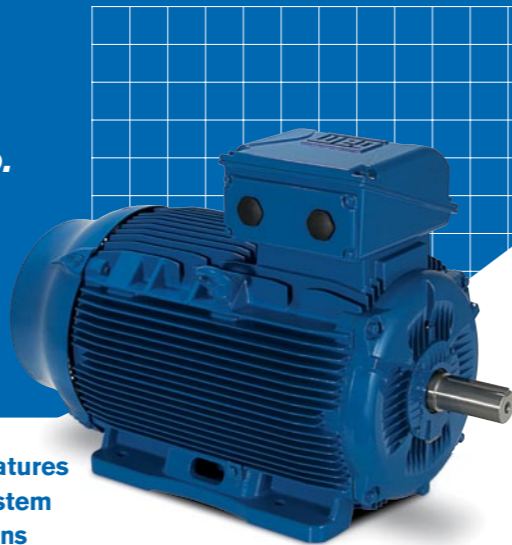


Reducing carbon footprint and cutting costs with the W22

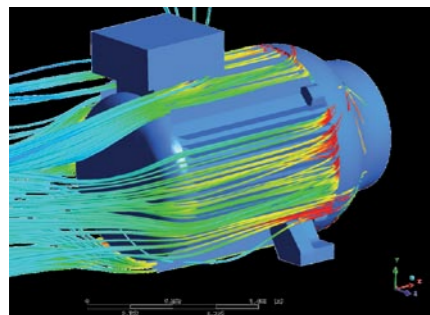


Learn how WEG's new W22 range of electric motors exceed the latest energy efficiency standards and offer cost-saving benefits, too.

Today, electric motors account for as much as 66% of industry's energy usage. Yet a huge amount of this energy is wasted, as organisations use solutions which are poorly designed, or inappropriate for their application. By reducing this wastage, companies not only help the environment, but cut their costs and improve profitability, too.



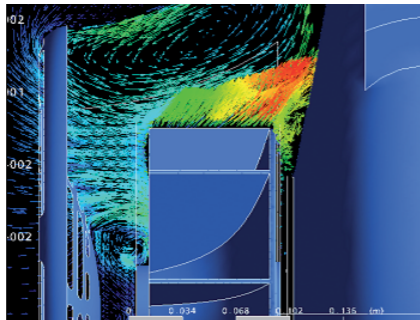
1. Maximum heat dissipation through extended frame area



The W22 frame concept takes heat dissipation very seriously with eyebolts positioned in such a way that they do not block any airflow path through the fins and also through the position of the terminal box which is placed towards the front part of the frame. The quantity and distribution of fins also has a great impact on heat dissipation performance.

Efficiency and Reliability Tip: Respect the minimum gap between any wall positioned at the back of the fan cover to allow enough air intake. Keep motor surroundings clean and periodically check for any blockage of air that can reduce the cooling system performance. Remember that a cooler motor means a motor that lasts longer.

2. Reduced operating temperatures through optimized cooling system (fan, fan cover and frame) designs



The cooling system of the W22 range is optimised providing outstanding heat dissipation. This allows for reduced operating temperatures that do not push the insulation material to its limits and eliminate any hot-spots.

Efficiency and Reliability Tip: Motors driven by VSD will have higher temperature rise due to the PWM wave form imposed to the motor winding. Whilst Variable Speed Drive operation allows for significant increase of any process performance in terms of efficiency and operation costs, the higher temperature rise combined with the voltage spikes from the switching frequency will contribute to shorten winding life time. The insulating materials of W22 allow for VSD operation minimising impacts in the winding.

3. Electrically insulated bearing hub: it does not require replacement compared to insulated bearings (which are very expensive too)

To avoid bearing circulating currents it is generally accepted to isolate the machine bearing and to short-circuit the shaft and frame in the other bearing side. Usually an insulated bearing and a grounding brush are used to this function. But insulated bearings are expensive and are prone to wear out which means replacement.

W22 motors can be fitted with a non drive end endshield where the hub is insulated. This component does not wear and guarantees longer operating hours.

Efficiency and Reliability Tip: Although available from 225S/M upwards, WEG recommends electrically insulated bearings from frame size 315 inclusive and up. Always follow WEG VSD guidelines for a safe and long operation. Go to www.weg.net and download our Technical Guide – Induction motors fed by PWM frequency converters for further information.

