proof)
<b>main exclusions</b>	- IEC frame size below 80 and higher than 315 - adjustable with optimized windings (cannot be line started) - customized OEM mounting - intermittent duty - integral with gearing or brake (motor cannot be used separately) - TENV* and TEAO* enclosures
<b>testing method</b>	IEEE 112-B or CSA C390-10
<b>future</b>	Integrated Horsepower Rule Premium efficiency (IE3) required for almost all motors from 1HP to 500HP.

\*) TENV = Totally Enclosed Not Ventilated  
TEAO = Totally Enclosed Air Over



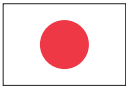
### Mexican MEPS

Standard NOM-016-ENER-2010 was published on 6.10.2010, and came into force on 19.12.2010, replacing its predecessor from 2002. The minimum efficiency level is IE2.

All motors must be provided with a specific rating plate according to the standard. All the information shown on the rating plate should be in Spanish.

Motors must be tested and approved by accredited laboratories annually, and there are penalties for failure to comply with the standard.

Mexico	
<b>reference</b>	NOM-016-ENER-2010
<b>voltage</b>	up to 600 V
<b>frequency</b>	60 Hz
<b>speed</b>	2, 4, 6 and 8 poles
<b>minimum efficiency</b>	since 19.10.2010 0.746kW–373kW (identical to IE2)
<b>main exclusions</b>	certification need depends on the sales channel, who is the importer and whether products are stocked locally or not
<b>testing method</b>	CSA C390 or IEEE Std.112
<b>future</b>	expected to follow the US EISA (IE3) model in the future

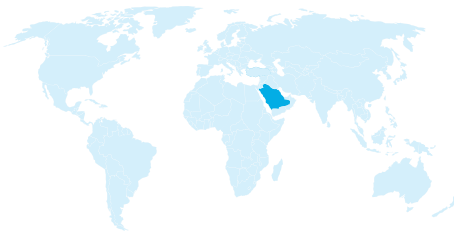


### Japanese MEPS

Japanese MEPS is a part of the Top Runner Program introduced by METI under the Energy Savings Act, which became compulsory in April 2015.

Minimum efficiency is IE3 without tolerance. Due to Japan being divided into 50Hz and 60Hz networks the typical requirement is to have 3 or 6 voltage-frequency combinations on the rating plate.

Japan	
reference	Energy Saving Act
voltage	up to 1000 V
frequency	50Hz, 60Hz
speed	2, 4, 6 poles
minimum efficiency	- IE3 since April 2015
main exclusions	- motors with insulation class H, N or R - motors with star-delta starter - motors for explosive atmospheres - motors designed to operate within liquids - water cooled motors - marine motors - high-slip motors - motors completely designed into a machine that cannot be tested separately from the machine
testing method	JIS C 4034-2-1: 2011
future	Due to recent introduction of first MEPS, additional measures are not expected within short.



