International Journal on
"Technical and Physical Problems of Engineering"
(IJTPE)
Published by International Organization on TPE (IOTPE)

ISSN 2077-3528
IJTPE Journal
www.iotpe.com
ijtpe@iotpe.com

December 2011 | Issue 9 | Volume 3 | Number 4 | Pages 111-114

ENERGY LABELING FOR THREE PHASE ELECTRO MOTORS IN IRAN

R. Effatnejad

Department of Electrical Engineering, Islamic Azad University, Karaj Branch, Iran, reza.efatnejad@kiau.ac.ir

Abstract- This paper presents standards and specifications to determine standards in energy consumption are the single phase induction electric motors. The standard determines energy labeling and minimum energy performance for three-phase induction motors. The standard functional and safety features and requirements include electric motors thresholds. Energy efficiency due to energy labeling is target of this paper, estimates show that three- phase induction motors has the significant role in electrical energy consumption. Energy ranking for product can be obtained base on Iran circumstances.

Keywords: Three-Phase, Energy, Labeling, Standard.

I. INTRODUCTION

Energy intensity in Iran is 3.5 times more than average world. This index shows that productivity of energy is low [1]. Based on researches and statistics the home sector is the most significant electrical consumption sector in Iran and after that industrial sector is the second order [2, 6]. In the Figure 1 is shown that comparing the status of energy intensity in Iran with other countries. So that energy efficiency in home appliances and industrial devices are the main plan of policy making in Iran. The most important equipment in industry is three-phase electromotor.

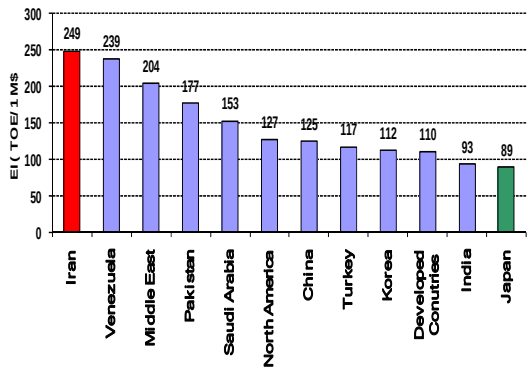

Figure 1. Comparing the status of energy intensity in Iran with other countries

II. SCOPE

Three phase induction electric motors used in various industries and applications for residential and commercial public use under the four categories in terms of number of poles and nominal output power, the scope of this standard are [3, 4, 5]:

A. three-phase induction electric motors with two poles nominal power output 0.9 kW to 75 kW

B. Three-phase induction electric motors with four poles to set the nominal output 0.6 kW to 75 kW

C. Three-phase induction electric motors with six-pole power output nominal 0.7 kW to 75 kW

D. Three-phase induction electric motors with eight poles nominal power output 0.75 kW to 75 kW

Note 1 of this standard, explosion proof electro above specification also covers.

Note 2 in some cases the standard "three-phase induction motors", short "electric" refers.

III. DEFINITIONS

- Nominal values of electric:

Nominal amounts of electric current and voltage contain nominal, rate (s) nominal, nominal power output and other profile (according to the Iranian National Standard No. 1-3772) for the conditions specified by the manufacturer to determine and work on electric profile electric plug is inserted.

- Times nominal: It consists of maximum load specified for electric cause electric nominal profile in their work.

-Energy efficiency: Term nominal yields a ratio of electric power to the total nominal output is the input power is expressed in terms of percentage.

- Power factor: An alternating current electric power factor is simply the ratio of nominal output power (kW) Nominal apparent power output (kVA).

- Nominal speed: Nominal rate of speed electromotor electro motor include under voltage, frequency and its nominal power.

- Electric four categories: The standard criteria to determine the three-phase induction motors energy consumption, according to the nominal power output and the number of terminals are classified into four categories Category energy efficiency for each of these categories is defined separately.

In Table 1 Classification of nominal electric power output based on the number of poles is marked.

