Motor efficiency labelling scheme

Brook Crompton and the efficiency labelling scheme

2219E

BROOK CROMPTON

What is it?

This is a scheme aimed at emphasising to all motor users, the importance of efficiency.

With the backing of the European Commission, manufacturers representing 80% of the European production of standard motors, have agreed to establish three efficiency bands or classes for their standard TEFV, 2 and 4 pole, squirrrel cage induction motors in the power range 1.1 to 90kW.

The bands are designated **EFF1**, **EFF2** , and **EFF3** - **EFF1** being the highest band.

The band must be declared by means of a label on the rating plate and in the catalogue. With all of its WP premium efficiency motors falling within the higher bands, Brook Crompton will, in addition, give greater visibility by means of stickers on the motors

By encouraging the use of motors in the higher efficiency 'band' **EFF1** , the European Commission expects to reduce significantly the consumption of electricity by industry. This in turn will lower the environmentally harmful emissions from power stations.

Scheme benefits ...

... to motor users

The use of higher efficiency motors is financially beneficial, almost by definition and regardless of any scheme:

- higher efficiency means lower losses resulting in lower running costs
- savings increase with motor use
- short pay-back periods
- helps combat the additional burden of the climate change levy
- opportunity to reduce your tax liability by claiming an enhanced capital allowance (ECA)[1]

... to motor buyers

You will now be able to class your own equipment into efficiency bands, dependent on the application or customer branch:

- simplifying motor selection procedures where efficiency is an issue
- using what will become a well know label, appearing on the motor
- adding value to certain ranges
- anticipating similar labelling schemes in the pipeline for fans, pumps, inverter drives etc

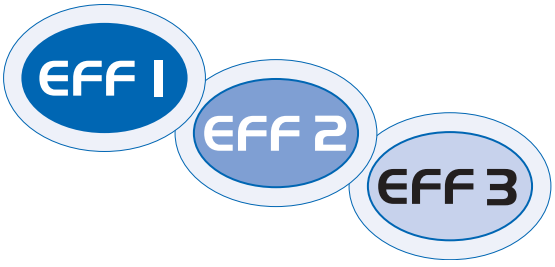
... to technicians

The scheme provides a reference value, which has never existed before in this field, useful for:

- comparing different products from the same base
- establishing manufacturers' guarantees within a band
- evaluating energy consumption using a common base

The scheme offers simplification and the opportunity to highlight your 'green' credentials:

- categorising motors into efficiency bands helps in their selection and purchase for particular applications;
  - -occasional use - fit **EFF3** motors
  - -regular use - fit **EFF2** motors
  - -continuous use - **EFF1** motors
- environmentally-friendly cost savings



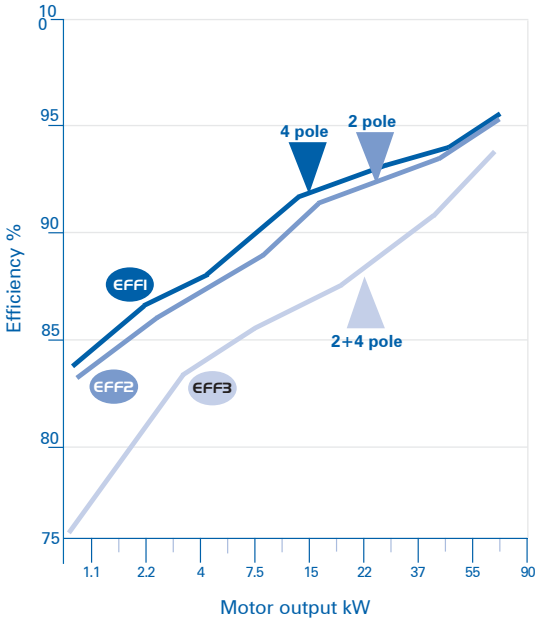
... to Brook Crompton? Certainly!

Brook Crompton has been at the forefront of the development and promotion of more efficient motors for many years, and is proud to participate in this scheme which is advantageous to its user and OEM customers, and highlights its own leading position

[1] *For full details of the enhanced capital allowance scheme, please visit our website: ww.brookcrompton.com*

How does it work?

