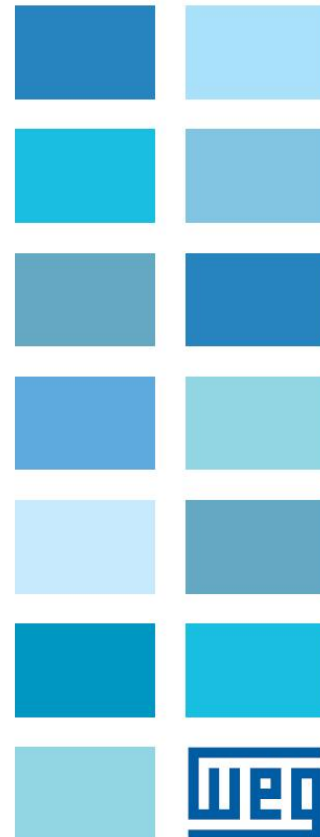
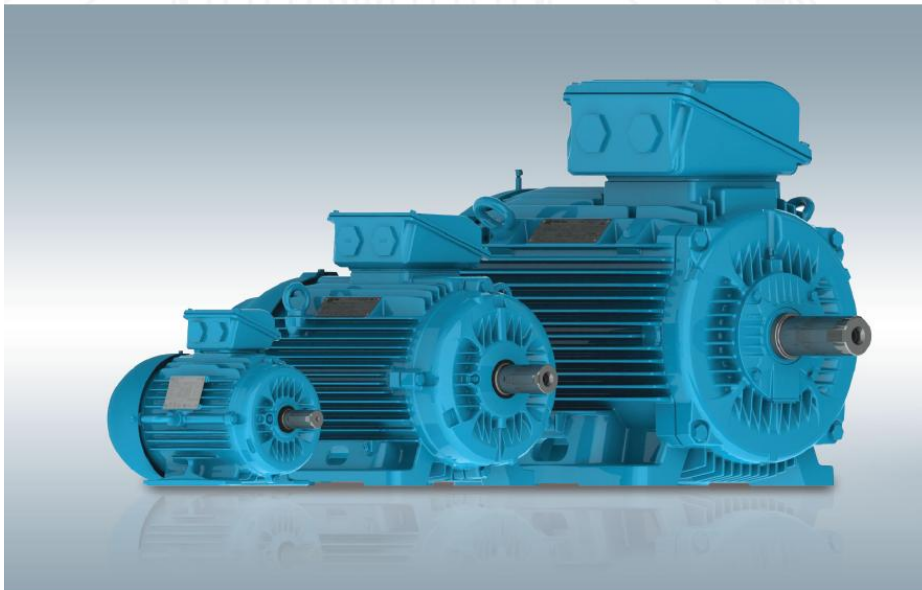


**W22**

Three-Phase Electric Motor

Technical Catalogue  
European Market





### W22 Line - High Efficiency Motors

The increasing demand for electrical energy to sustain global development requires consistent heavy investments in power supply generation. However, in addition to complex medium and long term planning, these investments rely on natural resources, which are becoming depleted due to constant pressures upon the environment. The best strategy, therefore, to maintain energy supply in the short term is to avoid wastage and increase energy efficiency. Electric motors play a major role in this strategy; since around 40% of global energy demand is estimated to be related to electric motor applications. Consequently, any initiatives to increase energy efficiency, by using high efficiency electric motors and frequency inverters, are to be welcomed, as they can make a real contribution to reductions in global energy demand.

At the same time as efficiency initiatives make an impact in traditional market sectors, the application of new technologies in emerging sectors is resulting in profound changes in the way that electric motors are applied and controlled. By integrating these changes

together with the demands for increased energy efficiency, WEG has taken up the challenge and produced a new design of high efficiency motor; one that exceeds the performance of WEG's existing W21 motor line, which is recognised worldwide for its quality, reliability and efficiency.

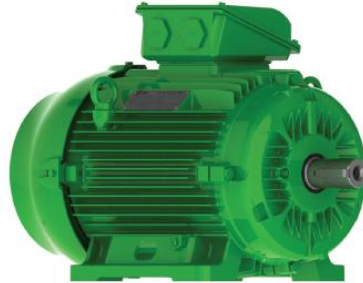
Using the latest generation of computerised tools, such as structural analysis software (finite element analysis) and computer fluid dynamics, as well as electrical design optimisation software, an innovative - next generation - product has been developed: the W22 motor.

