

**SIEMENS**



The new “Champion” for energy efficiency & reliability - Conforming to IE2 & IE3 Efficiency Classes

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Answers for industry.

## The New IS:12615

The New IS:12615 is based on the International Standard IEC 60034-30 (2008) which defines New Efficiency Classification for single speed, three phase, induction motors.

The new IS:12615 covers single speed, three-phase, 50Hz, cage induction motors that:

- have rated voltage  $\leq 1000V$ ;
- have a rated output  $0.37kW \leq P_N \leq 375kW$ ;
- have either 2, 4 or 6 poles;
- meet frame size to output relation as stipulated in IS:1231 (for outputs covered by IS:1231);
- are rated on the basis of either duty type S1 (continuous duty) or S3 (intermittent periodic duty) with rated cyclic duration factor of 80% or higher;
- are capable of operating direct on-line;
- are designed for operation on virtually sinusoidal and balanced voltage conditions as defined in 7.2.1 of IS/IEC 60034-1;

- designed for an ambient temperature not exceeding 40°C and altitude not exceeding 1000m;
- have degree of protection IP44 or superior;
- have method of cooling IC411 in accordance with IS 6362 / IEC 60034-6;
- have service factor not exceeding 1.0.

The Efficiency classes defined are:

IE1 - Standard Efficiency

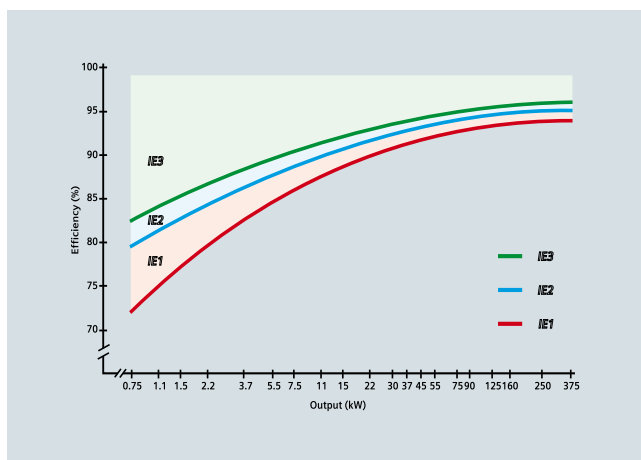
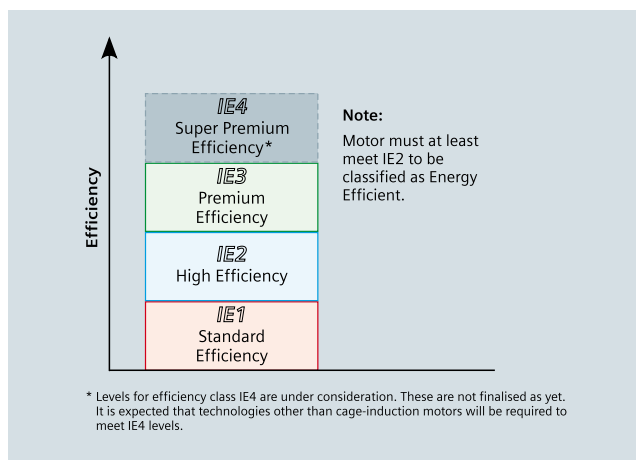
IE2 - High Efficiency

IE3 - Premium Efficiency

The New IS:12615 also stipulates that for motors to be classified as "Energy Efficient", these must meet at least IE2 efficiency values.

Two case studies are given on page 5 and 6, showing savings through IE2 and IE3 range of motors over IE1.

### The New Efficiency Classes are as under:



The values of efficiency for motors to classify as *IE2* or *IE3* in accordance with the new IS:12615 are as under:

