

Reputations

BALDOR

BALDOR

DODGE[®]

RELIANCE

PRESENTATION BY
Gulshan Bharti
Regional Manager-North
gbharati@baldor.com
+919818671892

Super-E® Premium Efficient Motors

BALDOR

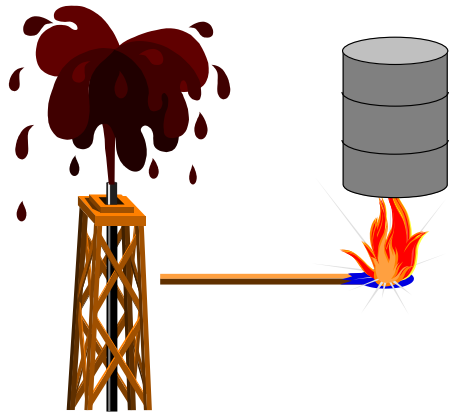
Baldor Electric Company

One of The leading manufacturer of “*industrial*” electric motors , drives and transmission products in world. Total production exceeds 100,000 electric motors, drives and gearboxes per week.

BALDOR

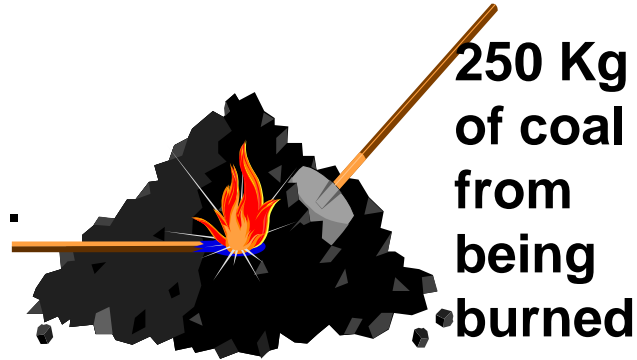
*Upgrading even one, 0.75 kW motor to a Premium Efficient motor gives double benefit of **Energy Savings** and **Carbon credits**...*

Every year will eliminate:



1 Drum
of Oil
from
being
burned

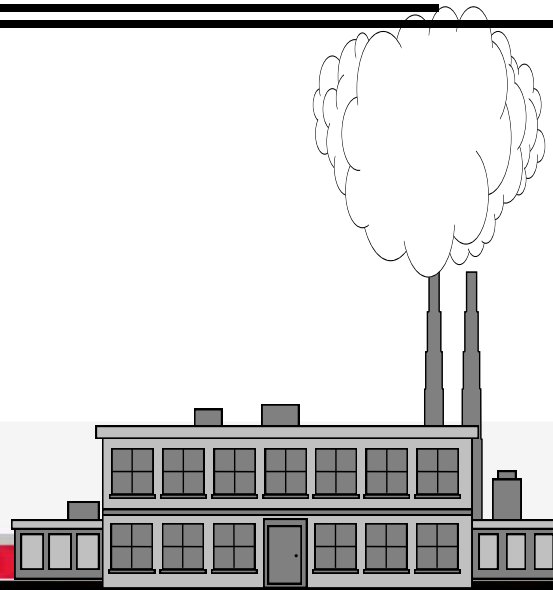
Or....



250 Kg
of coal
from
being
burned

and....

Up to 650 gms. of
carbon emissions
from being
released into the
atmosphere



SIMPLE PAYBACK CALCULATIONS

BALDOR

- **100KW MOTOR GIVING 1 % MORE EFFICIENCY SAVES 1KWH PER HOUR THAT IS 5 RS.**
- **IT SAVES PER ANNUM $8000 \times 5 = 40000$ RS**
- **IF THE MOTOR COSTS RS 60000 MORE, IT GIVES PAYBACK OF 18 MONTHS.**
- **AND IF YOU DECIDE TO REPLACE THE 15 YEAR OLD MOTOR, THE EFFICIENCY DIFFERENCE CAN BE 3 %**
- **THE ANNUAL SAVING COULD BE 1.2L AND IF THE MOTOR COSTS 2.4L, THE PAYBACK IS JUST 24 MONTHS FOR THE REPLACEMENT WITH ZERO SALVAGE VALUE.**