Several key objectives have been achieved in the design of the W22 motor:

- Reduction of noise and vibration levels
- Increased energy efficiency and reduced thermal footprint
- Easy maintenance
- Compatibility with present & future generations of frequency inverters
- Flexible and modular design



Frame 63 to 132



Frame 160 to 200



Frame 225 to 355

### Sustainability and Carbon Emission Reduction Through Super Premium Efficiency Motors

The Super Premium Efficiency (IE4) level established in IEC 60034-30-1: 2014 is considered the highest efficiency class which a squirrel cage induction motor can achieve whilst remaining economically viable.

It is also the optimum solution to increase the efficiency of an existing application through direct replacement.

So, why have Super Premium Efficiency motors not become the Industry standard?

It may be argued that super premium efficiency motors are also super premium in price when comparing against standard efficiency (IE1), high efficiency (IE2) and premium efficiency (IE3) motors.

Whilst this is not strictly untrue, it should be appreciated when considering their lifetime that the cost of acquisition of an induction motor typically represents only 2% of the total cost of ownership. In contrast, the associated energy savings

provided by Super Premium and Premium efficiency motors far outweigh this additional investment in purchase price.

The reduction in CO<sub>2</sub> emissions is one of the direct consequences, and therefore benefits, of increasing efficiency in industry. Using IE4 rated motors today will show that a company is serious about saving energy, carbon reduction and saving money.

Go to our website at [www.weg.net](http://www.weg.net) to check the potential reduction in CO<sub>2</sub> emissions and the return on investment of W22 Premium Efficiency motors.

The W22 Super Premium Efficiency line from WEG is the most complete range of IE4 motors available to Industry today, designed to offer not only a significant reduction in energy consumption, but improved noise and vibration levels, higher reliability, easier maintenance and lower overall total cost of ownership.

...we call it **WEGnology**

## Minimum Energy Performance Standards - Europe

Increasingly, the World seeks a path of sustainability and new ways to reduce energy consumption.

A significant percentage of the electrical energy utilized in facilities around the World is consumed by electric motors. Consequently, Governments around the World are implementing Energy Efficiency Programs in order to enforce the use of high efficiency motors.

Up until 2009, Europe did not have any specific regulations relating to the energy efficiency levels of electric motors. There existed only a voluntary agreement between Manufacturers from 1998 that determined the efficiency bands EFF1, EFF2 and EFF3.

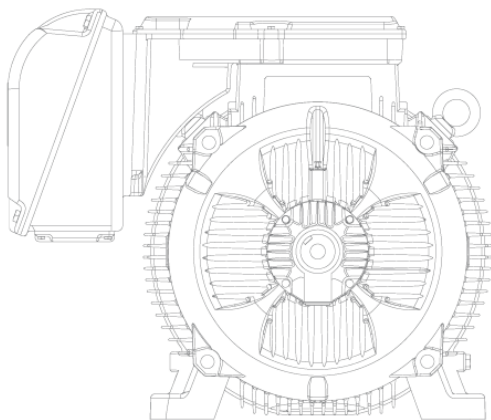
However, in July 2009 Commission Regulation 640/2009 (implementing EuP Directive 2005/32/EC of July 2005) was adopted, which determined the ecodesign requirements relating to the scope, implementation dates and efficiency levels for electric motors and their use with variable speed drives.

Also referred to as EU MEPS (European Minimum Energy Performance Standards), the efficiency levels for electric motors are determined in two IEC standards: IEC/EN 60034-30-1, which details the efficiency classes in the form of 'IE' codes, and IEC/EN 60034-2-1 which defines the methods to be used to measure the efficiency.

The EU Regulation is mandatory within the European Economic Area, EEA (EU countries plus Norway, Iceland and Liechtenstein), from 16th of June 2011.

EU MEPS does not apply outside Europe. Manufacturers can continue to supply IE1 non-CE marked motors to customers located in Europe for further shipment to non-European markets.