kW	2 Pole			4 Pole			6 Pole		
	Frame Size	Efficiency %		Frame Size	Efficiency %		Frame Size	Efficiency %	
		IE2	IE3		IE2	IE3		IE2	IE3
0.37	71	72.2	75.5	71	70.1	73.0	80	69.0	71.9
0.55	71	74.8	78.1	80	75.1	78.0	80	72.9	75.9
0.75	80	77.4	80.7	80	79.6	82.5	90S	75.9	78.9
1.1	80	79.6	82.7	90S	81.4	84.1	90L	78.1	81
1.5	90S	81.3	84.2	90L	82.8	85.3	100L	79.8	82.5
2.2	90L	83.2	85.9	100L	84.3	86.7	112M	81.8	84.3
3.7	100L	85.5	87.8	112M	86.3	88.4	132S	84.3	86.5
5.5	132S	87	89.2	132S	87.7	89.6	132M	86	88
7.5	132S	88.1	90.1	132M	88.7	90.4	160M	87.2	89.1
11	160M	89.4	91.2	160M	89.8	91.4	160L	88.7	90.3
15	160M	90.3	91.9	160L	90.6	92.1	180L	89.7	91.2
18.5	160L	90.9	92.4	180M	91.2	92.6	200L	90.4	91.7
22	180M	91.3	92.7	180L	91.6	93	200L	90.9	92.2
30	200L	92	93.3	200L	92.3	93.6	225M	91.7	92.9
37	200L	92.5	93.7	225S	92.7	93.9	250M	92.2	93.3
45	225M	92.9	94	225M	93.1	94.2	280S	92.7	93.7
55	250M	93.2	94.3	250M	93.5	94.6	280M	93.1	94.1
75	280S	93.8	94.7	280S	94	95	315S	93.7	94.6
90	280M	94.1	95	280M	94.2	95.2	315M	94	94.9
110	315S	94.3	95.2	315S	94.5	95.4	315M <sup>#</sup>	94.3	95.1
125	315M	94.5	95.3	315M	94.6	95.5	315M <sup>#</sup>	94.4	95.2
132	315M <sup>#</sup>	94.6	95.4	315M <sup>#</sup>	94.7	95.6	315L <sup>#</sup>	94.6	95.4
160	315L <sup>#</sup>	94.8	95.6	315L <sup>#</sup>	94.9	95.8	355L	94.8	95.6
200	315L	95	95.8	315L	95.1	96	355L	95	95.8
250	355L	95	95.8	355L	95.1	96	355L	95	95.8
315	355L	95	95.8	355L	95.1	96		95	95.8
375		95	95.8		95.1	96		95	95.8

**Notes:**

- 1 IS:1231 defines frame size to output co-relation only up to Frame Size 315M.
- 2 EN 50347:2001 specifies 132kW for 315M in 2P and 4P.
- 3 Frame Sizes indicated in italics are left to the manufacturer catalogue.
- # These frames are indicated as "preferred" in IS:12615-2011.

**Salient Features of the "new" IE efficiency class motors from Siemens:**

Frame Size	71 to 355
Power Range	0.37kW to 315kW
Number of Poles	2, 4, 6
Motor Material	Frame: Cast Iron (with mounting feet integral to the housing - for constructions with feet) Terminal Box: Generously dimensioned, Rotatable through 360° in steps of 90°; on Top as a standard Fan Cowl: Sheet Steel; Fan: Thermoplastic (Cast Iron for 2P in Frames 250 and above)
Efficiency Classes	IE2 (as a standard), IE3 upon enquiry
Marking	Ratings covered under IS:12615-2011 will be marked with the appropriate efficiency class
Degree of protection	IP55 as per IS:4691
Voltages	415V Standard. For other voltages possible please contact nearest sales office.
Frequency	50Hz (New IS:12615 does not cover any other frequency. Motors can be offered for 60Hz but without IE marking).
Type of Construction (For other possible constructions contact nearest sales office)	Frames up to 132: IMB3, IMB5, IMV1, IMB35, IMB14, IMB34 Frames 160 - 315M: IMB3, IMB5, IMV1, IMB35 Frames 315L - 355L: IMB3, IMV1, IMB35
Cooling Type	IC411 as per IS:6362. (Totally Enclosed Fan Cooled)
Ambient Conditions (Standard)	50°C, Altitude ≤ 1000m
Temperature Class	Class F, most of them utilised to Class B
Bearing System	63 Series for frames 160 and above. Identical bearings at DE and NDE help reduce inventory
Lubrication System	Regreasable bearings for frames 160 onwards

Ordering codes for standard IMB3 motors are as indicated below:

Ordering Codes for **IE2** efficiency class motors

2 Pole				4 Pole				6 Pole			
kW	HP	Frame Size	Ordering Code	kW	HP	Frame Size	Ordering Code	kW	HP	Frame Size	Ordering Code
0.37	0.5	71	1SE0 070-2NC70	0.37	0.5	71	1SE0 073-4NB70	0.37	0.5	80	1SE0 080-6NB70
0.55	0.75	71	1SE0 073-2NC70	0.55	0.75	80	1SE0 080-4NB70	0.55	0.75	80	1SE0 083-6NA70
0.75	1	80	1SE0 080-2NC70	0.75	1	80	1SE0 083-4NA70	0.75	1	90S	1SE0 090-6NA70
1.1	1.5	80	1SE0 083-2NC70	1.1	1.5	90S	1SE0 090-4NA70	1.1	1.5	90L	1SE0 096-6NA70
1.5	2	90S	1SE0 090-2NB70	1.5	2	90L	1SE0 096-4NA70	1.5	2	100L	1SE0 106-6NB70
2.2	3	90L	1SE0 096-2NB80	2.2	3	100L	1SE0 106-4NA80	2.2	3	112M	1SE0 113-6NB80
3.7	5	100L	1SE0 107-2NA80	3.7	5	112M	1SE0 113-4NA80	3.7	5	132S	1SE0 131-6NB80
5.5	7.5	132S	1SE0 130-2NC80	5.5	7.5	132S	1SE0 130-4NA80	5.5	7.5	132M	1SE0 134-6NB80
7.5	10	132S	1SE0 131-2NC80	7.5	10	132M	1SE0 133-4NA80	7.5	10	160M	1SE0 163-6NB80
11	15	160M	1SE0 163-2NB80	11	15	160M	1SE0 163-4NA80	11	15	160L	1SE0 167-6NB80
15	20	160M	1SE0 164-2NB80	15	20	160L	1SE0 166-4NA80	15	20	180L	1SE0 186-6NA80
18.5	25	160L	1SE0 166-2NA80	18.5	25	180M	1SE0 183-4NA80	18.5	25	200L	1SE0 206-6NA80
22	30	180M	1SE0 183-2NB80	22	30	180L	1SE0 186-4NA80	22	30	200L	1SE0 207-6NA80
30	40	200L	1SE0 207-2NB80	30	40	200L	1SE0 207-4NA80	30	40	225M	1SE0 223-6NA80
37	50	200L	1SE0 208-2NB80	37	50	225S	1SE0 221-4NB80	37	50	250M	1SE0 254-6NB80
45	60	225M	1SE0 224-2NB80	45	60	225M	1SE0 224-4NB80	45	60	280S	1SE0 281-6NA80
55	75	250M	1SE0 254-2NB80	55	75	250M	1SE0 254-4NA80	55	75	280M	1SE0 284-6NA80
75	100	280S	1SE0 281-2NB80	75	100	280S	1SE0 281-4NB80	75	100	315S	1SE0 311-6NB80
90	120	280M	1SE0 284-2NB80	90	120	280M	1SE0 284-4NB80	90	120	315M	1SE0 314-6NB80
110	150	315S	1SE0 311-2NC80	110	150	315S	1SE0 311-4NA80	110	150	315L	1SE0 318-6NA80
132	180	315M	1SE0 314-2NC80	132	180	315M	1SE0 314-4NA80	132	180	315L	1SE0 319-6NC80
160	215	315L	1SE0 318-2NC80	160	215	315L	1SE0 318-4NA80	160	215	355L	1SE0 356-6NB80
200	270	315L	1SE0 319-2NC80	200	270	315L	1SE0 319-4NA80	200	270	355L	1SE0 357-6NC80
250	335	355L	1SE0 356-2NC80	250	335	355L	1SE0 356-4NB80	250	335	355L	1SE0 358-6NB80
315	425	355L	1SE0 357-2NC80	315	425	355L	1SE0 357-4NB80				