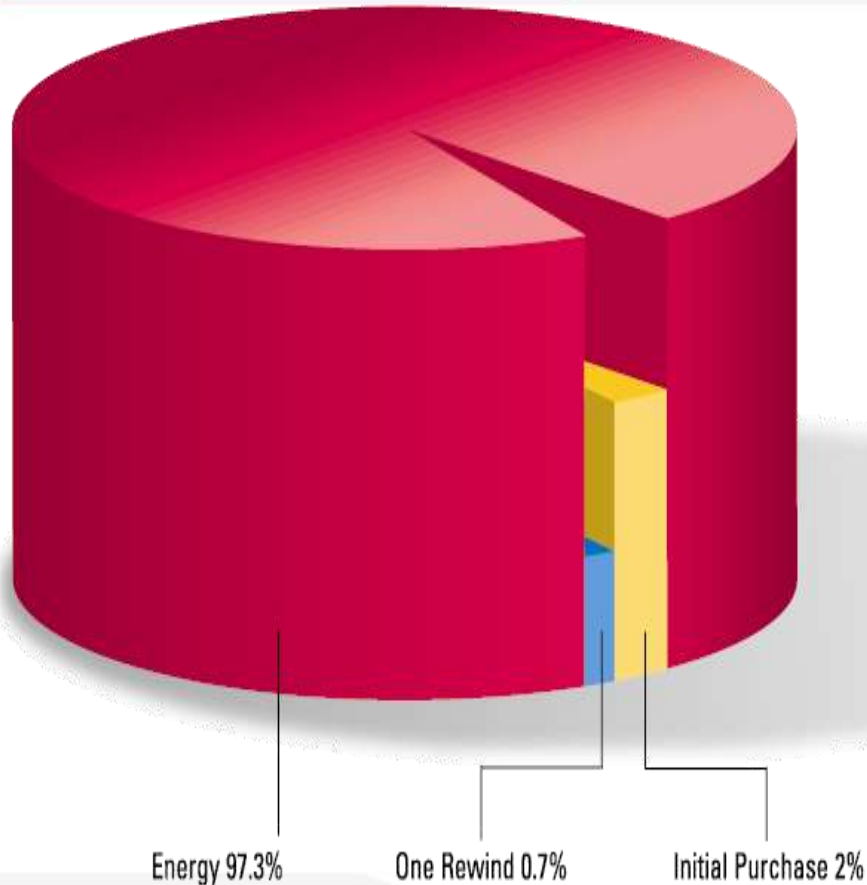


Payback improves if you consider salvage value of old motors

Salvage Value calculation	
Weight of the motor Kg (90kw)	1000
Copper weight	10%
Salvage value of Copper Rs	$100 \times 300 = 30000$
Wt of Steel %	90%
Salvage value of Steel Rs	$12 \times 900 = 10800$
Total salvage Value Rs	40800
Salvage Value/Kg	@41/kg

LIFETIME COST OF AN ELECTRIC MOTOR.

