New Class H High Voltage Insulation – allows a bigger punch from the all new STAMFORD® S9

STAMFORD®|AvK® are pleased to announce the introduction of the new STAMFORD® S-Range high voltage S9 product, incorporating CoreCooling ™ Technology and a true Class H insulation system, rated to 15kV.

The STAMFORD® S9 uses its advanced thermal technology system in combination with CoreCooling™ Technology to provide optimised power density, extended insulation lifetime, enhanced efficiencies and ratings up to 5,000kVA, all of which have been extensively validated and tested, with the added reassurance of a 3 Year Warranty.

Here we highlight the importance of a true class Class H insulation system and the key benefits of the STAMFORD® S9 thermal technology.

What is the importance of Class H?

The rotating electrical machine industry has long considered Class 155 (Class F) insulation materials as the preferred solution for reliable and cost-effective insulation systems. A significant shift was seen in the industry when Class 180 (Class H) insulation material were introduced into low voltage systems and it took a while for product acceptance to filter through into everyday specification and demand. However, high voltage products up to 36kV, can see an even slower response to change.

Moving forward 5 years, Class H is seeing a sharp increase in demand for MV and HV alternators, as specifiers start to understand and trust the competitive advantages of a Class H versus Class F insulation systems. Driven by this growing requirement, the market has seen an adoption of a hybrid Class H insulation system approach with various solutions available in the market. However, this can result in limitations, the most significant one of which results in rating hybridised insulation systems machines typically at Class F operational temperature rises only.

STAMFORD®|AvK® have ensured a robust true Class H system validated to various international standards and comprehensively testing the insulation system, both individually and as a full system.

Why was extensive validation of STAMFORD® S9 insulation system key?

The new STAMFORD® S9 insulation system has been designed and developed in partnership with leading industry supplier, Von Roll, who fully validated the system with extensive material and coil testing within their laboratories. In addition to this, STAMFORD®|AvK® continued validation at sub system and full system levels within their internal test facilities.

-

Figure 1 - HV Class H Development - Main Stator

The drive for insulation systems operational durability and proven life has guided the appropriate level of diligence in ensuring the STAMFORD®|AvK® Class H material components have been tested and validated as a fully integrated system. This is as expected from over 30 years' experience of integrating high voltage systems into rotating electrical machines. STAMFORD®|AvK® branded high voltage alternators have developed a world class reputation in virtually all the world's most arduous environments, whether that is extremes of hot or cold weather temperatures, high altitude, at sea or running in air contaminated challenging conditions.

What does this mean for life expectancy?

When operating at nominal temperature, a Class H system will provide the same life expectancy as a Class F system. Similarly, a Class H system operating at a Class F temperature rise will provide the same life expectancy as a Class F system operating at a Class B temperature rise.

Moving from an insulation system Class F, with a hotspot of 140°C, to a hotspot of 160°C, the S9 ratings were able to be increased by 7% - an improvement with an improvement in design of insulation lifetime of around 20,000 hours.

How does this improve the power to weight ratio?

A 2000kVA alternator with a Class F insulation system, will be designed to operate continuously with a maximum temperature rise of 155°C, according to IEC60034-1:2010. If the same alternator is fitted with a Class H insulation system, the alternator can now operate continuously up to a maximum temperature rise of 180°C. This will result in an increased output power of approximately 9%. This means it is possible to achieve higher outputs for the same active materials resulting in an increased power to weight ratio. For a given output power, comparing Class F to Class H results, enabling the Class H alternator to be physically shorter in length and lighter for the same output kVA ratings.

By developing and using this Class H insulation system, the STAMFORD® S9 has more optimized power density, is physically smaller and lighter than an alternator with an equivalent Class F ratings insulation system. Because of these factors, increased ratings up to 5000kVA have been achieved.

-

Is there added reassurance for all applications?

The STAMFORD®|AvK® design team understands that when customers buy high voltage designed alternators, they demand the very highest reliability and durability. In all high voltage developments, these critical points are in mind, ensuring both new insulation systems and new alternator products are validated and proven, individually and combined, before entering any market.

For added reassurance, the STAMFORD® S9 includes the renowned S-Range 3 Year Warranty as standard, such is the confidence in both this new insulation system and new alternator combined.

More information on the STAMFORD® S9

For further technical information or support, please contact your local representative or visit: www.stamford-avk.com

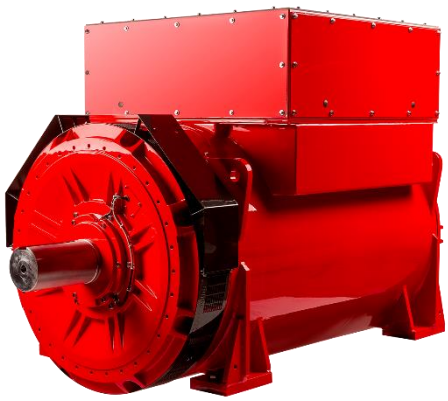

Figure 2 - The S9 HV

-