Ordering Codes for **IE3** efficiency class motors

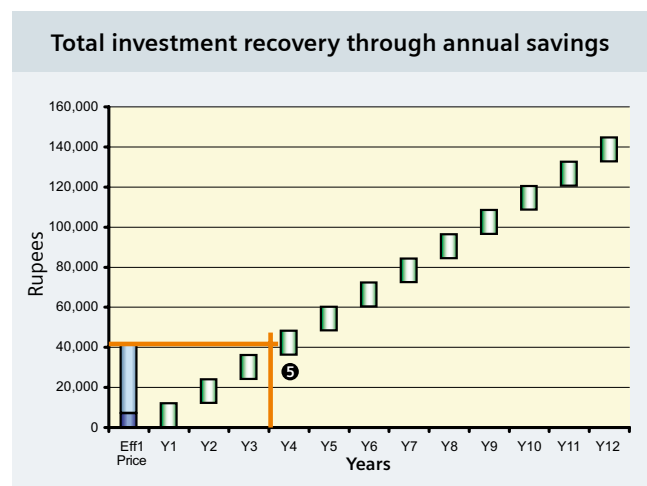
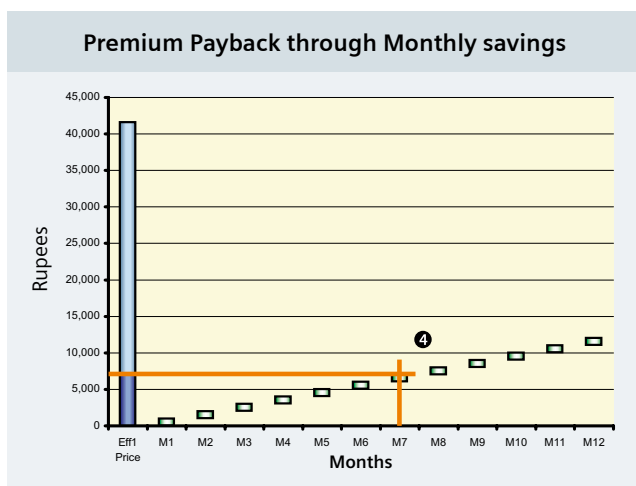
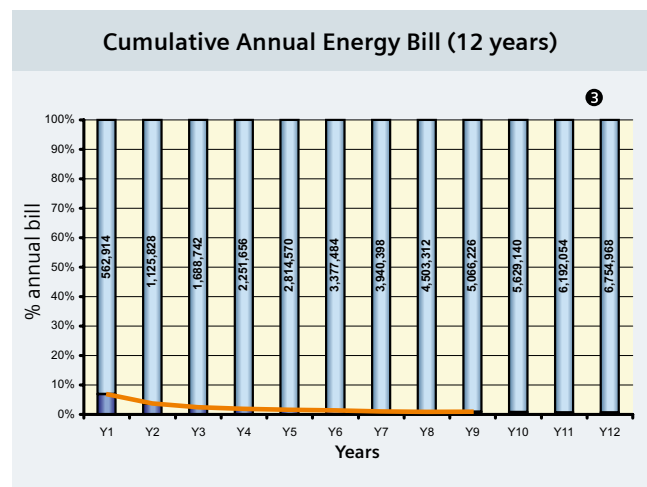
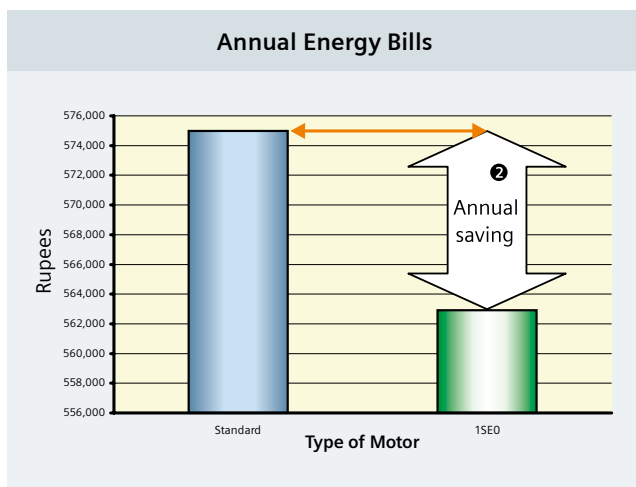
2 Pole				4 Pole				6 Pole			
kW	HP	Frame Size	Ordering Code	kW	HP	Frame Size	Ordering Code	kW	HP	Frame Size	Ordering Code
0.37	0.5	71	1LA2 070-2NC70	0.37	0.5	71	1LA2 073-4NB70	0.37	0.5	80	1LA2 080-6NC70
0.55	0.75	71	1LA2 073-2NC70	0.55	0.75	80	1LA2 080-4NA70	0.55	0.75	80	1LA2 083-6NA70
0.75	1	80	1LA2 080-2NC70	0.75	1	80	1LA2 083-4NA70	0.75	1	90S	1LA2 090-6NB70
1.5	2	90S	1LA2 090-2NA70	1.1	1.5	90S	1LA2 090-4NA70	1.5	2	100L	1LA2 106-6NB70
2.2	3	90L	1LA2 096-2NA80	1.5	2	90L	1LA2 096-4NA70	2.2	3	112M	1LA2 113-6NB80
5.5	7.5	132S	1LA2 130-2NA80	2.2	3	100L	1LA2 106-4NA80	3.7	5	132S	1LA2 131-6NA80
7.5	10	132S	1LA2 131-2NA80	3.7	5	112M	1LA2 113-4NA80	5.5	7.5	132M	1LA2 134-6NA80
11	15	160M	1LA2 163-2NA80	5.5	7.5	132S	1LA2 130-4NA80	7.5	10	160M	1LA2 163-6NA80
15	20	160M	1LA2 164-2NA80	7.5	10	132M	1LA2 133-4NA80	11	15	160L	1LA2 166-6NA80
18.5	25	160L	1LA2 166-2NA80	11	15	160M	1LA2 163-4NA80	15	20	180L	1LA2 186-6NA80
22	30	180M	1LA2 183-2NA80	15	20	160L	1LA2 166-4NA80	18.5	25	200L	1LA2 206-6NA80
30	40	200L	1LA2 207-2NB80	18.5	25	180M	1LA2 183-4NA80	22	30	200L	1LA2 207-6NA80
37	50	200L	1LA2 208-2NB80	22	30	180L	1LA2 186-4NA80	30	40	225M	1LA2 225-6NA80
45	60	225M	1LA2 224-2NA80	30	40	200L	1LA2 207-4NA80				
				37	50	225S	1LA2 221-4NA80				
				45	60	225M	1LA2 224-4NA80				