BALDOR

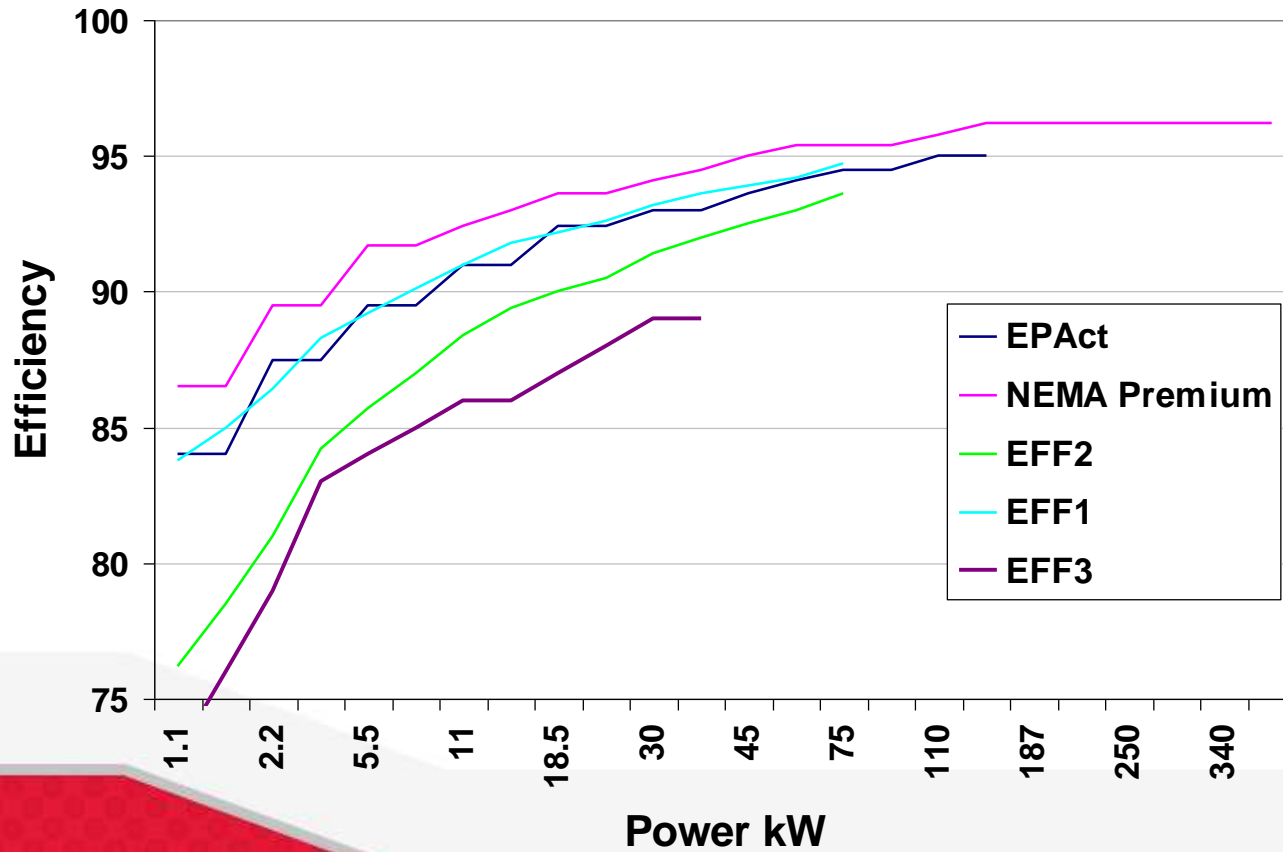


- **Purchase price represents 2% of motor life cost,**
- **One Rewind represents 0.7% of cost**
- **Electricity costs accounts for nearly 97%**
- **Rs 10,000 motor consumes Rs 2,00,000 annual energy and 5% efficiency advantage saves Rs.10000**

Efficiency Comparison

BALDOR

IEC / NEMA Comparison



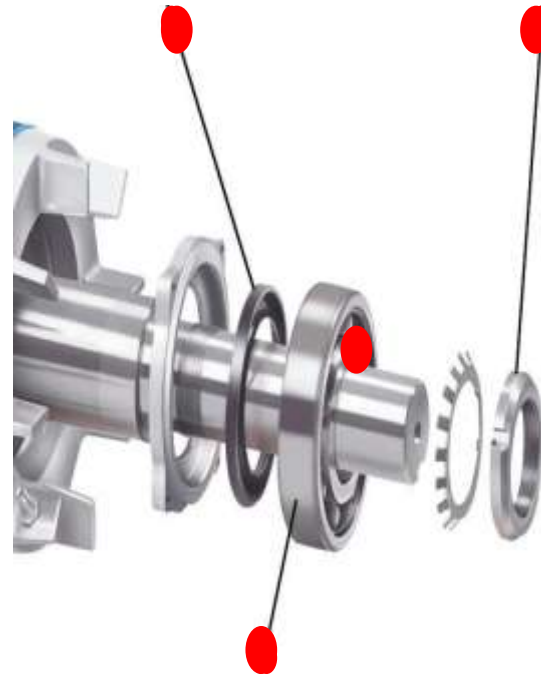
PREMIUM EFFICIENCY INSIDE

BALDOR

How to improve motor Efficiency and provide longer life?