Table 1. Classification of three phase electromotor based on output power

Nominal Output Power (kW)			
8 pole	6 pole	4 pole	2 pole
0.75	0.37	0.06	0.09
1.1	0.55	0.09	0.12
1.5	0.75	0.12	0.37
2.2	1.1	0.18	0.55
3	1.5	0.25	0.75
4	2.2	0.37	0.9
5.5	3	0.55	1.1
7.5	4	0.75	1.5
11	5.5	1.1	1.8
15	7.5	1.5	2.2
18.5	11	2.2	2.5
22	15	3	3
30	18.5	4	4
37	22	5.5	5.5
45	30	7.5	7.5
55	37	11	11
75	45	15	15
–	55	18.5	18.5
–	75	22	22
–	–	30	30
–	–	37	37
–	–	45	45
–	–	55	55
–	–	75	75

IV. TECHNICAL STANDARDS AND ENERGY CONSUMPTION AND ENERGY LABELS

The standard input output method is used to determine efficiency. Under this method, electric dynamometer under load by the nominal voltage is placed. Dynamometer, according to the nominal electric power output (which is determined by the manufacturer) is set so that the output equivalent to the electric load is applied. In this case the input power is measured by appropriate measuring devices.

Energy efficiency is simply the ratio of nominal output power (declared by the manufacturer in electro plate profile) to the input power (which is assisted dynamometer measurements). Energy efficiency is expressed in terms of percentage.

$$\eta\% = \frac{P_2}{P_1} 100 \quad (1)$$

Classification of energy efficiency three phase induction motors based on energy efficiency achieved for each of four categories determined by the three-phase electro (Table 1) is performed as follows:

- Classification of energy efficiency induction motors
- Classification of energy efficiency three-phase four-pole induction motors
- Energy efficiency of grouping six pole three phase induction motors
- Classification of energy efficiency induction motors

Note carefully measuring instruments in accordance with Iran's national standard number is 3772-1 grouping three phase induction motors energy efficiency bipolar.

- Classification of energy efficiency three phase induction motors based on energy efficiency achieved for each of four categories determined by the three-phase electro (Table 1) is performed as follows:
- Classification of energy efficiency induction motors
- Classification of energy efficiency three-phase four-pole induction motors
- Energy efficiency of grouping six pole three phase induction motors
- Classification of energy efficiency induction motors

Note carefully measuring instruments in accordance with Iran's national standard number is 3772 grouping three phase induction motors energy efficiency bipolar.

Classification of energy efficiency three phase induction motors based on the bipolar energy) is calculated according to Table 2 are grouped. η energy efficiency classification of A (highest yields) to E (lowest efficiency) are classified. Recalling groups D and E from the beginning of the third year after starting the implementation of this standard mandatory energy label is removed. Table 2 groups of three phase induction motors energy efficiency bipolar shows.

Table 2. Ranking of three-phase electromotor based on efficiency for 2 poles

Energy ranking based on efficiency (%)					Nominal power (kW)
E	D	C	B	A	
$47 \le \eta < 51$	$51 \le \eta < 55$	$55 \le \eta < 59$	$59 \le \eta < 63$	$63 \le \eta$	0.09
$48 \le \eta < 52$	$52 \le \eta < 56$	$56 \le \eta < 60$	$60 \le \eta < 64$	$64 \le \eta$	0.12
$55 \le \eta < 59$	$59 \le \eta < 63$	$63 \le \eta < 67$	$67 \le \eta < 71$	$71 \le \eta$	0.37
$58 \le \eta < 62$	$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 74$	$74 \le \eta$	0.55
$61 \le \eta < 65$	$65 \le \eta < 69$	$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta$	0.75
$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 74$	$74 \le \eta < 78$	$78 \le \eta$	0.9
$63 \le \eta < 67$	$67 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta$	1.1
$65 \le \eta < 69$	$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta < 81$	$81 \le \eta$	1.5
$66 \le \eta < 70$	$70 \le \eta < 74$	$74 \le \eta < 78$	$78 \le \eta < 82$	$82 \le \eta$	1.8
$67 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta < 83$	$83 \le \eta$	2.2
$68 \le \eta < 72$	$72 \le \eta < 76$	$76 \le \eta < 80$	$80 \le \eta < 84$	$84 \le \eta$	2.5
$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta < 81$	$81 \le \eta < 85$	$85 \le \eta$	3
$70 \le \eta < 74$	$74 \le \eta < 78$	$78 \le \eta < 82$	$82 \le \eta < 86$	$86 \le \eta$	4
$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta < 83$	$83 \le \eta < 87$	$87 \le \eta$	5.5
$73 \le \eta < 77$	$77 \le \eta < 81$	$81 \le \eta < 85$	$85 \le \eta < 89$	$89 \le \eta$	7.5
$80 \le \eta < 83$	$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta$	11
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	15
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	18.5
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	22
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	30
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	37
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	45
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	55
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	75

