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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 32891.2-2019

**Rotating electrical machines -- Efficiency classes (IE-code) --
Part 2: Variable speed AC motors**

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Foreword

GB/T 32891 "Rotating Motor Efficiency Grading (IE Code)" is divided into the following two parts.

--- Part 1. AC-powered AC motors;

--- Part 2. Variable speed AC motor.

This part is the second part of GB/T 32891.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This section uses the translation method equivalent to IEC TS60034-30-2.2016 "Rotating electrical machines Part 30-2. Variable speed AC motors

Efficiency rating (IE code).

The documents of our country that have a consistent correspondence with the international documents referenced in this part are as follows.

---GB/T 755-2008 Rotating electrical machine rating and performance (IEC 60034-1.2004, IDT)

---GB/T 32877-2016 Frequency converter AC induction motor specific test method for determining loss and efficiency (IEC /

TS60034-2-3.2013, IDT)

--- GB/T 32891.1-2016 Rotating electrical machine efficiency grading (IE code) Part 1. Grid-powered AC motors

(IEC 60034-30-1..2014, IDT)

This section has made the following editorial changes.

--- To coordinate with existing standards, change the standard name to "Rotating Motor Efficiency Rating (IE Code) Part 2. Variable Speed AC

motivation".

This part was proposed by China Electrical Equipment Industry Association.

This part is under the jurisdiction of the National Rotating Electric Machine Standardization Technical Committee (SAC/TC26).

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Introduction

This section is to coordinate the energy efficiency classification of variable speed motors. It involves variable speed operation in the range of constant flux speed (basic speed range)

Various low voltage AC motors, voltage and frequency changes are provided by the frequency converter.

Note. At present, the test standard IEC TS60034-2-3 used in this part is limited to induction motors, but the relevant input-output method 3-C method in the standard is also

Suitable for all kinds of variable speed AC motors. The second edition of IEC TS60034-2-3 will expand the range of applications and will also apply to synchronous motors.

This part is about the efficiency grading of AC motors when operating under variable voltage and frequency conversion conditions, that is, there is no GB/T 32891.1.

The efficiency ratings of the covered induction motors and synchronous motors during variable speed operation. This part will be coordinated with IEC 61800-9-2.

IEC 61800-9-2 specifies the energy efficiency rating (IE-) and power drive system (PDS) energy efficiency of frequency converters (CDM, complete drive modules)

Rating (IES-).

Only high-efficiency motors do not necessarily constitute a highly efficient PDS system. Users should be based on the actual load/operating point and operation

Time to choose the right efficiency level of the motor.

When operating in a short-time, intermittent or partial load operation, selecting a high-efficiency class of the S1 system does not necessarily save energy. Take

The post-developed IEC 61800-9 series of standards will provide an extended product (EPA) application description for energy efficiency of drive equipment and components.

Be explained.

Do not expect all manufacturers to produce motors of all efficiency grades and all power grades.

The IE code is not limited to marking the energy efficiency rating of the motor, but can also be applied to other products such as inverters and gearboxes. Expect other

The product is also suitable for the same system. IE1 is inefficient and IE5 is the most efficient.

Rotating motor efficiency rating (IE code)

Part 2. Variable speed AC motors

1 Scope

This part of GB/T 32891 specifies the energy efficiency rating of variable speed AC motors not included in IEC 60034-30-1.

And the motor must meet the following requirements.

- a) rated output power (PN). 0.12kW~1000kW;
- b) rated voltage (UN). 50V~1000V;
- c) rated speed (nN). 600r/min~6000r/min has nothing to do with the number of poles;
- d) Cooling method. IC4A1A0 (IC410), IC4A1A1 (IC411), IC4A1A6 (IC416), IC4A1A8 (IC418);
- e) It can operate continuously for a long time under the rated operating point (torque/power, speed) to ensure that its temperature rise limit meets its insulation level;

Note 1. Most of the motor ratings included in this section are S1 working system (continuous working system), however, some are fixed-cycle motors.

As long as it can work continuously at rated output power, it is also covered in this section. The working system is S3~S10 load sustained rate is 80% or

The motor on top can be covered.

- f) The ambient temperature range is -20 ° C ~ 60 ° C;

Note 2. Ratings and efficiency ratings are given in accordance with IEC 60034-2-1 and IEC TS60034-2-3 at ambient air temperatures of 25 °C.

Note 3. Motors rated for operation below -20 ° C or above 60 ° C are generally considered to have a special structure and are therefore not included in this Part.

In the middle.

Note 4. This section includes exhaust fan motors with temperature class ≤ 400 °C.

g) The altitude does not exceed 4000m.

Note 5. The rated efficiency and efficiency rating is based on an altitude of ≤ 1000 m.

The motors covered in this section are designed to operate at sinusoidal fundamental currents but not directly online (grid-powered), such as permanent magnets.

The step motor has or does not have an additional reluctance torque, a sinusoidal reluctance synchronous motor and a synchronous motor with a DC field winding. Also includes special design

Induction motor for variable speed operation.

Switched reluctance synchronous motors are not included.

The loss at any speed and load point is determined in accordance with IEC TS60034-2-3. This standard applies to the operation of various inverters.

motivation.

Does not distinguish between the technology used by the motor, the supply voltage or the need to increase the insulation for the variable frequency power supply, not even all of this

Motivation technology can achieve higher levels of efficiency. This concept allows different motor technologies to be charged with regard to their energy efficiency potential.

Comparison of points.

The efficiency and losses of the electronic drive system (that is, the losses including the motor and power supply) are not included in this section. Efficiency and loss

See IEC 61800-9-2.

The motors that are also applicable in this section are.

- a) motors with flanges, feet and/or shafts different in size from IEC 60072-1;
- b) a geared motor with a non-standard shaft and flange, but the efficiency test is carried out in the motor section;
- c) Motors designed to operate in an explosion-proof environment according to IEC 60079-0 are also suitable for this part.