Smart solutions.
Strong relationships.

Dhandapani

IE-2 Efficiency AC Motors

Apex Series

Safe area and Flameproof

APEX SERIES-IE2 MOTORS

Dhandapani

We are the first in India to launch IE2 Efficiency Motors!!

Apex Series IE2 Motors

A green solution by CG....

Maintaining the completeness of the world's environment is the responsibility of everyone. With our company's history tracing back to 1937, we take this responsibility seriously and have developed the Green Products, an integrated system of products with the environment and user-safety in mind.
Apex IE2 series is yet another green initiative to save the energy and hence environment ……

Features:

Efficiency Class (IE 2)
As per new requirements of IEC 60034-30 & IS12615: 2011
Testing Method:
CG determines efficiency values according to clause 8.2.2.5.1 of IEC 60034-2-1 using the indirect method (low uncertainty), with additional load losses (PLL) determined by measurement.

Range:

- Output 0.37 kW to 250 kW
- Frame IEC 71 to IEC 355 LX
- Pole 2,4,6
- Voltage 415 +/- 10 %
- Frequency 50 Hz +/- 5 %
- Construction Flameproof / Safe area

INTRODUCTION:

As part of the Ecodesign Directive, the European Commission has passed a regulation that stipulates the minimum efficiency levels for LV electric motors that can be sold within Europe. The Regulation has its first effect in June of 2011 after which motors have to be of an efficiency class IE 2 or higher. In 2015, the minimum rises to IE3 or IE2 if combined with a VFD.
The Ecodesign Directive is a measure that has been introduced to raise the energy efficiency of a wide range of energy using products, ranging from light bulbs to refrigerators to electric motors. According to studies carried out for the Commission, these higher efficiency products should save consumers money in the long term due to their lower operating costs.
Motors are one of the first products to be regulated, reflecting their significance in the energy consumption mix. The regulations have already been passed by European parliament and stipulate that:
From 16th June 2011, Motor shall not be less efficient than the IE2 efficiency level.

APEX SERIES-IE2 MOTORS

FAQ

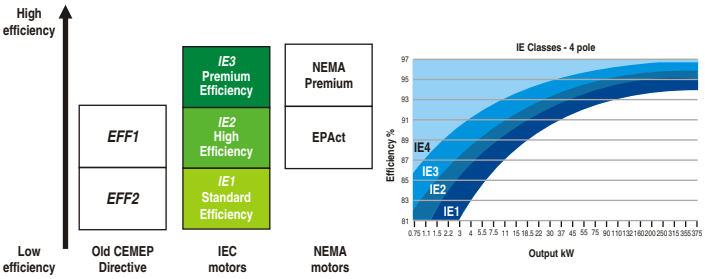
CG has developed IE2 range of motors. We are the first in India to have an entire range of IE2 motors in safe area and flameproof construction. Subsequently, IS 12615:2004 also got revised and now its 2011 edition is inline with IEC60034-30.

The Indian standard mentions following additional performance other than IEC60034-30

A) Performance requirements in addition to efficiency.
B) Breakaway torque
C) Breakaway current
D) Full load speed
D) Full Load Current
E) Frame size designation
F) Schedule of tests

What is IE ?

IE is "International Efficiency" with class 1, 2 & 3 i.e. IE1, IE2 & IE3. The new standard IEC 60034-30:2008 & IS12615:2011 defines these classes. At the same time, with the IEC 60034-2-1:2007 standard, a new procedure for the determination of efficiency has been introduced which also contributes to international harmonization. This standard is made to unify motor testing procedures, determination of efficiency and product labeling requirements. This is to enable motor user worldwide to easily identify premium efficiency products. New efficiency classes defined by IEC60034- 30 and its equivalence with other standards/nomenclature as per given below



How do the new IE efficiency classes compare with the old EFF efficiency classes?

There is a rough relationship between the IE and EFF and NEMA levels as is shown in Figure 1.

