

### Introduction

The Electric Motor Systems Annex (EMSA) bundles best technical practice and policy know-how in order to stimulate market transformation towards energy efficiency in the field of electric motor systems and their applications in industry, infrastructure and large buildings. The project deals with pumps, fans, compressors, industrial handling & processing.



(IE3 motor: 0.75 kW, 4-pole, WEG)

The goal of EMSA is to propagate energy efficiency in electric motor systems of advanced technology and engineering by coordinated policy and market mechanisms. The reduction of electricity demand will reduce global CO<sub>2</sub> emissions.

### Background & Scope

Motor systems are responsible for 40% of global electricity demand. Energy efficiency improvements of 20% to 30% on average have been proven by industrial efficiency programs.

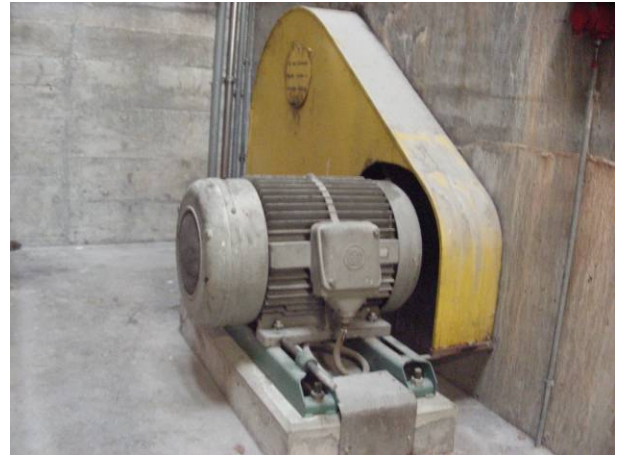
Motors are traded internationally. The marketing of more efficient components and systems is hindered by barriers in technical standards. The harmonization of testing standards and efficiency classification within the International Electrotechnical Commission (IEC) is a major prerequisite for a competitive global market of premium products. Information, incentives and mandatory energy performance standards are the three key elements of market transformation.

The range of electric motor systems to be treated in EMSA is clearly defined. Major focus are the poly-phase electric motors between 0.5 and 500 kW that carry the bulk of the load to drive pumps, fans, compressors and mechanical drives. These machines are produced worldwide in large quantities and are used globally. The majority of the motors are AC, 2-, 4- and 6-pole and with 200 V to 1000 V. The scope of EMSA also includes new emerging motor technologies with higher efficiencies and motor controls.

EMSA was launched in November 2008 as a project under the International Energy Agency's Implementing Agreement on Efficient Electrical End-Use Equipment (4E). 4E provides an international forum for governments and other stakeholders to share expertise and develop a better understanding of the efficiency of electrical end-use equipment and policies; and facilitate co-ordination of policies for efficient electrical equipment.

### EMSA Objective

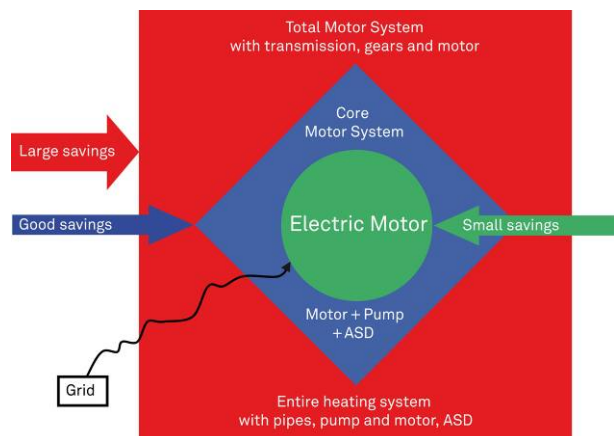
The objective of EMSA is to build a Global Motor Systems Network in industrialized and developing countries to stimulate knowledge, technology and policy in the field of efficient motor systems. EMSA aims to contribute to the harmonization of standards, to provide technical and policy advice and to distribute best practice experience.



(Existing fan)

### Motors and Systems

The electric motor and its core motor system (pump, fan, compressor, and so on, including the auxiliary components variable speed drive, gear, transmission belt, brakes, etc.) are treated in the framework of EMSA; they are approached in the Tasks as separate work items. The complete motor system (e.g. the entire heating-, cooling-, ventilation system in a building) with pipes, ducts, and other parts, which has the largest energy savings potential, cannot be considered within the scope of EMSA because of its complexity.



