



TD Engineering

Certification process description

Version 001 - 2016-01-27

Date of First Issue:	2016-01-27	
Report No.:	Certification process description	
Revision No.:	01	
Summary:	<p>This documents describes the certification process of a wind turbine with a swept area < 200m².</p>	
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Date	Revision	Author	Description of change
20160127	01	THDA	Initial revision

1. Type approval - BEK73

1.1 Certification Process

Onshore turbines installed on Danish soil must comply with the Danish executive order no. 73, 31 January 2013 (DEO). The document can be downloaded from www.vindmoellegodkendelse.dk.

The DEO distinguishes between small and large wind turbines. Large turbines have a rotor area $> 200 \text{ m}^2$.

On www.vindmoellegodkendelse.dk, that is administrated by "Energistyrelsens Godkendelsessekretariat for Vindmøller" (DEA) the companies who can certify wind turbines for DK installations are listed. TD Engineering is approved by DEA for certifying small wind turbines (Rotor area $< 200 \text{ m}^2$, Max. AC 1000V, Max. DC 1500 V).

Note that for DK installations other regulations limit the turbine height to a maximum of 25 m from ground level. Due to feed-in tariffs the nominal power cannot exceed 25 kW. As outlined in the table below the certification process deviates depending on the rotor size.

Rotor size	IEC61400-22	IEC61400-1	IEC61400-2	DEO
$> 200 \text{ m}^2$	X	X		X
$< 200 \text{ m}^2$	X		X	X
$< 40 \text{ m}^2$				X
$< 5 \text{ m}^2$				No requirements

For wind turbines with a rotor area $> 40 \text{ m}^2$ the DEO requires certification according to IEC 61400-22. The main difference is that the load and safety approach for small wind turbine will follow the load and safety standard IEC 61400-2 instead of IEC 61400-1. Please note that IEC 61400-2 has a special chapter on duration testing that replaces the IEC61400-22 Type test requirements. In addition to load calculation requirements, the Type Testing represents the main difference between small and large wind turbine type certification for Denmark. The certification process is quite similar.

Approval and installation of a prototype turbine:

A prototype turbine is normally required in order to satisfy the type test/duration test requirements.

The prototype certificate is mainly based on a theoretical documentation of loads and component extreme load capacity. The certification process has focus on personal safety.

The prototype certificate can normally be obtained based on the following documents (see IEC 61400-22 annex A):

- Load calculation report
- Control and safety system description
- Manufacturing drawings (dimensions and materials)
- Components calculation reports (components relevant for load line blade - foundation)

The prototype certificate will state prototype turbine location and configuration. To obtain a Type certificate the technical integrity, structural reliability, functionality and safety of your product must be verified. This is done by considering the modules outlined in Chapter 7 ref IEC 61400-22.

The type test module is for small wind turbine assessment replaced by the "duration test" module as outlined in IEC 61400-2.

Documents normally required but not limited to:

- Load assumptions
- Safety system and manuals
- Rotor blades
- Machinery components
- Tower
- Foundation
- Electrical installations
- Testing (Note special noise requirements for DK see www.vindmoellegodkendelse.dk , BEK 1284)

As part of the testing a turbine inspection and witnessing of safety system and functional test is normally required.

The result of the technical assessments are documented in Certification Reports and a concluding Certificate..