V. CLASSIFICATION OF ENERGY EFFICIENCY THREE PHASE INDUCTION MOTORS OF FOUR POLES, SIX POLES AND EIGHT POLES

Classification of energy efficiency three phase induction motors based on the 4 poles, 6 poles and 8 poles are given in Tables 3-5. Energy efficiency η, is calculated according to Energy efficiency classification and A (highest yields) to E (lowest efficiency) are classified.

Table 3. Ranking of three-phase electromotor based on efficiency for 4 poles

Energy ranking based on efficiency (%)					Nominal power (kW)
E	D	C	B	A	
$40 \le \eta < 44$	$44 \le \eta < 48$	$48 \le \eta < 52$	$52 \le \eta < 56$	$56 \le \eta$	0.06
$41 \le \eta < 45$	$45 \le \eta < 59$	$49 \le \eta < 53$	$53 \le \eta < 57$	$57 \le \eta$	0.09
$44 \le \eta < 48$	$48 \le \eta < 52$	$52 \le \eta < 56$	$56 \le \eta < 60$	$60 \le \eta$	0.12
$58 \le \eta < 62$	$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 74$	$64 \le \eta$	0.18
$61 \le \eta < 65$	$65 \le \eta < 69$	$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta$	0.25
$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 74$	$74 \le \eta < 78$	$78 \le \eta$	0.37
$63 \le \eta < 67$	$67 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta$	0.55
$65 \le \eta < 69$	$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta < 81$	$81 \le \eta$	0.75
$66 \le \eta < 70$	$70 \le \eta < 74$	$74 \le \eta < 78$	$78 \le \eta < 82$	$82 \le \eta$	1.1
$67 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta < 83$	$83 \le \eta$	1.5
$68 \le \eta < 72$	$72 \le \eta < 76$	$76 \le \eta < 80$	$80 \le \eta < 84$	$84 \le \eta$	2.2
$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta < 81$	$81 \le \eta < 85$	$85 \le \eta$	3
$70 \le \eta < 74$	$74 \le \eta < 78$	$78 \le \eta < 82$	$82 \le \eta < 86$	$86 \le \eta$	4
$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta < 83$	$83 \le \eta < 87$	$87 \le \eta$	5.5
$72 \le \eta < 76$	$76 \le \eta < 80$	$80 \le \eta < 84$	$84 \le \eta < 88$	$88 \le \eta$	7.5
$80 \le \eta < 83$	$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$93 \le \eta$	11
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	15
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	18.5
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	22
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	30
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	37
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	45
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	55
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	75