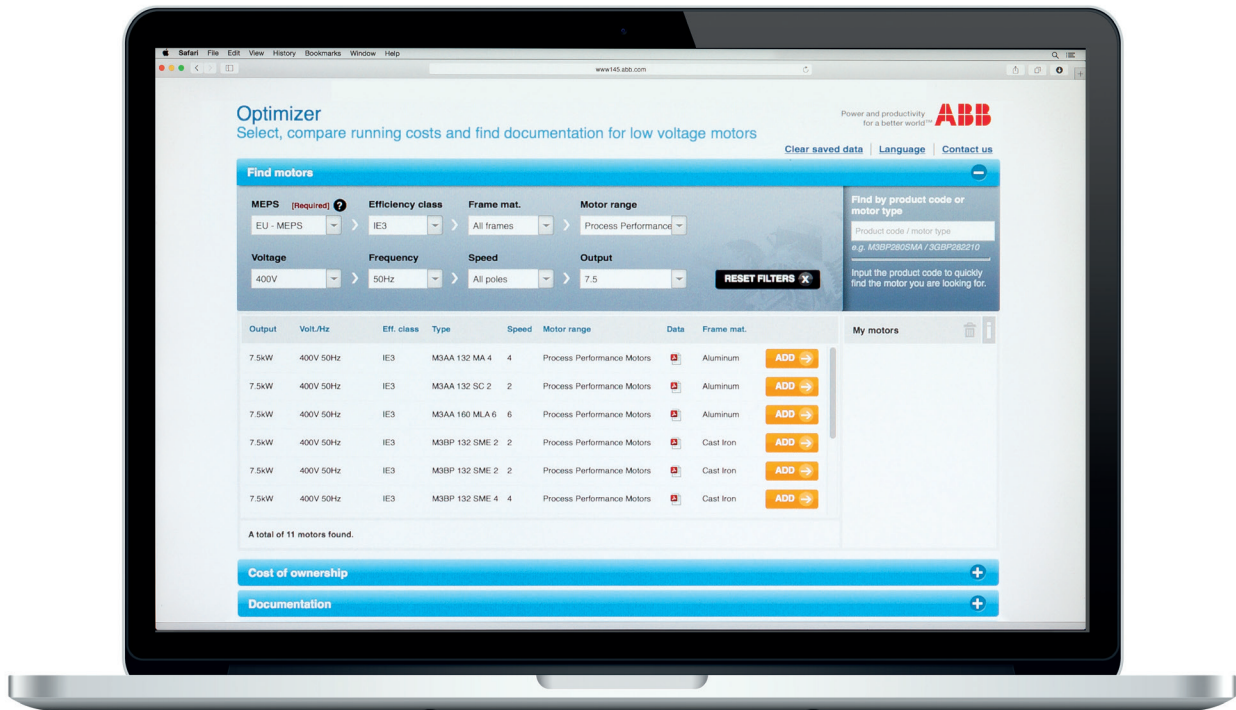
### Saudi Arabia MEPS

The Saudi Arabian Standards Organisation (SASO) has adopted the International Standard IEC 60034-30 Ed. 1.0 (2008) efficiency classes of single-speed, three phase, cage induction motors (IE-code) and published the SASO IEC 60034-30:2013 with regard to energy efficiency requirements for electric motors. This regulation made IE2 as compulsory efficiency level for low voltage motors from 1<sup>st</sup> of July 2015. The next step is expected to take place in 2017.

Saudi Arabia	
reference	SASO IEC 60034-30: 2013
voltage	up to 1000 V
frequency	60 Hz
speed	2, 4, 6 poles
minimum efficiency	- IE2 since 1.7.2015
main exclusions	- motors for explosive atmospheres - motors made solely for converter operation - motors completely integrated into a machine that cannot be tested separately from the machine - brake motors - gear motors - wound rotor motors
testing method	IEC 60034-2-1: 2007
future	Preliminary time line for IE3 requirements 1.1.2017.



# Optimizer selects the optimal motor for any MEPS



Use the Optimizer to quickly select the optimal motor, get easy access to technical documentation, and learn more about efficiency and energy savings.

## Optimizer

Optimizer is ABB's easy-to-use online tool to select the optimal motor for any MEPS worldwide. Optimizer also includes a calculator to compute the cost of ownership of different motors and provides fast access to drawings, test reports and data sheets in the ABB library.

Start by selecting the country/region where the motor will be used, and the Optimizer will give you default voltage, frequency and other options. With a few more clicks you'll get a list of suitable motors that you can compare and select from. For motors used on continuous duty, the Optimizer may recommend an even higher efficiency class than required by MEPS.

Optimizer can be used in the web browser of regular PCs or downloaded as an iPad app.