FRICITION LOSS REDUCTION

- High Quality Ball Bearing, reduce friction and vibration
- Patented Lube-Lok retainer grease seal on both end
- Locked bearing reduces endplay and minimizes energy loss in axial movement



PREMIUM EFFICIENCY INSIDE

BALDOR

How to improve motor Efficiency and provide longer life?

WINDAGE LOSS REDUCTION

- Fan & Fan cover designed for optimum cooling and quieter operation
- Smaller fan generate less losses
- Smaller fan can be used due to cooler operation



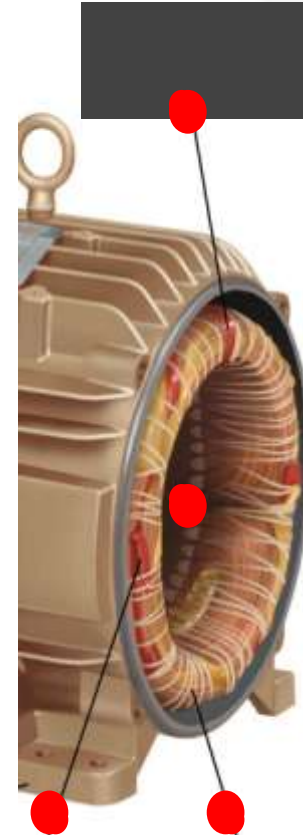
PREMIUM EFFICIENCY INSIDE

BALDOR

How to improve motor Efficiency and provide Longer Life?

STATOR COPPER LOSS REDUCTION

- More Wire volume
- Improved slot design
- ISR (Inverter Spike Resistant) magnet wire is up to 100 times more resistant to voltage spikes
- End turns laced both end
- Low temp. raise ($< 80^{\circ}\text{C}$)
- Class F insulation systems
- Each 10°C below max allowed temperature double insulation life



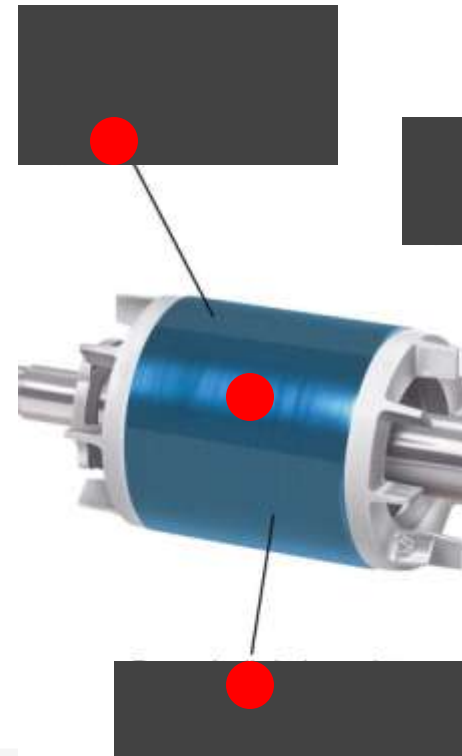
PREMIUM EFFICIENCY INSIDE

BALDOR

How to improve motor Efficiency and provide longer life?

ROTOR LOSS REDUCTION

- Improved Rotor insulation
- High-pressure die cast aluminum Rotor
- Rotor dynamically balanced to IEEE 841 vibration limits as standard (0.08 in/sec). This reduces energy losses in vibrations.



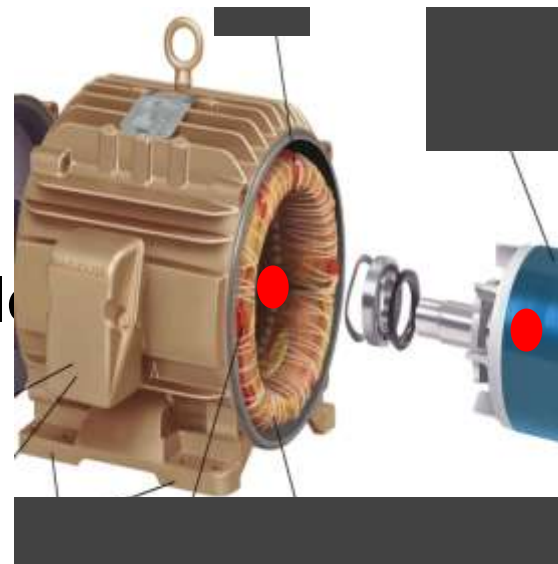
PREMIUM EFFICIENCY INSIDE

BALDOR

How to improve motor Efficiency and provide longer life?