Table 4. Ranking of three-phase electromotor based on efficiency for 6 poles

Energy ranking based on efficiency (%)					Nominal power (kW)
E	D	C	B	A	
$48 \le \eta < 52$	$52 \le \eta < 56$	$55 \le \eta < 60$	$60 \le \eta < 67$	$67 \le \eta$	0.37
$51 \le \eta < 55$	$55 \le \eta < 59$	$59 \le \eta < 63$	$63 \le \eta < 70$	$70 \le \eta$	0.55
$54 \le \eta < 58$	$58 \le \eta < 62$	$62 \le \eta < 66$	$66 \le \eta < 73$	$73 \le \eta$	0.75
$56 \le \eta < 60$	$60 \le \eta < 64$	$64 \le \eta < 68$	$68 \le \eta < 75$	$75 \le \eta$	1.1
$58 \le \eta < 62$	$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 77$	$77 \le \eta$	1.5
$60 \le \eta < 64$	$64 \le \eta < 68$	$68 \le \eta < 72$	$72 \le \eta < 79$	$79 \le \eta$	2.2
$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 74$	$74 \le \eta < 81$	$81 \le \eta$	3
$63 \le \eta < 67$	$67 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 82$	$82 \le \eta$	4
$65 \le \eta < 69$	$69 \le \eta < 73$	$73 \le \eta < 77$	$78 \le \eta < 84$	$84 \le \eta$	5.5
$67 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 79$	$79 \le \eta < 87$	$87 \le \eta$	7.5
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	11
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	15
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	18.5
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	22
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	30
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	37
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	45
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	55
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	75
$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta < 96$	$96 \le \eta$	22

Nominal output mechanical power available is based on the terms of watts or kilowatt described. Nominal value of output power by the manufacturer in electric plate profile is determined.

Nominal output power according to the third row is characterized by paragraph VI-1. Power factor and nominal power factor (paragraph III-4), according to section VI-1 and fourth row is determined. Nominal speed rate on three-phase electro, according to the fifth row is determined.

Table 5. Ranking of three-phase electromotor based on efficiency for 8 poles

Energy ranking based on efficiency (%)					Nominal power (kW)
E	D	C	B	A	
$52 \le \eta < 56$	$56 \le \eta < 60$	$60 \le \eta < 64$	$64 \le \eta < 71$	$71 \le \eta$	0.75
$54 \le \eta < 58$	$58 \le \eta < 62$	$62 \le \eta < 66$	$66 \le \eta < 73$	$73 \le \eta$	1.1
$56 \le \eta < 60$	$60 \le \eta < 64$	$64 \le \eta < 68$	$68 \le \eta < 75$	$75 \le \eta$	1.5
$60 \le \eta < 62$	$62 \le \eta < 66$	$66 \le \eta < 70$	$70 \le \eta < 77$	$77 \le \eta$	2.2
$60 \le \eta < 64$	$64 \le \eta < 68$	$68 \le \eta < 72$	$72 \le \eta < 79$	$79 \le \eta$	3
$62 \le \eta < 66$	$66 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 82$	$82 \le \eta$	4
$62 \le \eta < 66$	$66 \le \eta < 71$	$71 \le \eta < 75$	$75 \le \eta < 82$	$82 \le \eta$	5.5
$65 \le \eta < 69$	$69 \le \eta < 73$	$73 \le \eta < 77$	$77 \le \eta < 84$	$84 \le \eta$	7.5
$78 \le \eta < 81$	$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta$	11
$80 \le \eta < 83$	$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta$	15
$80 \le \eta < 83$	$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta$	18.5
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	22
$81 \le \eta < 84$	$84 \le \eta < 87$	$87 \le \eta < 90$	$90 \le \eta < 93$	$93 \le \eta$	30
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	37
$82 \le \eta < 85$	$85 \le \eta < 88$	$88 \le \eta < 91$	$91 \le \eta < 94$	$94 \le \eta$	45
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	55
$83 \le \eta < 86$	$86 \le \eta < 89$	$89 \le \eta < 92$	$92 \le \eta < 95$	$95 \le \eta$	75

VI. ENERGY LABELS

Energy labeling containing information on standards and technical specifications on each product is energy. Also tagged in three phase induction electric motors energy, electric energy efficiency criteria in the accepted standard are compared (Figures 1 and 2). In three phase induction electric motors energy label should be placed on it or is attached. Tags should be easily visible.

VI-1 items contained in the label, must meet the Figures 1 and 2 in terms of application, the energy label three phase induction electric motors to be inserted:

1. Energy Standard Mark (the mark only for electro production is used domestically, and not on imported electro energy labels to be inserted);
2. The term "three-phase electric energy consumption labels";
3. Energy efficiency;
4. W output power nominal terms or kW;
5. Nominal power factor;
6. Nominal rate (per rpm);
7. Numerical value of energy efficiency in nominal output;
8. Name of the manufacturer or trademark;
9. Model name or attribute type;

Label samples three phase induction electric motors in forms 1 and 2 are shown.

