

Technical Guidelines

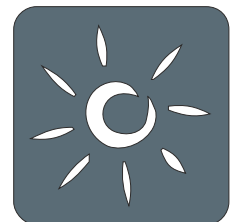
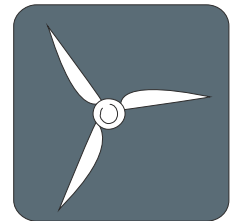
for Power Generating Units

Part 4

**Demands
on Modelling and Validating
Simulation Models
of the Electrical Characteristics
of Power Generating Units and
Systems**

Revision 4

Dated 01.10.2009



**Published by:
FGW e.V. -
Fördergesellschaft Windenergie
und andere Erneuerbare Energien**

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The following parts are available:

Part 1	Determination of Noise Emission Values
Part 2	Determination of Power Curves and Standardised Energy Yields
Part 3	Determination of the Electrical Characteristics of Power Generating Units in the MV, HV and HiV Grid
Part 4	Demands on Modelling and Validating Simulation Models of the Electrical Characteristics of Power Generating Units and Systems
Part 5	Determination and Application of Reference Yield
Part 6	Determination of Wind Potential and Energy Yields
Part 7	Maintenance of Wind Farms
Part 8	Certification of the Electrical Characteristics of Power Generating Units and Systems in the Medium, High and Highest-voltage Grids

Foreword

The FGW's Technical Guidelines serve to aid in presenting measuring and testing methods allowing determination of reliable and comparable data for power generating units (PGUs) and power generating systems (PGS) based on state-of-the-art technology.

This Guideline describes the demands on modelling and validating simulation models of PGUs and PGS for describing the electrical characteristics on the grid.

A description of the methods for validation and modelling of the electrical performance of PGUs and PGS in accordance with this Technical Guideline serves to verify that the simulation models can model the electrical performance of the PGU and PGS with sufficient accuracy in terms of the measurements given in FGW TG3.

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1 General information

1.1 Scope

This Guideline describes the demands on modelling and validating simulation models of the electrical characteristics of power generating units and systems, measured in accordance with FGW TG3 'Determination of the Electrical Characteristics of Power Generating Units in the Medium-, High- and Highest-voltage Grids' and which require certification in accordance with FGW TG8 'Certification of the Electrical Characteristics of Power Generating Units in the Medium-, High- and Highest-voltage Grids' in accordance with the grid connection regulations (e.g. /1/, /2/).

This Guideline is limited to modelling and validating simulation models of power generating units (PGUs).

Modelling and validation of simulation models for power generating systems (PGS) will be included in a subsequent revision of the guideline.

1.2 Normative references

The specifications of the following standards are an integral part of these Guidelines. At the time of publication of these Guidelines the following versions were applicable:

IEC 61400-21 ed. 2	Wind turbine generator systems – Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines
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1.3 Terms/Definitions

The following terms apply when using these Guidelines:

1. **Power curve:** The relationship between primary energy supply and power output identified for each PGU type.
2. **Rated power¹:** A power rating generally allocated by the manufacturer to a component, an installation or a piece of equipment for a defined operating condition /3/.

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¹ Highest continuous electrical power output for which a PGU is designed under normal operating conditions.