Press Release

Pole-Position:

Racing cars with VACUUUMSCHMELZE technology assert themselves

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Stator and laminations © VACUUMSCHMELZE GmbH & Co. KG

Hanau – Black and white chequered flag for VACUUMSCHMELZE (VAC): From energy recovery to complete electric drives, versatile electric motors are decisive for victory or defeat in state-of- the-art racing. High-quality magnetic materials are required for the highest possible power density and efficiency. As VAC's core competence, they are its proverbial profitable contribution to Formula 1, Formula E, the WEC (World Endurance Championship) to which the Le Mans racing series belongs, or the Formula Student Electric. VACSTACK® technology puts the company on a broad base. The use of these systems has already enabled several speed world records and world championship wins in various racing categories.

The patented production process is the key to VAC's long-standing cooperation with motorsport. The VACSTACK process enables the use of very thin strip material (down to 50 µm) in lamination stacks. Individual sheets are bonded to the height of the finished core. Then the final shape is produced using wire-cutting technology. Despite thin sheet metal thicknesses, VAC achieves typical packing densities of 98 % and at the same time excellent insulation between the lamination layers. The very thin laminations help to prevent eddy current losses extremely efficiently.

In Formula 1, for example, VACSTACK finds use in the ERS (Energy Recovery System). The energy recovery consists of two systems: MGU-K (motor-generator-unit-kinetic) and MGU-H (motor-generator-unit-heat). The first recovers energy kinetically, while the MGU-H generates energy from the exhaust gas stream using a generator. Although the electric motor-generator unit is fixed to a maximum speed of 125,000 rpm, it is not limited in energy consumption. This is an advantage that VAC knows how to use with its lamination packages.

In formula racing and in Formula Student Electric, weight reduction or performance increase of electric motors is even more decisive. The electrical steel sheets normally used for this purpose are noticeably more limited in terms of magnetic saturation, which is decisive for the power density. Accordingly, VAC supplies the racing series with rotor stator systems made of cobalt-iron alloys VACOFLUX® and VACODUR®. While the induction of the standardized electrical steel quality at a field strength of 1,000 A/m is still below 1.5 T, the materials of VAC reach 2.3 T. Thus, either more powerful motors of the same size or smaller motors with the same power can be achieved.

“VAC is the global leading supplier of these high-performance components. With VACSTACK we can therefore meet the special requirements of racing in an optimal way. Since the technology enables maximum performance in the smallest of spaces, it will prevail in all racing series," says Dr. Robert Brand, Product Management and Application Specialist at VAC.

VACUUMSCHMELZE

VACUUMSCHMELZE (VAC), based in Hanau, has 4,300 employees worldwide, 1,450 of whom are in Hanau. The company designs, produces and markets advanced materials, particularly with magnetic, but also with other physical qualities as well as related products. In 1914, the first vacuum furnace laid the foundation for today's VACUUMSCHMELZE. Industrial vacuum melting techniques for alloys have been in operation since 1923.

VAC Group today achieves annual sales of approx. 380 million euros in over 50 countries and is holder of around 800 patents. The company is among the world’s most highly innovative developers of advanced industrial materials.

VAC’s range of products comprises a broad array of advanced semi-finished materials and parts, inductive components for electronics, magnets and magnet systems for use in a wide variety of fields and industries spanning watch-making and medical technology, renewable energies, shipbuilding, installation technology, automotive and aviation. VAC’s custom solutions are developed in close collaboration with the customer, reflecting the company’s expertise in materials, applications and state-of-the-art production technology.

For more information, visit www.vacuumschmelze.com

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