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Certification of components for wind energy applications using a transformer as an example

Various product certificates have already been issued for most types of wind turbines. They document the conformity of these products with accepted standards, such as the "Guideline for the Certification of Wind Turbines", Edition 2003 with Supplement 2004. Such certificates lead to uniform minimum requirements for turbines, and are therefore required by many turbine customers, financiers and insurance companies.

In most cases, the GL Statements of Compliance for Design Assessments are issued within the scope of certifications for entire turbine types only. These documents then serve as a basis for type certificates and are recognized worldwide. In consequence, component manufacturers of bought-in parts are often not involved directly in the certification of wind turbines, but instead only indirectly through the turbine manufacturer in connection with a certain turbine type. However, it may be useful for component manufacturers to have their components certified directly, i.e. without any assignment to a particular turbine type. If, within the scope of the component certification, the part is intended for a special type of turbine, the component manufacturer is effectively given an "entrance ticket" for becoming a supplier to the manufacturer of that turbine. An assessment by an independent organization, such as GL, has the significant advantage that any weak points in the design can be detected more easily during an examination from a different perspective. GL's viewpoint here is focused on the entire turbine and hence offers specifically for the component manufacturer a certain number of advantages, since he is then a customer and not a contractor as in his relationship to the turbine manufacturer. The "dual control principle" can be maintained consistently throughout the process. This gives the component manufacturer the following benefits:

- Through the certificate, the component manufacturer shows that his product can be used in turbines without any difficulty.
- GL Wind confirms with the certificate that a certification of the entire turbine will be easier if the certified component is used.
- Interfaces for use in turbines are specified in the certificate.
- The GL logo can be used in advertising for the certified product.

On the whole, the component manufacturer gains competitive advantages in the wind energy sector – and the added security of a written confirmation that his product is designed for use in wind turbines.

The certification of a transformer for offshore applications will be presented by way of example.

Special challenges are encountered when using transformers in offshore wind turbines:

- Salt and dirt deposits on the surfaces to be cooled, and thus on the insulation.
- Condensation in combination with salt encrustation, reducing the creepage distances on the insulation.
- Electrical and mechanical stresses when switching on the transformer after it has cooled down appreciably, in conjunction with saline condensate.

In the international standard "Guideline for the Certification of Offshore Wind Turbines", Edition 2005, the corresponding requirements aimed at preventing such problems have already been incorporated. With the aim of verifying the offshore compatibility of the transformer, the customer entrusted GL with component certification. To achieve the corresponding Statement of Compliance, a transformer has to meet the minimum requirements of the above Offshore Guideline. Some of these minimum requirements are described in the following.

The environmental conditions at the place of installation represent a chief hazard for the transformer as an electrical component when used in offshore applications. This is why, during a GL certification, the intended operational climate for the component is specified with great precision, namely by means of a climatogram. An admissible range of values relating to the temperature and the relative as well as absolute air humidity is defined.

Beginning with these site conditions, the necessary climate tests are then defined. Such tests reflect the actual climatic environmental conditions at the place of installation, but with intentional exaggeration, so that the effect of damage becomes evident far sooner in the test than in reality. The transformer in question passed all of these tests.

It is also possible to carry out the certification of other electrical and mechanical components according to the globally recognized Wind Guidelines of GL. Please do not hesitate to contact us for details.

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