Notes:

- 1 The above indicated Ordering Codes are for a Standard 415V, 50Hz, IMB3 mounted motors.
- 2 Motors rated 1.5kW and below are Y connected, while those rated 2.2kW and above are Δ Connected.
- 3 8 Pole motors are not covered under IS:12615-2011 and therefore will not have IE Class marked on the nameplate. These can be ordered using the existing ordering codes.
- 4 Motors can also be offered for other voltages and in other mounting constructions. Please consult your nearest sales office for appropriate ordering code.

## It makes much better Economic Sense to invest in SIEMENS Energy Efficient Motors

Equipment Name / Tag number:			
Type of Motor		Standard	1SE0
Motor Rating		15kW / 4P	
Rated output of the motor	kW	15	15
Motor Type		Make X <sup>①</sup>	1SE0 166-4NA..
Efficiency compared to the value stipulated in IS:12615-2004		IE1	IE2
How much is the motor loaded as a % of the rated?		85.0%	85.0%
Efficiency		88.7%	90.6%
Power Tariff	Rs./kWH	5	5
Operation of the motor per annum	hours	8,000	8,000
Energy consumption per annum	kWH	114,994	112,583
Energy Saved per annum over standard motor	kWH	-	2,412
Annual Energy Bill	Rs.	574,972	562,914
Savings towards energy bill per annum	Rs.	-	12,058
Savings towards energy bill per month	Rs.	-	1,005
Purchase price of a new motor [exclusive of taxes and duties]	Rs.	34,495	41,610
"Incremental" investment over a standard motor	Rs.		7,115
Payback of incremental investment (Premium)	months		7-Months, 2-days <sup>④</sup>
Payback of total investment (Purchase Price)	years		3-Year, 5-Months <sup>⑤</sup>