The main difference between the efficiency classes (EFF and IE) lies in the method used to determine them. In a direct comparison of both measuring methods for the same motor, it is expected that the new method of determining efficiency levels will show a reduction in the measured efficiency level for the motor. For example, an EFF1 motor with 91.0% efficiency is physically identical to an IE2 motor with 89.8% efficiency.

Can EFF1 motors simply be relabeled as IE2 without re-testing?

No-IE and EFF ratings are not the same or equivalent. Motors that have been given an EFF rating will have to be re-tested before being given an IE rating

What efficiency values should I use when comparing motors?

When comparing motor efficiencies, be sure to use a consistent measure of efficiency. Nominal efficiency is best. Nominal efficiency is an average value obtained through standardized testing of a population of motors. Minimum guaranteed efficiency, which is based on nominal efficiency, is slightly lower to take into account typical population variations. Minimum guaranteed efficiency is also less accurate, because the value is rounded. Other efficiency ratings, including apparent and calculated, should not be used.

What motors are in the Scope of the Efficiency Standard?

The efficiency class system specified under IEC 60034-30 is valid for low voltage three phase cage-induction motors with the following specifications:

- Rated voltage up to 1000V
- Rated output between 0.75kW and 375kW
- 2, 4, or 6 poles
- Rated on the basis of continuous duty (S1) or intermittent periodic duty (S3) with a cyclic duration factor of 80% or higher
- Capable of operating direct on-line
- Rated for operating conditions in accordance with IEC 60034-1 (temperature, installation altitude etc.)
- Motor with feet, flanges and/or shafts with mechanical dimensions different from IEC 60072-1 are covered by this standard.

The following motors are excluded from the standard:

- Motors made solely for converter operation.
- Motors completely integrated into a machine (for example ,pump ,fan or compressor)that can not be tested separately from the machine

Why improving motor efficiency is important?

Over 70 % of all electrical energy consumed in industries is used by electric motors. Improving the efficiency of electric motors and the driven equipment can save energy, reduce operating costs, and improve our nation's productivity. Energy efficiency should be a major consideration when you purchase or rewind a motor. The annual energy cost of running a motor is usually many times greater than its initial purchase price. For example, even at the relatively low energy rate of Rs 4/kWh, a typical 15 kW continuously running motor uses almost Rs 4 Lacs worth of electricity annually Energy-efficient motors should be considered in the following circumstances: ,about ten times its initial purchase price.

When should I consider buying an energy-efficient motor?

For all new installations

- When purchasing equipment packages, such as compressors, HVAC systems, and pump
- When major modifications are made to facilities or processes
- Instead of rewinding older, standard efficiency units
- To replace oversized and under loaded motors
- As part of a preventive maintenance or energy conservation program.

What design factors should I consider when choosing a new motor?

Motor size-

Motors should be sized to operate with a load factor between 65% and 100%. The common practice of over sizing results in less efficient motor operation. For example, a motor operating at a 35% load is less efficient than a smaller motor that is matched to the same load. Of course, some situations may require over sizing for peak loads, but in such cases alternative strategies should be considered, such as a correctly sized motor backed up with a pony motor.

Operating speed-

Replacement is to done by energy efficient motors with a comparable full load speed for centrifugal load applications (pumps and fans). Induction motors have an operating speed that is slightly lower than their rated synchronous speed. For example, a motor with a synchronous speed of 1500 rpm will typically operate under full load at about 1420 rpm. Operating speed (full-load rpm) is stamped on motor nameplates. The difference between the synchronous speed and the operating speed is called slip. Slip varies with load and the particular motor model. Every pump and fan has a designed speed.

Centrifugal pump and fan loads are extremely sensitive to speed variations; an increase of just 5 rpm can significantly affect the pump or fan operation, leading to increased flow, reduced efficiency, and increased energy consumption. Whenever a pump or fan motor is replaced, be sure to select a model with a full-load rpm rating equal to or less than that of the motor being replaced.