4. Extended lubrication intervals – less intervention leads to less maintenance costs

In the W22 design extended lubrication intervals were reached mainly due to the reduced bearing temperature rise. The lubrication intervals are up to 26% higher compared to the W21 design, which means less intervention for lubrication, lowering the total cost of ownership.

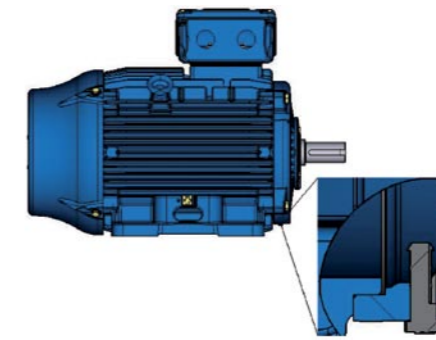
Efficiency and Reliability Tip: Always respect nameplate information when lubricating the motor. Do not mix grease types, even if they use the same elements. If another grease will be used in the application, contact WEG about recommended lubrication.

5. Efficient lubrication system – grease inlet and outlet channels developed for improved grease guiding to and from the bearing to the outside of the motor.

In the W22 design the lubrication system received special attention in terms of both grease paths in the endshield to the bearing, from the bearing to the outside of the motor and also the bearing caps design.

Efficiency and Reliability Tip: As an optional feature, a grease outlet pipe can be supplied to be fitted in the non drive end endshield. This pipe guides the grease out of the fan cover and is recommended to keep the fan cover interior clean.

6. New drain plug: from an IP55 drain to an IP66 by changing drain position



The W22 line motors are supplied with drain holes for draining the condensed water from inside the motor. The position of these drain holes ensure efficient condensed water draining from the motor enclosure. The drain holes are fitted with new rubber plugs that allow continuous condensed water draining from inside the motor (drain plug at open position IP55) and depending on the motor application, the drain plug can be closed to ensure the degree of protection IP66 to the drain region (other parts of the motor will require different features to guarantee this degree of protection).

Efficiency and Reliability Tip: Include in your checklist opening the drain plug during periodic maintenance to drain condensed water from inside the motor.

7. WISE insulation system: better materials for VFD capabilities

W22 motors are fitted with WISE insulation (WEG Insulation System Evolution) that allows them to operate driven by VFD. WISE is a system composed by: wire of class H (200°C), enhanced insulation materials and the solvent free resin.

Efficiency and Reliability Tip: Motors can operate driven by VFD without filters if the following conditions are respected:

Motor Rated Voltage	Voltage peak on motor terminals (phase to phase)	dV/dt on motor terminals (phase to phase)	Rise time	Time between pulses
$V_n \leq 460 \text{ V}$	$\leq 1430 \text{ V}$	$\leq 5200 \text{ V}/\mu\text{s}$		
$460 \text{ V} < V_n \leq 575 \text{ V}$	$\leq 1780 \text{ V}$	$\leq 6500 \text{ V}/\mu\text{s}$	$\leq 0,1 \mu\text{s}$	$\geq 6 \mu\text{s}$
$575 \text{ V} < V_n \leq 690 \text{ V}$	$\leq 2140 \text{ V}$	$\leq 7800 \text{ V}/\mu\text{s}$		

For the three cases above the maximum recommended switching frequency is limited to 5kHz. If one of the above conditions is not followed accordingly (including the switching frequency), a filter must be installed on VFD outlet.



Problem
Khazakstan Automotive Company use a blow moulding machine to produce plastic petrol tanks. The extruder section of the machine was powered by a DC motor and DC drive. Same old problems - reliability issues caused by lack of maintenance and obsolete parts.

Solution
Our solution was to replace the DC equipment with a WEG W21 EFF1 motor, complete with force vent fan & encoder (inverter duty motor), and control it with the WEG CFW09 Vectrue inverter, running in Closed Loop Vector mode - providing full torque from zero speed - essential for when the extruder is not up to full temperature!

The high efficiency AC motor package reduced energy consumption by 9.3% resulting in a cost saving £16,915

Total cost savings per annum
£16,915