A new version of the EuP Directive (2009/125/EC) became effective on 21st October 2009 to expand the ecodesign requirements for Energy Related Products, whilst January 2014 saw the adoption of the Commission Regulation 4/2014 (amending the scope of 640/2009) which came into force with effect from 27th July 2014.



## Scope

The scope of the EuP motor regulation (which is more limited than that of the IEC 60034-30-1 standard), covers single speed, three-phase squirrel-cage induction motors for 50Hz or 50/60Hz operation which:

- Have 2, 4, or 6 poles
- Have a rated voltage ( $U_N$ ) up to 1000 V
- Have a rated output ( $P_N$ ) between 0.75kW and 375 kW
- Are rated for continuous duty operation (S1)
- Are intended for use at altitudes up to 4,000 metres above sea level or at ambient air temperatures between  $-30^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$ .

However, the Regulation does not apply to:

- a) Motors designed to operate wholly immersed in liquid
- b) Motors completely integrated into a product where its energy efficiency cannot be measured independently
- c) Motors designed to operate exclusively:
  - at altitudes greater than 4,000 metres above sea level
  - in ambient air temperatures exceeding  $60^{\circ}\text{C}$
  - in maximum operating temperature above  $400^{\circ}\text{C}$
  - where ambient air temperatures are below  $-30^{\circ}\text{C}$  (or  $0^{\circ}\text{C}$  for water cooled motors)
  - where water coolant temperatures are below  $0^{\circ}\text{C}$  or above  $32^{\circ}\text{C}$  at the inlet to the product
  - in potentially explosive atmospheres defined in the Directive 94/9/EC
- d) Brake motors

## Effective Dates

The implementation dates of the Regulation are as follows:

- Stage 1 - From 16 June 2011, motors shall not be less efficient than the IE2 efficiency level;
- Stage 2 - From 1 January 2015 motors with a rated output of 7.5-375 kW shall not be less efficient than the IE3 efficiency level (defined in Table 1) OR meet the IE2 efficiency level and operated / equipped with a variable speed drive;
- Stage 3 - From 1 January 2017 all motors with a rated output of 0.75-375 kW shall not be less efficient than the IE3 efficiency level OR meet the IE2 efficiency level and operated / equipped with a variable speed drive.

## Equipment Marking

Those IE2 motors which are required to be operate with a variable speed drive, must bear a sticker / label to ensure that the End User is made aware of the compulsory need to equip the motor with a VSD.

IE2 motors from WEG (7.5-375kw) per Stage 2 of the Regulation are provided with a sticker as follows:

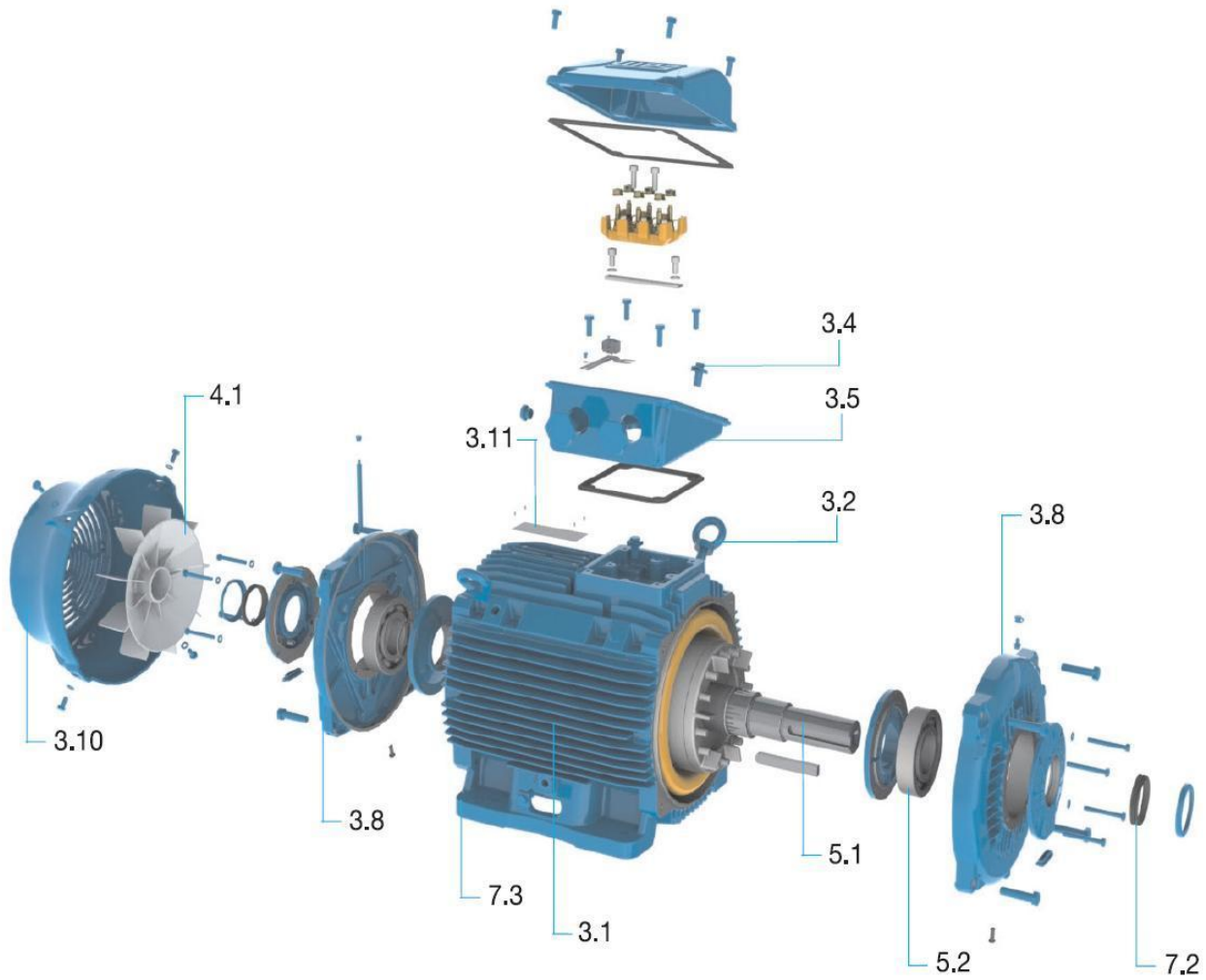


Output	IE1 - Standard Efficiency				IE2 - High Efficiency				IE3 - Premium Efficiency				IE4 - Super Premium Efficiency			
	Poles				Poles				Poles				Poles			
kW	2	4	6	8	2	4	6	8	2	4	6	8	2	4	6	8
0.12	45.0	50.0	38.3	31.0	53.6	59.1	50.6	39.8	60.8	64.8	57.7	50.7	66.5	69.8	64.9	62.3
0.18	52.8	57.0	45.5	38.0	60.4	64.7	56.6	45.9	65.9	69.9	63.9	58.7	70.8	74.7	70.1	67.2
0.20	54.6	58.5	47.6	39.7	61.9	65.9	58.8	47.4	67.2	71.1	65.4	60.6	71.9	75.5	71.4	68.4
0.25	58.2	61.5	52.1	43.4	64.8	68.5	61.6	50.6	69.7	73.5	68.6	64.1	74.3	77.9	74.1	70.8
0.37	63.9	66.0	59.7	49.7	69.5	72.7	67.6	56.1	73.8	77.3	73.5	69.3	78.1	81.1	78.0	74.3
0.40	64.9	66.8	61.1	50.9	70.4	73.5	68.8	57.2	74.6	78.0	74.4	70.1	78.9	81.7	78.7	74.9
0.55	69.0	70.0	65.8	56.1	74.1	77.1	73.1	61.7	77.8	80.8	77.2	73.0	81.5	83.9	80.9	77.0
0.75	72.1	72.1	70.0	61.2	77.4	79.6	75.9	66.2	80.7	82.5	78.9	75.0	83.5	85.7	82.7	78.4
1.1	75.0	75.0	72.9	66.5	79.6	81.4	78.1	70.8	82.7	84.1	81.0	77.7	85.2	87.2	84.5	80.8
1.5	77.2	77.2	75.2	70.2	81.3	82.8	79.8	74.1	84.2	85.3	82.5	79.7	86.5	88.2	85.9	82.6
2.2	79.7	79.7	77.7	74.2	83.2	84.3	81.8	77.6	85.9	86.7	84.3	81.9	88.0	89.5	87.4	84.5
3	81.5	81.5	79.7	77.0	84.6	85.5	83.3	80.0	87.1	87.7	85.6	83.5	89.1	90.4	88.6	85.9
4	83.1	83.1	81.4	79.2	85.8	86.6	84.6	81.9	88.1	88.6	86.8	84.8	90.0	91.1	89.5	87.1
5.5	84.7	84.7	83.1	81.4	87.0	87.7	86.0	83.8	89.2	89.6	88.0	86.2	90.9	91.9	90.5	88.3
7.5	86.0	86.0	84.7	83.1	88.1	88.7	87.2	85.3	90.1	90.4	89.1	87.3	91.7	92.6	91.3	89.3
11	87.6	87.6	86.4	85.0	89.4	89.8	88.7	86.9	91.2	91.4	90.3	88.6	92.6	93.3	92.3	90.4
15	88.7	88.7	87.7	86.2	90.3	90.6	89.7	88.0	91.9	92.1	91.2	89.6	93.3	93.9	92.9	91.2
18.5	89.3	89.3	88.6	86.9	90.9	91.2	90.4	88.6	92.4	92.6	91.7	90.1	93.7	94.2	93.4	91.7
22	89.9	89.9	89.2	87.4	91.3	91.6	90.9	89.1	92.7	93.0	92.2	90.6	94.0	94.5	93.7	92.1