- it applies to the following motors :
  - totally enclosed fan ventilated (TEFV) 3 phase, squirrel cage induction motors
  - 2 and 4 pole only
  - in the output range 1.1 to 90 kW
  - rated for 400 volts, 50 Hz, S1 duty
  - in standard design, defined as design N, given in EN 60034 - 12 and HD 231
- for each standard motor output, two values of full load efficiency are given
  - outputs as defined in IEC 34
  - efficiencies as measured according to IEC 60034-2 (1972) + Amendment 1 (1995) + Amendment 2 (1996)
- these define 3 bands of efficiency level
  - bands designated **EFF1**, **EFF2** & **EFF3**
  - see adjacent tables and graphs
- labelled accordingly on motor rating plates and in technical data tables in manufacturers' catalogues



2 pole			
kW	efficiency %		
	EFF1 equal to or above	EFF2 equal to or above	EFF3 below
1.1	82.8	76.2	
1.5	84.1	78.5	
2.2	85.6	81.0	
3	86.7	82.6	
4	87.6	84.2	
5.5	88.6	85.7	
7.5	89.5	87.0	
11	90.5	88.4	
15	91.3	89.4	
18.5	91.8	90.0	
22	92.2	90.5	
30	92.9	91.4	
37	93.3	92.0	
45	93.7	92.5	
55	94.0	93.0	
75	94.6	93.6	
90	95.0	93.9	

4 pole			
kW	efficiency %		
	EFF1 equal to or above	EFF2 equal to or above	EFF3 below
1.1	83.8	76.2	
1.5	85.0	78.5	
2.2	86.4	81.0	
3	87.4	82.6	
4	88.3	84.2	
5.5	89.2	85.7	
7.5	90.1	87.0	
11	91.0	88.4	
15	91.8	89.4	
18.5	92.2	90.0	
22	92.6	90.5	
30	93.2	91.4	
37	93.6	92.0	
45	93.9	92.5	
55	94.2	93.0	
75	94.7	93.6	
90	95.0	93.9	

Brook Crompton motor ranges

Full range of EFFI 'WP' motors

	2 pole 3000rpm		4 pole 1500rpm	
kW	EFFI BS Frame	EFFI European Frame	EFFI BS Frame	EFFI European Frame
1.1	WP-DF80MM	WP-DF80MM	WP-DF90LRX	WP-DF90LRX
1.5	WP-DF90LMX	WP-DF90LMX	WP-DF90LWX	WP-DF90LWX
2.2	WP-DF90LSX	WP-DF90LSX	WP-DF100LRF	WP-DF100LRF
3	WP-DF100LMF	WP-DF100LMF	WP-DF100LTF	WP-DF100LTF
4	WP-DF112MMX	WP-DF112MMX	WP-DF112MWX	WP-DF112MWX
5.5	WP-DF132SEX	WP-DF132SEX	WP-DF132STX	WP-DF132STX
7.5	WP-DF132SJX	WP-DF132SJX	WP-DF132MVX	WP-DF132MVX
11	WP-DF160MB	WP-DF160MB	WP-DF160MJ	WP-DF160MJ
15	WP-DF160MJ	WP-DF160MJ	WP-DF160LR	WP-DF160LR
18.5	WP-DF160LR	WP-DF160LR	WP-DF180ME	WP-DF180ME
22	WP-DF180ME	WP-DF180ME	WP-DF180LJ	WP-DF180LJ
30	WP-DF200LGX	WP-UDF200LGX	WP-DF200LNX	WP-UDF200LNX
37	WP-DF200LNX	WP-UDF200LNX	WP-DF225SN	WP-UDF225SN
45	WP-DF225MN	WP-UDF225MN	WP-DF225MN	WP-UDF225MN
55	WP-DF250SN	WP-UDF250MNE	WP-DF250SN	WP-UDF250MNE
75	WP-DF250MN	WP-UDF280SNE	WP-DF250MN	WP-UDF280SNE
90	WP-DF280SN	WP-UDF280MNE	WP-DF280SN	WP-UDF280MNE

EFFI With the **EFF** labelling scheme now in effect, Brook Crompton have developed a new range of premium efficiency motors. As a result, we can offer **EFFI** motors across the whole range, relevant to this scheme – 1.1 to 90 kW, 2 and 4 pole.

This **EFFI** range is designated 'WP' and covers products with outputs from as low as 0.07kW up to 400kW in 2, 4, 6 and 8 pole speeds.

EFF2 **EFF2** motors will become the European standard within the next year or two, as the use of **EFF3** motors declines and is eventually eliminated. There are a number of applications where high efficiency is of minor significance, however at Brook Crompton, we believe that any saving of energy is of benefit – both to the user and to the environment.

EFF3 In concert with CEMEP and the European Commission, our aim has been to contribute to an overall reduction in **EFF3** motors on the market. As a result, Brook Crompton no longer manufacture motors with efficiencies so low as to fall into the **EFF3** band.

All of Brook Crompton's motors fall within the higher bands of either **EFFI** or **EFF2**.

Saving money and the environment

Effect on user costs

The price of the motor to the user, especially if it is fitted to an expensive piece of kit, should not be the main criterion.

Actual savings for the user in reduced electricity bills are likely to be far more significant, because the calculation of such cost reductions has so many variables, dependent on the user's circumstances. The accompanying chart simply shows typical lifetime savings compared with the full purchase price of three sizes of motor.

Most of the factors in the cost equation are predetermined, but the motor efficiency and any premium for **EFFI**, for example, do present the user with an area of choice.

