

New alloy to be unveiled in Berlin:

VACUUMSCHMELZE presents ULTRAVAC 44 V6 at 2012 Coil Winding

Press contact:

No.: 10/12

Hanau, 10 May 2012

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Hanau / Frankfurt – At this year's Coil Winding trade show, VACUUMSCHMELZE GmbH & Co. KG (Hanau) will once again take the opportunity to present advanced materials designed to maximise the efficiency of electric motors. The highlight for 2012 at Stand 4413 in Hall 2.2 will be the company's new ULTRAVAC® 44 V6 alloy, with properties that significantly boost performance optimisation in high-efficiency electric motors. The highest-profile application of this at present is the new HB-SIB aircraft from the Solar Impulse project, the motor of which uses ULTRAVAC 44 V6 in its stator and rotor assembly. In addition, the magnetic drive of the motor contains magnetic systems comprising small bonded segments of VACODYM®. This design minimises eddy current losses in the rotor resulting in an exceptional motor efficiency of 98%.

Nickel-iron (NiFe) materials are well-known as alternatives to electrical steel. NiFe has lower saturation induction in comparison to electrical steel which enables the dimensioning of rotor and stator assemblies to be optimised. By adding molybdenum to the alloy, VACUUMSCHMELZE has succeeded in developing a new material which is tailored towards the requirements for high-efficiency electric motors which offers very low iron losses. This new ULTRAVAC 44 V6 alloy will be unveiled to a wider public at the 2012 Coil Winding trade show to be held in Berlin from 26 to 28 June.

At 3.5 A/m, the coercivity of ULTRAVAC 44 V6 is only around one-quarter that of electrical steel, resulting in reduced hysteresis losses. While its saturation magnetisation is lower, at low field strengths its static initial magnetisation curve rises faster than that of electrical steel. Both cases deliver flux density of 1 T at a magnetic field strength of 100 A/m.

Important considerations for high-speed motors and/or motors with high pole numbers are not only hysteresis losses, but also the eddy current losses gener-

ated at high operating frequencies. Whilst eddy current losses can be effectively controlled by reducing lamination thickness, processing these ultra-thin metal sheets is a complex and expensive procedure. The use of ULTRAVAC 44 V6 enables eddy current losses to be significantly reduced due to the extremely high specific electrical resistance of the material – around 50% higher than that of electrical steel at 0.8 $\mu\Omega\text{m}$.

Due to the outstanding properties of the new ULTRAVAC 44 V6 alloy, iron losses at flux density of 1T are also extremely low offering an iron loss reduction of between 70% and 80% compared to NO20 electrical steel for tape thickness of 0.2 mm.

VACUUMSCHMELZE GmbH & Co. KG

VACUUMSCHMELZE (VAC) with 1,500 employees in Hanau, 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 more than 450 million Euros in over 40 countries and is holder of more than 750 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, 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.

Find out more at www.vacuumschmelze.com

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