30	90.7	90.7	90.2	88.3	92.0	92.3	91.7	89.8	93.3	93.6	92.9	91.3	94.5	94.9	94.2	92.7
37	91.2	91.2	90.8	88.8	92.5	92.7	92.2	90.3	93.7	93.9	93.3	91.8	94.8	95.2	94.5	93.1
45	91.7	91.7	91.4	89.2	92.9	93.1	92.7	90.7	94.0	94.2	93.7	92.2	95.0	95.4	94.8	93.4
55	92.1	92.1	91.9	89.7	93.2	93.5	93.1	91.0	94.3	94.6	94.1	92.5	95.3	95.7	95.1	93.7
75	92.7	92.7	92.6	90.7	93.8	94.0	93.7	91.6	94.7	95.0	94.6	93.1	95.6	96.0	95.4	94.2
90	93.0	93.0	92.9	91.1	94.1	94.2	94.0	91.9	95.0	95.2	94.9	93.4	95.8	96.1	95.6	94.4
110	93.3	93.3	93.3	91.5	94.3	94.5	94.3	92.3	95.2	95.4	95.1	93.7	96.0	96.3	95.8	94.7
132	93.5	93.5	93.5	91.9	94.6	94.7	94.6	92.6	95.4	95.6	95.4	94.0	96.2	96.4	96.0	94.9
160	93.8	93.8	93.8	92.5	94.8	94.9	94.8	93.0	95.6	95.8	95.6	94.3	96.3	96.6	96.2	95.1
200	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.3	95.4
250	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.5	95.4
315 up to 1000	94.0	94.0	94.0	92.5	95.0	95.1	95.0	93.5	95.8	96.0	95.8	94.6	96.5	96.7	96.6	95.4

Table 1 - Minimum efficiency levels (according to IEC 60034-30-1 : 2014).

WEG can support the movement towards these high efficiency levels by offering a comprehensive range of products meeting the IE1, IE2, IE3 and even IE4 criteria detailed above. Additionally our variable speed drives are perfectly matched to our motors, affording you the most reliable package of motor / drive products in industry. To learn more about WEG, our products and the new Global Directives, go to [www.weg.net](http://www.weg.net) or [www.weg.net/green](http://www.weg.net/green)

# Visual Index



3.1	Frame
3.2	Eyebolts
3.4	Earth terminals
3.5	Terminal box
3.8	Endshields
3.10	Fan cover
3.11	Nameplate
4.1	Cooling system
5.1	Shaft
5.2	Bearings
7.2	Sealing system
7.3	Painting

Table 2 - Visual Index