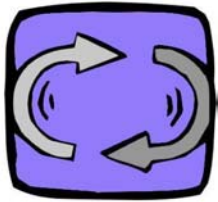


- **High efficiency motors can now obtain the respect that they deserve**

- Bill effects
- Duration effects
- Industry effects
- Ambient effects

- Reference values
- **How to make a more efficient motor**



## High efficiency motors can now obtain the respect that they deserve

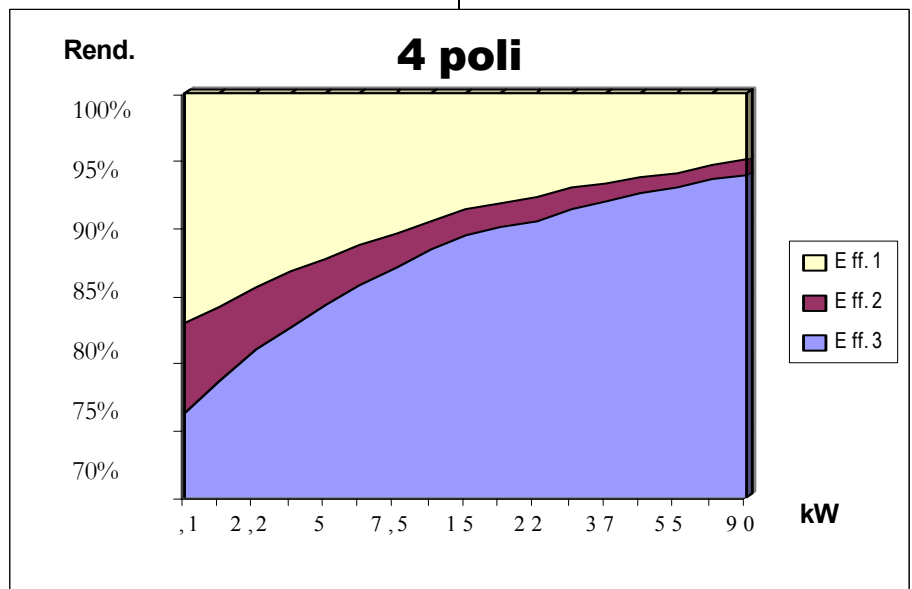
*To make more efficient electric motors has never had better incentive than today.*

The objectives of the European Agreement established by the European Commission and CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics), regarding a new classification system of electric motors based on the efficiency, are becoming reality. The reference values, citing the example of 4 poles motors, are clarified by the attached diagram and a successive paragraph.

There are no requests about minimum efficiency, but it is defined clearly which are the motors classified efficiency 1, 2 and 3.

Motive has already organized its production respecting the parameters indicated by the new European classification.

Client's benefits are of many kinds



### Bill effects

Bill effects are the first to be in evidence.



The calculation changes depending by the use circumstances, but we can say that efficiency 2 motors allow a saving of about 20%. For instance, a 15kW motor, for an operation period of 6.000 hours per year, can save about 2 MWh/a or more: about 100 Euro of yearly operation costs

### Duration effects

Another important effect: higher efficiency motors heat less, they slow down the aging cycle of the insulating materials and live longer.

Average operating life of Motive motors is:

- 2500 hours/ year for motors up to 15kW
- 4000 hours/year for bigger motors

The average life is approximately from 25 to 30.000 hours for the first and 50,000 for the second ones

## Industry effects

It is probable that the motors efficiency class identification will become soon a norm request. For sure, this classification will push to a reduction in the use of the motors to Efficiency 3 until 50% from year 2003.

Control systems are to be implemented by CEMEP in order to verify the effectiveness of this new policy

## Ambient effects

Efficiency 2 motors guarantee great energy and money savings, with an objective of sustainable development, reduction of CO<sub>2</sub> emissions and consequent improvement of the quality of the atmosphere

## Reference values

| 2 poles motors |            |       |       |
|----------------|------------|-------|-------|
| kW             | efficiency |       |       |
|                | eff3       | eff2  | eff1  |
| 1.1            | <76.2      | ≥76.2 | >82.8 |
| 1.5            | <78.5      | ≥78.5 | >84.1 |
| 2.2            | <81.0      | ≥81.0 | >85.6 |
| 3              | <82.6      | ≥82.6 | >86.7 |
| 4              | <84.2      | ≥84.2 | >87.6 |
| 5.5            | <85.7      | ≥85.7 | >88.6 |
| 7.5            | <87.0      | ≥87.0 | >89.5 |
| 11             | <88.4      | ≥88.4 | >90.5 |
| 15             | <89.4      | ≥89.4 | >91.3 |

|      |       |       |       |
|------|-------|-------|-------|
| 18.5 | <90.0 | ≥90.0 | >91.8 |
| 22   | <90.5 | ≥90.5 | >92.2 |
| 30   | <91.4 | ≥91.4 | >92.9 |
| 37   | <92.0 | ≥92.0 | >93.3 |
| 45   | <92.5 | ≥92.5 | >93.7 |
| 55   | <93.0 | ≥93.0 | >94.0 |
| 75   | <93.6 | ≥93.6 | >94.6 |
| 90   | <93.9 | ≥93.9 | >95.0 |

| 4 poles motors |            |       |       |
|----------------|------------|-------|-------|
| kW             | efficiency |       |       |
|                | eff3       | eff2  | eff1  |
| 1.1            | <76.2      | ≥76.2 | >83.8 |
| 1.5            | <78.5      | ≥78.5 | >85.0 |
| 2.2            | <81.0      | ≥81.0 | >86.4 |
| 3              | <82.6      | ≥82.6 | >87.4 |
| 4              | <84.2      | ≥84.2 | >88.3 |
| 5.5            | <85.7      | ≥85.7 | >89.2 |
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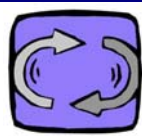
## How to make a more efficient motor?

High efficiency can be seen in many ways: like the relation between output power and input absorbed power, or like

a measure of the losses that born when converting the electric power in mechanical energy. From an other perspective, high efficiency motors consume less energy to produce the same torque on the shaft. Basically, an high efficiency motor is the result of precise workings, smaller frictions, and of the use of better materials. The main points for the design are based on the choice of the type of lamination sheets and windings with a greater coil number and a bigger diameter wire. Also how a motor is produced contributes to its efficiency. Smaller frictions, a dynamically balanced rotor and a smaller space between rotor and stator help furthermore.

Motive motors have been thought taking in consideration all the factors above listed. In fact:

- they adopt magnetic lamination sheets FeV
- the n° of coils and the diameter of the wire are studied to guarantee less energy consumption
- the rotor is dynamically balanced
- frames are worked with precision also in the places where, very often, producers are used to insert with force stator or bearings
- the choice of the bearings allow to improve the sliding of rotary parts. Furthermore, they can have a longer life thanks to the dynamically balanced rotor



electric motors

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