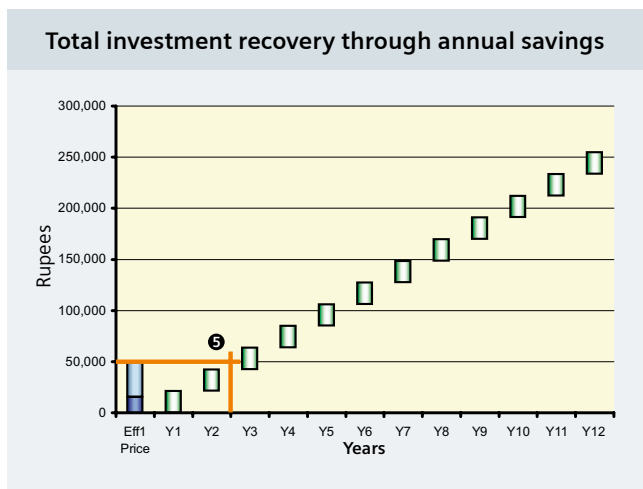
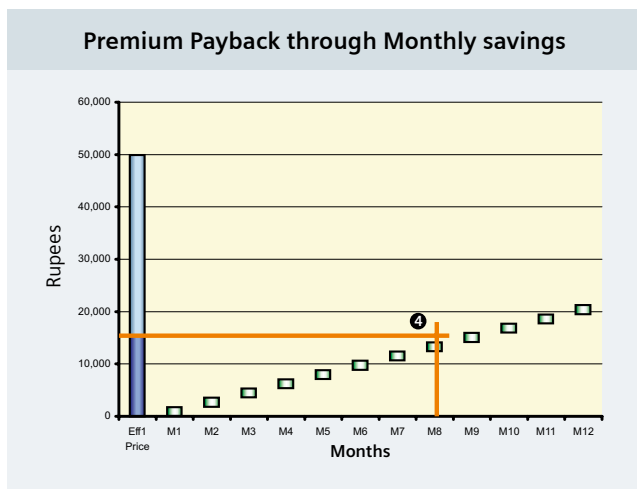
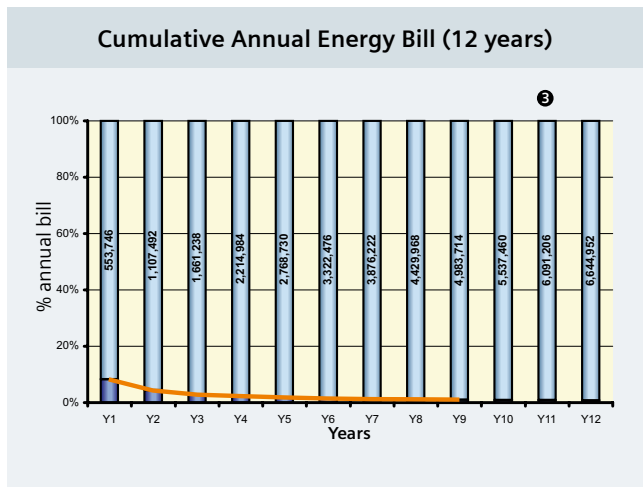
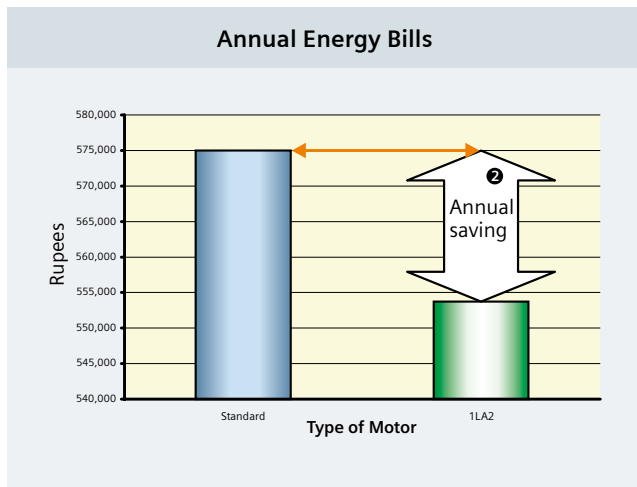


- ① Any make having efficiency level IE1 as per revised IS:12615-2011
- ② Purchase price is less than 1% of total operating cost over the life time



**It makes much better Economic Sense to invest in SIEMENS Energy Efficient Motors.**

Equipment Name / Tag number:		
Type of Motor		<b>Standard</b> <b>1LA2</b>
Motor Rating		15kW / 4P
Rated output of the motor	kW	15 <sup>❶</sup> 15
Motor Type		<b>Make X</b> <b>1LA2 166-4NA..</b>
Efficiency compared to the value stipulated in IS:12615-2004		IE1                      IE3
How much is the motor loaded as a % of the rated?		85.0%                      85.0%
Efficiency		88.7%                      92.1%
Power Tariff	Rs./kWH	5                      5
Operation of the motor per annum	hours	8,000                      8,000
Energy consumption per annum	kWH	114,994                      110,749
Energy Saved per annum over standard motor	kWH	-                      4,245
Annual Energy Bill	Rs.	574,972                      553,746
Savings towards energy bill per annum	Rs.	-                      21,226
Savings towards energy bill per month	Rs.	-                      1,769
Purchase price of a new motor [exclusive of taxes and duties]	Rs.	34,495                      49,930 <sup>❷</sup>
"Incremental" investment over a standard motor	Rs.	-                      15,435 <sup>❸</sup>
<b>Payback of incremental investment (Premium)</b>	<b>months</b>	<b>8-Months, 22-days</b>
<b>Payback of total investment (Purchase Price)</b>	<b>years</b>	<b>2-Year, 4-Months</b>



- ❶ Any make having efficiency level IE1 as per revised IS:12615
- ❷ Purchase price is less than 1% of total operating cost over the lifetime