FOR IMMEDIATE RELEASE

FOCUS ON ENERGY EFFICIENCY IN NEW MOTORS

With the growing demand for energy in a burgeoning global population, it may not be possible to keep up with demand. "However, an alternative is to decrease the actual energy required in specific industrial and mining applications, by increasing the energy efficiency of electric motors," Chris Chryssoulis, of Zest Electric Motors, the local WEG agent, says.

It is estimated that approximately 40% of the global energy consumption is related to the use of electric motors. Thus the initiative to increase the efficiency of electric drives by using high efficiency electric motors and frequency inverters for variable speed applications, is significant when their participation in the global energy consumption is considered.

"On the other hand, the application of new technologies has become more frequent in the different sectors of the industry, resulting in profound changes to how electric motors are applied and controlled," Chryssoulis says.

With the increasing pressure on manufacturers to further advance energy efficient products, WEG developed a new industrial motor line with the challenge of exceeding the well established and reliable W21 motor range.

Using latest generation computational tools such as structural (finite element method) and fluid flow analysis as well as electric design optimisation software, the WEG W22 product line was conceived.

A number of premises were adopted in the design of the WEG W22 motors, including a reduction in noise and vibration levels as well as an increase in energy and thermal efficiency and an increase in variable speed applications by using frequency inverters.

Because a chain is only as strong as its weakest link, close attention was paid not only to the internal efficiencies of the working motor, but also to the elements constituting the external components of the designed motor.

Focus on the frame/housing

The frame is a fundamental component in the design because, besides constituting the mechanical structure reference, it is the main conduit responsible for the heat dissipation generated inside the electric motor.

"In addition, the frame and the endshields ensure the enclosure of the electric components, protecting them against the environment where the motor is installed," Chryssoulis says. "The frame design must always ensure high thermal exchange and high reliability where mechanical strength and resistance are required." The terminal box has also been moved to the front

of the frame to increase the heat dissipation area and provide a uniform air flow over the motor frame.

Reliability of the frame was also deemed important so careful consideration of construction materials led to the selection of FC-200 cast iron which is produced in WEG's own facilities. Interestingly, this is the same material that is used in the company's explosion-proof motors.

Fan and fan cover

The main function of the fan, when assembled directly on the motor shaft, is to promote the air flow over the frame fins, thus dissipating the heat generated inside the motor.

The function of the fan cover is to protect the fan against external agents and to ensure continuous air flow over the motor fins regardless of the environmental conditions within which the motor is operating. As a natural consequence, when the cooling system is operating to promote heat dissipation, it generates noise and mechanical losses which can be caused by a combination of the friction of the fan blades through the air and ineffectual design of the fan cover's shape.

WEG's design on the cooling system on these new motors was conceived using the most advanced simulation software and fluid flow analysis software,

resulting in an innovative aerodynamic profile with reductions in both mechanical losses and noise.

Terminal box

Because the terminal box is the point of contact between the user and the motor, WEG first carried out a field survey amongst installation and maintenance experts to determine optimal design performance. This research resulted in a new terminal box concept that prioritises the interface with the user, providing easier access and handling of the power and accessory cables and ensuring more reliability and versatility in the motor installation.

The new terminal box allows improved cable housing, ensuring larger contact areas between the cables and the motor terminals and allowing correct tightening torque. The diagonal cut design of the terminal box base and the terminal box cover enables easier access to the electrical connection and gives a better view of the interior of the terminal box during installation procedures.

Using the same WEG exclusive BMC (polyester with 20% fibreglass) die-cast terminal blocks that are used for the terminal blocks of hazardous area motors ensures high electrical insulation resistance and durability. In addition, the accessory cable connections are made with quick coupling connectors.

"With a focus on designing for efficiency, coupled with the ability to understand and implement market needs, WEG W22 motors are a long-term solution to the ongoing need for energy usage reductions," Chryssoulis concludes.

CAPTION FOR WEG 01: The new WEG W22 electric motor introduced by Zest Electric Motors.

CAPTION FOR WEG 02: The drive endshield.

CAPTION FOR WEG 03: The non drive endshield.

CAPTION FOR WEG 04: The new endshield design has optimised bearing location with a greater heat dissipation area.

CAPTION FOR WEG 05 & 06: The aerodynamic cowl and fan.

CAPTION FOR WEG 07 & 08: The terminal box with a diagonal cut.

CAPTION FOR WEG 09 & 10: A solid foot has been integrated into the frame.

CAPTION FOR WEG 11: The WEG W22 provides for both top mounted and side mounted terminal box positions without disassembly.

ENDS … SEPTEMBER 2009