Inrush current-

Avoid overloading circuits. Energy-efficient motors feature low electrical resistance and thus exhibit higher inrush currents than standard models. The inrush current duration is too short to trip thermal protection devices, but energy-efficient motors equipped with magnetic circuit protectors can sometimes experience nuisance starting trips.

APEX SERIES-IE2 MOTORS

FAQ

SAVE ENERGY
SAVE ENVIRONMENT!

What efficiency values are mentioned in standard?

Minimum efficiency values defined in IEC 60034-30:2008 & IS12615 :2011						
	IE1			IE2		
Output	Standard Efficiency			High Efficiency		
kW	2 Pole	4 Pole	6 Pole	2 Pole	4 Pole	6 Pole
0.37	66.1	65.1	63.0	72.2	70.1	71.9
0.55	69.1	69.1	67.0	74.8	75.1	75.9
0.75	72.1	72.1	70.0	77.4	79.6	75.9
1.1	75.0	75.0	72.9	79.6	81.4	78.1
1.5	77.2	77.2	75.2	81.3	82.8	79.8
2.2	79.7	79.7	77.7	83.2	84.3	81.8
3	81.5	81.5	79.7	84.6	85.5	83.3
3.7	82.7	82.7	80.9	85.5	86.3	84.3
4	83.1	83.1	81.4	85.8	86.6	84.6
5.5	84.7	84.7	83.1	87.0	87.7	86.0
7.5	86.0	86.0	84.7	88.1	88.7	87.2
11	87.6	87.6	86.4	89.4	89.8	88.7
15	88.7	88.7	87.7	90.3	90.6	89.7
18.5	89.3	89.3	88.6	90.9	91.2	90.4
22	89.9	89.9	89.2	91.3	91.6	90.9
30	90.7	90.7	90.2	92.0	92.3	91.7
37	91.2	91.2	90.8	92.5	92.7	92.2
45	91.7	91.7	91.4	92.9	93.1	92.7
55	92.1	92.1	91.9	93.2	93.5	93.1
75	92.7	92.7	92.6	93.8	94.0	93.7
90	93.0	93.0	92.9	94.1	94.2	94.0
110	93.3	93.3	93.3	94.3	94.5	94.3
125	93.4	93.4	93.4	94.5	94.6	94.4
132	93.5	93.5	93.5	94.6	94.7	94.6
160	93.7	93.8	93.8	94.8	94.9	94.8
200	94.0	94.0	94.0	95.0	95.1	95.0
250	94.0	94.0	94.0	95.0	95.1	95.0
315	94.0	94.0	94.0	95.0	95.1	95.0
355	94.0	94.0	94.0	95.0	95.1	95.0
375	94.0	94.0	94.0	95.0	95.1	95.0

NOTES

1) It must be noted that efficiency values are only comparable if they are measured using the same method.
2) Any efficiency value between IE1 and IE2 values is to be considered as IE1 class for motors.
3) The full load efficiency of any individual motor, when tested at rated voltage and frequency, shall not be less than the rated efficiency minus the tolerances in accordance with IEC 60034-1.
4) Energy efficient cage induction motors are typically built with more active material, i.e. longer core length and/or greater core diameter in order to achieve the higher efficiency. For these reason the starting performance of energy efficient motors differs somewhat from motors with a lower efficiency. On average the locked rotor current increases by 10%-15% for motors from one energy efficiency class compared to motors of the next higher class with the same output power. Individually, this difference depends on the construction principle of the motor and should be checked with manufacturer when replacing motors in an existing installation. It must be ensured that the control protective device is properly sized and setup.
5) As per IEC60034-30 : 2008 motors specially designed, For special requirement of the driven machine (e.g. heavy starting duty , special torque stiffness and/or breakdown torque characteristics , large number of start/stop cycles , very low rotor inertia)

For special characteristics of grid supply (e.g. limited starting current, high tolerances of voltage and/or frequency) for special ambient conditions (e.g. very low ambient temperature, smoke extraction motors, high altitudes of installation) may not be able to achieve higher efficiency classifications.

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