

Procurement problems? Not this way - solutions for professionals.

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Component manufacturers often struggle to enter new markets or become part of the supply chain of OEMs. OEMs themselves have difficulties in selecting the right partners for their product development and series production. This paper focusses on the issues and clearly describes solutions to overcome those. It includes insights in daily work as certification body, details of relevant normative requirements and use of component certificates to overcome the problems. The approach lasts from standard development to efficient certification processes, from joint industry projects to lessons learnt seminars, from recently issued certificates to 30 years of experience, from platform improvement to market entries.

The pressure on reduction of cost of energy is high in the renewable energy sector. Focusing on reducing costs increases the risk for safety, quality and reliability. Hence, the independent evaluation of a third party is of an even higher importance to ensure the highest level of safety, quality and reliability.

This paper identifies services for component certification of onshore and offshore wind turbines and serves as a facilitator to identify and apply relevant technical standards, guidance for engineers from concept to serial production and description to meet state-of-the-art requirements for modern wind turbine components, and beyond. It further serves as a common communication platform for describing the scope and extent of activities performed for certification of a component as well as (via the respective service documents) contractual basis therein.

The conceptual and prototype stages of the development process are covered considering technology qualification and risk analysis. The interface to type certification of whole wind turbines and platforms is key. The certification services are adjusted to follow the component development phases from concept to serial production and beyond (see Figure 1). These development phases may be supported by respective certification deliverables.



Figure 1: Certification services aligned with the development process

Component certification as a term covers e.g. major and minor components, systems, single parts or assemblies used in a wind turbine or attached to it. The mandatory certification modules comprise design, manufacturing and testing at different stages of the development process.

The service specification DNVGL-SE-0441 clearly describes solutions in component certification. Together with the respective DNV GL standards and recommended practices as per Table 1 it represents a completely revised and expanded version of the GL-IV-1 “Guideline for the Certification of Wind Turbines”, Edition 2010 and GL-IV-2 “Guideline for the Certification of Offshore Wind Turbines”, Edition 2012; both with a history of 30 years.

<i>Document code</i>	<i>Title</i>
DNVGL-SE-0441	Type and component certification of wind turbines
DNVGL-SE-0190	Project certification of wind power plants
DNVGL-SE-0436	Shop approval in renewable energy
DNVGL-SE-0439	Certification of condition monitoring
DNVGL-SE-0077	Certification of fire protection systems for wind turbines
DNVGL-SE-0124	Certification of grid code compliance
DNVGL-SE-0263	Certification of lifetime extension of wind turbines
DNVGL-SE-0448	Certification of service and maintenance activities in the wind energy industry
DNVGL-ST-0076	Design of electrical installations for wind turbines
DNVGL-ST-0126	Support structures for wind turbines
DNVGL-ST-0361	Machinery for wind turbines
DNVGL-ST-0376	Rotor blades for wind turbines
DNVGL-ST-0437	Loads and site conditions for wind turbines (planned to be published in November 2016)
DNVGL-ST-0438	Control and protection systems for wind turbines
DNVGL-ST-0125	Grid Code Compliance
DNVGL-ST-0262	Lifetime extension of wind turbines
DNV-RP-A203	Technology Qualification
DNVGL-RP-0363	Extreme temperature conditions for wind turbines
DNVGL-RP-0416	Corrosion protection for wind turbines
DNVGL-RP-0440	Electromagnetic compatibility of wind turbines

Table 1: DNV GL service documents (in **bold** those substituting GL-Guidelines)

The latest revision of all DNV GL documents (Table 1 showing those relevant for component and type certification of wind turbines) can be found in the "rules and standards" pages on the DNV GL website <https://www.dnvgl.com/rules-standards/index.html>

The benefits of applying these are:

- independent approval of the wind turbine component to reduce own risk in developing and designing
- building of trust in the design and construction
- reducing costs by early detection of non-conformities
- confidence in technical integrity
- confirmation of requirements as stated by project developers, investors, operators, manufacturers, governmental and non-governmental organisations
- prove by an independent body to meet the national and international acknowledged state-of-the-art and to ease market entry
- utilise statements and certificates for authorisation by governmental institutions
- prove to investors or insurer that third party approval is successfully performed
- securing sustainable energy production throughout life-cycle
- minimising technical risks
- document stepwise the maturity of the component development project
- mitigate risks to environment and people