IRON AND STRAY LOSS REDUCTION

- Thinner lamination
- Improved steel properties (0.7 watts/kg against 1.3 watts/kg) for lower losses and also allow same performance after rewind
- Optimized air gap. (Hardened and thicker inside shaft)
- More steel - Longer stack

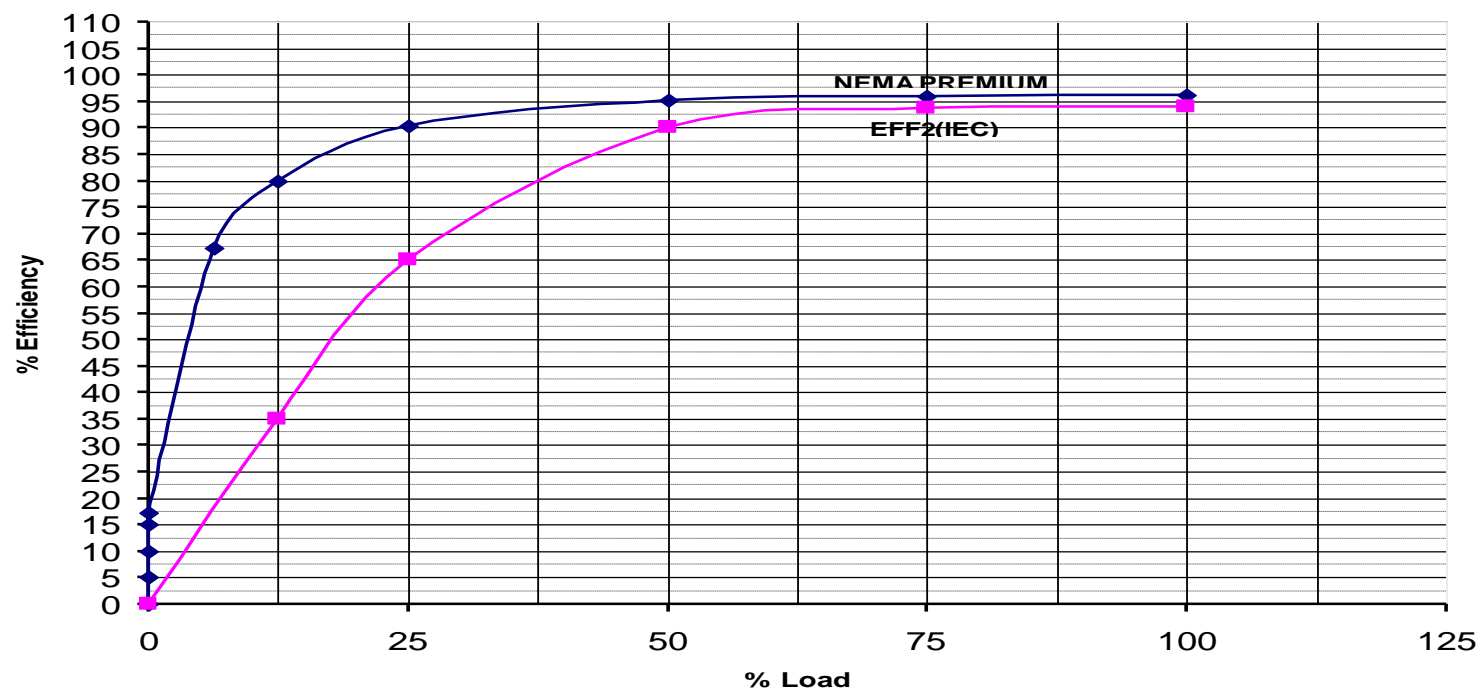


Efficiencies.