To use the tool go to [www.abb.com/motors&generators](http://www.abb.com/motors&generators)

# IEC Low voltage motors

## Complete product offering

### Standard induction motors

- Process performance motors
- General performance motors

### Motors for explosive atmospheres

- Flameproof motors
- Increased safety motors
- Non-sparking motors
- Dust ignition protection motors
- Underground mining

### Other industries and applications

- Marine motors
- Mining motors
- Motors for food and beverage
- Motors for high ambient temperatures
- Brake motors
- HDP AC servomotors
- High speed motors
- Permanent magnet motors
- Roller table motors
- Smoke extraction motors
- Synchronous reluctance motors
- Traction motors
- Water cooled motors



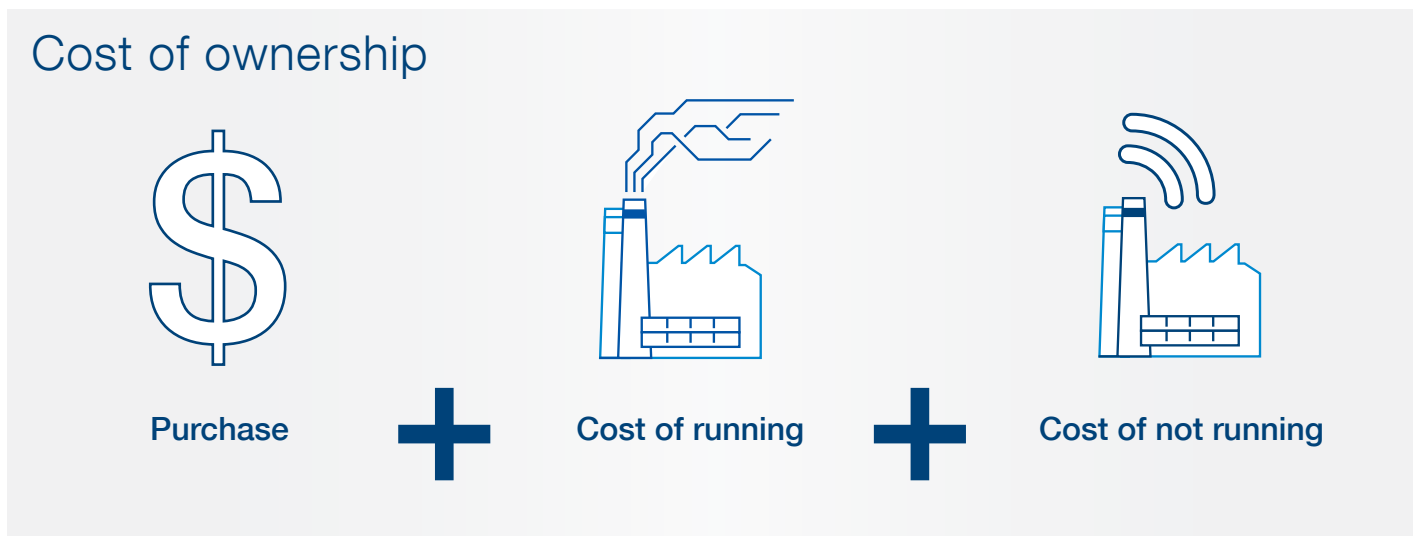
# Total cost of ownership and life cycle management

## Optimizing your total cost of ownership

When you buy a new motor the figure that sticks in your mind is the purchase price. In fact, the purchase price generally ends up being less than 3% of the total cost of owning the motor over its lifetime. In addition to the purchase price, the cost of ownership includes the cost of running the motor – mainly the cost of the electricity it uses – and the costs that arise through downtime if the motor fails. Depending on the

process, this unplanned downtime can cause big production losses.

The best way to minimize your total cost of ownership is to use motors that are highly efficient and reliable, sourced from a dependable supplier who can provide the local service and support you need.



## Managing your product's life cycle

ABB offers a complete portfolio of services to ensure trouble-free operation and long product lifetimes. These services cover the entire life cycle. Local support is provided through a global network of ABB service centers and certified partners.



Active	Classic	Limited	Obsolete
Active products are in production and actively marketed and sold for new installations. After sales support is guaranteed to customers.	Classic products are no longer in production as they are replaced with superior models. Complete Classic products are not available for spare and extension purposes. After sales support is guaranteed to customers.	Limited products are no longer in production as they are replaced by superior model. After sales support is no longer guaranteed but in many cases still available. ABB recommends migration to active products.	Obsolete products are no longer in production. After sales support is NOT guaranteed and normally not available. ABB strongly recommends migration to active products.

# Contact us

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**[www.abb.com/motors&generators](http://www.abb.com/motors&generators)**

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