

TECHNICAL REFERENCE**Rotating electrical machines –**

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

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TECHNICAL REFERENCE

Rotating electrical machines –

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

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	Prof Toh Kok Chuan	<i>Individual Capacity</i>

The Working Group, appointed by the Energy Standards Committee to assist in the preparation of this standard, comprises the following experts who contributed in their *individual capacity*:

	Name
Convenor	: Mr Roland Tan
Members	: Assoc Prof Ang Hock Eng Mr Clarence Chiang Mr Chng Tuan Meng Er. Eddie Chong Chun Sen Mr Choong Chow Neng Mr Carsten Ederer Ms Lydia Goh Mr Norman Lee Ms Tracy Liu Mr Colin Ong Er. Ong Eng Tong Mr Kelvin Ong Mr Jerry Ooi Mr S Suresh Kumar Mr Toh Eng Shyan Dr Tseng King Jet Mr Xu Xiao Ming

The organisations in which the experts are involved are:

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National Foreword

This Technical Reference (TR) was prepared by a Working Group under the direction of the Energy Standards Committee.

This TR is identical with IEC/TS 60034-31:2010 published by the International Electrotechnical Commission.

Attention is drawn to the following:

1. The reference to “IEC 60034-1” shall be replaced by “SS IEC 60034-1”.
2. The comma has been used throughout as a decimal marker whereas in Singapore Standards it is a practice to use a full point on the baseline as the decimal maker.

This TR is a provisional standard made available for application over a period of three years. The aim is to use the experience gained to update the TR so that it can be adopted as a Singapore Standard. Users of the TR are invited to provide feedback on its technical content, clarity and ease of use. Feedback can be submitted using the form provided in the TR. At the end of the three years, the TR will be reviewed, taking into account any feedback or other considerations, to further its development into a Singapore Standard if found suitable.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ROTATING ELECTRICAL MACHINES –

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

FOREWORD

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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

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

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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*.

ROTATING ELECTRICAL MACHINES –

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

1 Scope

This part of IEC 60034 provides a guideline of technical aspects for the application of energy-efficient, three-phase, electric motors. It not only applies to motor manufacturers, OEMs (original equipment manufacturers), end users, regulators and legislators but to all other interested parties.

This technical specification is applicable to all electrical machines covered by IEC 60034-30. Most of the information however is also relevant for cage-induction machines with output powers exceeding 375 kW.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-30, *Rotating electrical machines – Part 30: Efficiency classes of single-speed three-phase, cage induction motors (IE-code)*