(Motor systems: definitions)

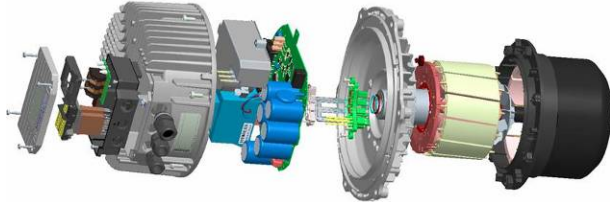
### Energy Efficiency in Electric Motor Systems

In industry audits in all parts of the world we see a lot of old and inefficient motors running. We see oversized motors, systems with not well integrated components and that cannot adapt to changing loads. We see large unnecessary losses of energy and a huge waste of money.

We know from successful pilot projects in many parts of the world that there is an efficiency potential that can be exploited

with payback times below one year or up to a maximum of three years.

Many existing barriers hinder the implementation of this considerable energy savings potential.



(EC motor for fan, ebmpapst)

### EMSA Tasks

The EMSA work plan includes the following tasks:

Task A	Implementation support & outreach
Task B	Technical guide for motor systems
Task C	Testing centers
Task D	Instruments for coherent motor policy
Task E	Training and capacity building
Task F	Energy management in industry
Task G	New motor technologies
Task H	Total motor systems integration (start later)



(IE3/Premium motor, Emerson)

### EMSA Participants

From the countries participating in 4E the following are working actively in EMSA at present:

- Australia
- Austria
- Denmark
- Netherlands
- United Kingdom
- Switzerland

A number of other countries are interested to join or have already made arrangements to become EMSA participants. The participating countries share the general cost (for the operating agent and the project outreach) as well as the Task oriented work. Industry collaboration is welcome and will require a specific arrangement.

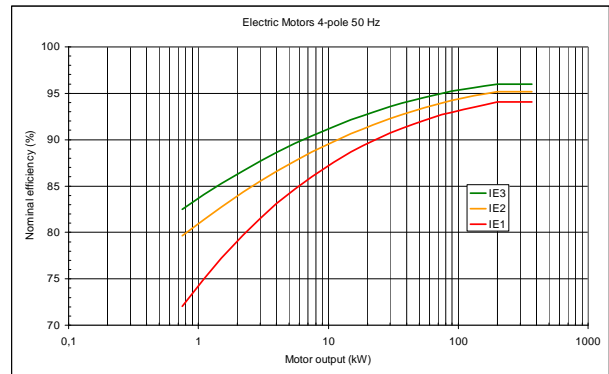
### IEC Standards

The international Electrotechnical Commission IEC has published new international standards that will help harmonize the field of efficient motor systems (all available at [www.iec.ch](http://www.iec.ch)):

IEC 60034-2-1 (2007):	Motor testing
IEC 60034-30 (2008):	Efficiency classes
IEC 60034-31 (2010):	Guide for the selection and application of energy-efficient motors including variable-speed applications

	Existing Europe	Existing USA	New IEC
Super Premium Efficiency			IE4
Premium Efficiency		NEMA Premium	IE3
High Efficiency	Eff1	EPAAct	IE2
Standard Efficiency	Eff2		IE1
Below Standard Efficiency	Eff3		

A new standard IEC 60034-2-3 on "Specific test methods for converter-fed AC motors" is under study and will be available by the end of 2010.



(IEC 60034-30:2008: Efficiency classes)

### Publications

EMSA has a regular "Global Motor Systems Newsletter" with three to four editions per year. You can subscribe under: [www.motorsystems.org/emsa-newsletter](http://www.motorsystems.org/emsa-newsletter)

EMSA distributes motor publications to be downloaded under: [www.motorsystems.org/downloads](http://www.motorsystems.org/downloads).

Recent publications include:

- **Electric Motor MEPS Guide**, Boteler, Brunner, De Almeida, Doppelbauer, Hoyt, Zurich, February 2009 (1<sup>st</sup> edition)



(Existing compressor)

### Events

EMSA is participating in several international motor events. See website for programs of upcoming events and for proceedings of past events.

The next Motor Summit will be held on 27 - 28 October 2010 in Zurich (for program and registration see: [www.motorsummit.ch](http://www.motorsummit.ch)).

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