Nema Super E compared with Eff2



50 HP, 4 POLE MOTOR



Nema and IEC Testing Methods

BALDOR

Method	KW	Name Plate Eff %	Stray Adder %	Comparable Eff %
IEC 34-2(India and Europe)	90	95	2.3-0.5=1.8	93.2
IEEE 112-b(USA)	90	95	NA	95

Present IEC Efficiencies are overstated due to incorrect Stray Loss assumption as per the difference in existing method of IEC 34-2 and proposed method of IEC 61972 which is the Stray Adder.

IEC Measurement Method

BALDOR

- **Motor Loaded by Generator**
- **Input given equal to output by Name plate efficiency**
- **Stator resistance is measured to calculate Stator copper loss**
- **Slip is measured to calculate rotor copper loss**
- **Friction and windage loss assumed as 1% of output**
- **Stray Loss assumed as 0.5% of Output.**
- **Input-losses=Output and Output/Input=Efficiency**

Stray losses comparison



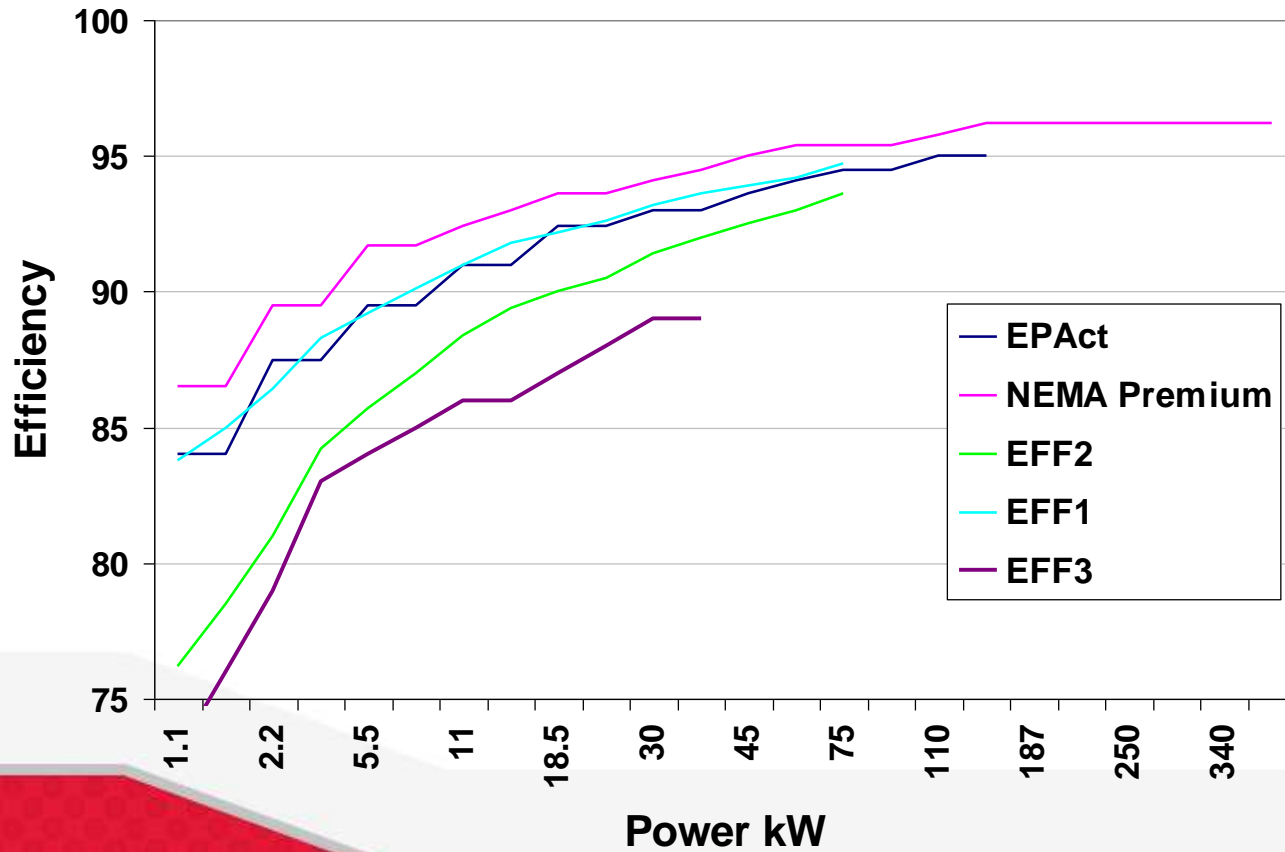
CEMEP
adopted IEC
60034-2 for
summation of
losses.