10. The phrase "in accordance with National Standards No. 7874".

VII. CONCLUSIONS

The result of standard is reduction of peak and energy saving in home appliances. The share of residential sector in electrical network is 36 percent. Home appliances such as washing machines, evaporative cooler and other equipment have a special single phase electromotors. The best method for efficiency is improving the efficiency of electro motors. Estimates show that 5 percent can be improved of efficiency of electromotors.

REFERENCES

[1] "Determining the Criteria of Electrical Motors", Energy Standard Office, Tehran, Iran, 2010.

[2] "Specification and Energy Labeling for Single Phase Electromotors", Institute of Standard and Industrial Research of Iran, Standard No. 3772-1.

[3] "Energy Balance", Ministry of Energy, Tehran, Iran, 2010.

[4] J. Zhong, E. Nobile, A. Bose, K. Bhattacharya, "Localized Reactive Power Markets using the Concept of Voltage Control Areas", IEEE Transactions on Power Systems, Vol. 19, Issue 3, pp. 1555-1561, Aug. 2004.

[5] R. Effatnejad, A.B. Salehian, "Standard of Energy Consumption and Energy Labeling in Evaporative Air Cooler in Iran", International Journal on Technical and Physical Problems of Engineering (IJTPE), Issue 1, Vol. 1, No. 1, pp. 54-57, December 2009.

[6] R. Effatnejad, "Specification of Energy Consumption and Energy Labeling of Single Phase Electrical Motors", International Journal on Technical and Physical Problems of Engineering (IJTPE), Issue 8, Vol. 3, No. 3, pp. 138-141, September 2011.

BIOGRAPHY

Reza Effatnejad is the Ph.D. in Electrical Engineering. Now, he has published more than 38 papers in journals and international conferences. Power and energy is the field of his study. Labeling in home appliances was the first of his activity. He is an expert in energy auditing in industry. He is an Assistant Professor of Electrical Engineering Department in Islamic Azad University, Karaj Branch, Iran.

Product Introduction: YZR series winding rotor three-phase asynchronous hoist motors are for hoisting and metallurgical machines and other similar equipments. With great load capacity and mechanical strength, they are suitable for equipment with short time or intermittent duty, frequency start or brake, obvious shock and impact.Â 3 phase electric motor iran. often have two main parts with an outer cover known as a stator that produces electricity using coils that create a rotating magnetic field. These. 3 phase electric motor iran. also have an inner rotor that generates an additional magnetic field.Â 3 phase electric motor iran. are universal motors and are ideal for power tools or small appliances. Here at Alibaba.com, finding the right. 3 phase electric motor iran. is simple. Three-phase squirrel-cage induction motor. A squirrel-cage induction motor (SCIM) - is an asynchronous electric motor, in which the rotor is made with a short-circuited winding in the form of a squirrel cage [1]. Induction motor construction.Â An induction motor converts the electrical energy supplied to the stator windings into mechanical energy (rotation of the rotor shaft). But the input and output power are not equal to each other as during the conversion energy loss occurs: friction, heating, eddy currents and hysteresis losses.Â Three-phase induction motors with a wound rotor were usually used in devices with severe starting conditions, for example, as crane AC motors, or to drive devices that require smooth control of the rotational speed. WRIM construction. Wound rotor. Reducing energy consumption and CO2 emissions AC motors have a significant impact on the total energy operation cost for industrial, institutional and commercial buildings. With this in mind Lafert embraced the challenges and brought a combination of IE3 Premium Efficiency and high reliability product to service this lucrative market. Today, the major factor influencing the motor industry is energy efficiency driven by both increasingly demanding legislation and industryâ€™s greater awareness of green issue responsibilities. The PREMIUM EFFICIENCY IE3 motors provide compliance with the requirements of EU MEPS that has come into force January 1, 2015 and NEMA EPAct/EISA, which has been in force since December 2010 in the USA and January 2011 in Canada.