IEC/TS 60034-31

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# TECHNICAL SPECIFICATION

# SPÉCIFICATION TECHNIQUE



## Rotating electrical machines – Part 31: Selection of energy-efficient motors including variable speed applications – Application guide

## Machines électriques tournantes – Partie 31: Choix des moteurs économétiques incluant les applications à vitesse variable – Guide d'application



IEC/TS 60034-31:2010



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# Part 31: Selection of energy-efficient motors including variable speed applications – Application guide

## FOREWORD

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 60034-31, which is a technical specification, has been prepared by IEC technical committee 2: Rotating machinery.

The text of this technical specification is based on the following documents:

| Enquiry draft | Report on voting |
|---|---|
| 2/1575/DTS | 2/1594/RVC |

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60034 series, published under the general title *Rotating electrical machines,* can be found on the IEC website.

NOTE A table of cross-references of all IEC TC 2 publications can be found in the IEC TC 2 dashboard on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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# INTRODUCTION

The present technical specification gives technical guidelines for the application of energy-efficient motors in constant-speed and variable speed applications. It does not cover aspects of a purely commercial nature.

Standards developed by IEC technical committee 2 do not deal with methods of how to obtain a high efficiency but with tests to verify the guaranteed value. IEC 60034-2-1 is the most important standard for this purpose.

For approximately 15 years regional agreements were negotiated in many areas of the world regarding efficiency classes of three-phase, cage-induction motors with outputs up to about 200 kW maximum, as motors of this size are installed in high quantities and are for the most part produced in series production. The design of these motors is often driven by the market demand for low investment cost, hence energy efficiency was not a top priority.

In IEC 60034-30, IE efficiency classes for single-speed cage-induction motors have been defined and test procedures specified:

| | |
|---|---|
| IE1 | Standard efficiency |
| IE2 | High efficiency |
| IE3 | Premium efficiency |
| IE4 | Super-premium efficiency |

Determination of efficiency for motors powered by a frequency converter will be included in IEC standard 60034-2-3.

However, for motors rated 1 MW and above, which are usually custom made, a high efficiency has always been one of the most important design goals. The full-load efficiency of these machines typically ranges between 95 % and 98 %. Efficiency is usually part of the purchase contract and is penalized if the guaranteed values are not met. Therefore, these higher ratings are of secondary importance when assigning efficiency classes.

With permission from the National Electrical Manufacturers Association (NEMA), some parts of this TS are based on NEMA MG 10, *Energy Management Guide For Selection and Use of Fixed Frequency Medium AC Squirrel-Cage Polyphase Induction Motors*.