Motor Power	Assumed stray load losses (% of full-load power)	
	kW	IEC 60034-2
0.75	0.50	3.00
1.1	0.50	2.99
1.5	0.50	2.99
2.2	0.50	2.98
3.7	0.50	2.97
5.5	0.50	2.96
7.5	0.50	2.94
11	0.50	2.92
15	0.50	2.89
18.5	0.50	2.86
22	0.50	2.84
30	0.50	2.78
37	0.50	2.72
45	0.50	2.66
55	0.50	2.58
75	0.50	2.44
95	0.50	2.30
110	0.50	2.16
150	0.50	1.88

Stray load losses are due to Magnetic transfer loss in the air gap between the stator and rotor

Efficiency Comparison across the BALDOR® Globe

IEC / NEMA Comparison



Nema and IEC Comparison

BALDOR

KW	3/4 FL Eff Nema	Stray Ad der	Equivalent IEC Eff	Eff3	Eff2	Eff1	Baldor Advanta ge over Eff3	Baldor Advan tage over Eff2	Baldor Adva ntage over Eff1
1.1	86.5	2.49	88.99	73	77	83.8	15.99	11.99	5.19
1.5	87.5	2.49	89.99	76	79	85	13.99	10.99	4.99
2.2	89.1	2.48	91.58	79	80	86.4	12.58	11.58	5.18
4	89	2.47	91.47	83	84	88.3	8.47	7.47	3.17
5.5	91.9	2.46	94.36	84	85	89.5	10.36	9.36	4.86
7.5	92.5	2.44	94.94	85	87	90.3	9.94	7.94	4.64
9.3	92.1	2.43	94.53	86	88	90.5	8.53	6.53	4.03
11	91.9	2.42	94.32	86	89	92	8.32	5.32	2.32
15	92.9	2.39	95.29	86	90.5	92.2	9.29	4.79	3.09
18.5	93.3	2.36	95.66	87.5	91.2	92.4	8.16	4.46	3.26

What Motors To Replace

BALDOR

- **Non Branded**
- **Old motors having no efficiency written on name plate**
- **New motors having lower efficiency on name plate**
- **Motors which are rewound more than once.**
- **Compressor motors which go thru Load/Unload Cycles.**

Utilities-Pumps/Fan/Agitator

BALDOR

Motor Rating	7.5kw to 110kw 6 nos
Total KW before Replacement	252.5
Total KW after Replacement	236 (Savings of 16.5Kw)=6.9%
Observed KWH Saving for 24 Hours of operation	16.5X24=396
Annual Savings INR	396X350X4.3=595980
Salvage Value=WtX40	1500X40=60000
Baldor Motor Cost INR	9,00,000
Replacement payback, Months	12X(9-0.6)/5.95)=16.8
Carbon Credits Earned	16.5 KWX0.8 KGX8400HRX7YRX20EX55Rs/1000=10.6L

WHY BALDOR MOTORS

BALDOR

- Baldor (88 years old) is the generic name in US for high efficiency motors.
- Motors are with high efficiency and of high reliability coming with 36 months warranty.
- Highest levels of efficiencies.
- Service centers in all major cities in India.
- Baldor is present in 70 countries. Visit www.baldor.com for details
- All motors are Inverter ready by Default.
- All motors are epoxy painted and with regreasing Facility even for small motors of 90 frame.
- Motors with IEC Dimensions for exact replacement.

Incentives Available

BALDOR

IREDA offers (refer www.ireda.in) following incentives.

- **Concessional rates of interest for energy efficient equipment.**
- **The allowable depreciation for energy efficient motors upto 80%. .**

Please Remember

BALDOR

- **Energy costs every hour but motor costs only once and paysback to the owner for the rest of its life of 25-30 years.**
- **Saved Energy can be sold to earn profits.**

BALDOR

- **THANKS**
gbharati@baldor.com
- www.baldor.com
- **+919818671892**