Effect on European industry

There is no doubt that motor labelling will become the norm in Europe, because manufacturers, representing about 80% of the European market for standard motors, will be participants in the scheme.

Motors manufactured outside the EU, but sold through CEMEP members, may also be labelled. Any none EU manufacturer importing into the Union, will need to participate if he wishes to be taken seriously by the market.

Encouraging the use of **EFFI** motors is an important objective of this labelling scheme, however its main achievement will be to have reduced the use of the 'dirty' **EFF3** motors to 50% of current use by the year 2003.

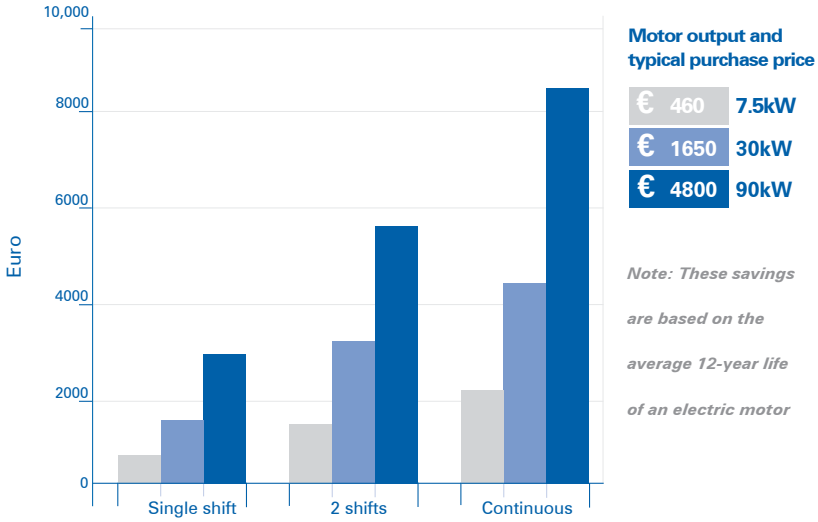
Monitoring systems are being installed by CEMEP and the Commission to measure the effectiveness of this campaign, which is so important to the environment.

"Electric motors account for nearly two-thirds of industrial electricity consumption. Users can cut energy bills and help the environment for little or no additional cost by being careful to specify higher efficiency motors.

"The European scheme for efficiency labelling of industrial motors provides a simple means for users to specify and select higher efficiency electric motors."

Dr H Falkner - ETSU

Motor life savings with EFFI



Note: These savings are based on the average 12-year life of an electric motor

Application of the EFF banding

The efficiency of electric motors

Electric motors have the job of converting electrical energy directly into rotating mechanical power, at the point where it is required.

Generally they do this very efficiently, but, since almost two thirds of industry's electricity consumption is accounted for by motors, even the smallest improvement in motor efficiency
(= reduction in losses), can significantly reduce the energy consumed – globally or in a single installation.

It is a characteristic of the high efficiencies motors inherently have, that small increases in the efficiency value mean that high percentages of energy are being saved.

For a large motor – for example 90 kW – a 1% improvement in efficiency means that a 20% reduction in losses has been achieved.

The smaller motors generally have efficiency values more than 10% lower than those at the top of the range, and the loss reductions required to acheive **EFF1** levels can be up to 40%!

The use of electric motors

The duty, the load and the running time of a motor are important factors in assessing the value of its efficiency. If a motor operates continuously at full load, it is likely to use its own purchase cost in electricity charges, within approximately one month of installation.

The initial cost is therefore quite a minor factor in the overall lifetime cost. In view of the significance of electricity costs, any motor use greater than 50% would certainly justify the installation of **EFF1** motors, or those at the higher end of the **EFF2** band.

The average energy saving achieved from one side of this band to the other is in excess of 25%.

It is likely that, only in the area of occasional use, it is appropriate to install **EFF3** motors.

Other issues

In selecting electric motors for use on original equipment, or for direct installation in a handling or processing plant, the following points are worth consideration:

- high efficiency motors run cooler and will last longer
- energy costs will increase over and above inflation, due to government actions such as the climate change levy.
- the availability of **EFF3** motors will dramatically reduce over the next few years, and therefore it could make sense to move to higher efficiency band motors in any new installation

The award-winning

Selected as a millennium product – recognising the creativity and innovation of the 'W' motor range

CSA Energy Efficiency verification mark

The highest standard motor efficiencies in Europe!!

plus the following features as standard:

- high efficiency
- high reliability
- long insulation life
- low noise levels
- cool running
- Eurovoltage: 400 V ±10%
- dual frequency: 50 Hz and 60 Hz
- high power factors
- high torque with smooth acceleration and low current
- ease of maintenance
- IP55 protection
- IEC, NEMA & Japanese standards
- 4-position cable entry

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