Press Release

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Reality-based efficiency measurements for electric motors according to IEC/EN/UL 60034

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New motor test bench from TÜV SÜD

Frankfurt am Main. TÜV SÜD has commissioned a new, state-of-the-art motor test bench at its Frankfurt am Main site. The test bench enables precise energy efficiency measurements of electric motors and complete drive systems under real operating conditions. Tests can be carried out in accordance with the IEC, EN and UL 60034 standards, which provide an important basis for reliable efficiency data, product development and international market approval.

Electric motors are among the largest industrial energy consumers worldwide. It is estimated that electrically powered systems account for around 45 percent of global electricity consumption. Consequently, their potential for energy savings, CO_2 reduction and achieving national and international climate targets is correspondingly high. Against this backdrop, regulatory requirements for the efficiency of electric drives are continuously increasing.

Measuring efficiency as it occurs in operation

In practice, however, efficiency values often differ significantly from idealised laboratory data. Factors such as temperature rise, harmonics, inverter losses, dynamic load profiles and non-linear consumers significantly impact on the actual performance of a motor. TÜV SÜD's new motor test bench replicates these real-world operating conditions specifically, delivering reliable, reproducible measurement results.

“Efficiency is not just a data sheet value. It only arises from the interaction of the motor, converter and control system under real operating conditions,” says Hendrik Elze, Head of Department Industrial Electronics at TÜV SÜD. “It is precisely this system behaviour that we can measure with our new test bench.”

Regulatory pressure and rising efficiency classes

In Europe, North America and many Asian markets, the minimum requirements for the energy efficiency of electric motors and drive systems are gradually being tightened. In the EU, the Ecodesign Directive stipulates binding efficiency classes, while international standards such as

IEC, EN and UL 60034 define the technical framework for efficiency measurement and comparability.

For manufacturers, this means that efficiency data must not only be ambitious, but above all robust, comparable and auditable, particularly when transitioning from IE4 to IE5 requirements or when evaluating complete motor-converter systems.

Standard-compliant, accredited testing for global markets



The test bench is designed for efficiency measurements in accordance with IEC/EN/UL 60034-2-1. It supports defined load points, high-precision torque and power measurement technology, and transparent uncertainty analysis. Tests are carried out independently and in accordance with recognised, accredited procedures. The result is comparable efficiency data that can be used worldwide for development, certification and tenders.

The test bench covers a wide range of industrially relevant motors. 2-, 4-, 6- and 8-pole motors operating at 50 and 60 Hz can be tested. Depending on the number of poles and frequency, realistic power measurements can be taken in the range of around 3 kW to 80 kW. The site thus addresses typical applications in mechanical engineering, conveyor technology, pump and fan drives, and industrial infrastructure in particular.

By covering both 50 Hz and 60 Hz applications, the Frankfurt site specifically supports manufacturers with international target markets, such as Europe, North America and Asia, and enables efficiency verification under the respective standard market grid conditions.

On the other hand, non-accredited measurements or measurements taken under non-comparable conditions, on the other hand, can lead to delays in certification, repeat tests or even exclusion from tenders. Accredited test reports from TÜV SÜD minimise these risks and facilitate cross-market planning.

Added value beyond certification

In addition to formal conformity assessment, TÜV SÜD supports manufacturers in the early stages of development. System-level tests provide valuable insights into energy and CO_2 optimisation, reducing the total cost of ownership and facilitating life-cycle-based engineering decisions. This allows efficiency potential to be identified before design changes become expensive or time-critical. Against the backdrop of rising energy prices and growing sustainability requirements, reliable efficiency data is becoming increasingly important for investment decisions, subsidy programmes and sustainability reports.

Part of an international testing infrastructure

The new motor test bench in Frankfurt am Main complements TÜV SÜD's global testing and certification network for motors, drives and converters. Companies can therefore benefit from locally available testing capacities combined with internationally recognised reporting, which is a decisive advantage for manufacturers operating globally.

Further information:

- Inverter, drive, and motor testing services

Note for editorial staff: The press release and the photo are available on the Internet at: tuvsud.com/newsroom.

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