IEC 61400-2

Edition 3.0 2013-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Wind turbines –
Part 2: Small wind turbines

Eoliennes –
Partie 2: Petits aérogénérateurs

IEC 61400-2:2013

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Part 2: Small wind turbines

FOREWORD

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International Standard IEC 61400-2 has been prepared by IEC technical committee 88: Wind turbines.

This third edition cancels and replaces the second edition published in 2006.

This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- the title has been modified to better reflect the scope;
- restructured into part I (design evaluation) and part II (type testing) to harmonise use with IEC 61400-22 conformity testing and certification;
- caution provided regarding the use of simplified equations;
- added annex on other wind conditions;
- added annex on tropical storms;
- added annex on extreme environmental conditions;

- added annex on EMC testing;
- added annex on dynamic behaviour;
- duration testing requirements modified;
- added annex on standardised format consumer label;
- many minor changes and all known errata corrected.

The text of this standard is based on the following documents:

FDIS	Report on voting
88/465/FDIS	88/469/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61400 series, published under the general title *Wind turbines*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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WIND TURBINES –

Part 2: Small wind turbines

1 Scope

This part of IEC 61400 deals with safety philosophy, quality assurance, and engineering integrity and specifies requirements for the safety of small wind turbines (SWTs) including design, installation, maintenance and operation under specified external conditions. Its purpose is to provide the appropriate level of protection against damage from hazards from these systems during their planned lifetime.

This standard is concerned with all subsystems of SWTs such as protection mechanisms, internal electrical systems, mechanical systems, support structures, foundations and the electrical interconnection with the load. A small wind turbine system includes the wind turbine itself including support structures, the turbine controller, the charge controller / inverter (if required), wiring and disconnects, the installation and operation manual(s) and other documentation.

While this standard is similar to IEC 61400-1, it does simplify and make significant changes in order to be applicable to small wind turbines. Any of the requirements of this standard may be altered if it can be suitably demonstrated that the safety of the turbine system is not compromised. This provision, however, does not apply to the classification and the associated definitions of external conditions in Clause 6. Compliance with this standard does not relieve any person, organisation, or corporation from the responsibility of observing other applicable regulations.

This standard applies to wind turbines with a rotor swept area smaller than or equal to 200 m^2, generating electricity at a voltage below 1 000 V a.c. or 1 500 V d.c. for both on-grid and off-grid applications.

This standard should be used together with the appropriate IEC and ISO standards (see Clause 2).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038:2009, *IEC standard voltages*

IEC 60204-1:2005, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60364-5-54, *Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors*

IEC 60721-2-1, *Classification of environmental conditions – Part 2-1: Environmental conditions appearing in nature – Temperature and humidity*

IEC 61400-11, *Wind turbines – Part 11: Acoustic noise measurement techniques*

IEC 61400-12-1:2005, *Wind turbines – Part 12-1: Power performance measurements of electricity producing wind turbines*

IEC/TS 61400-13, *Wind turbine generator systems – Part 13: Measurement of mechanical loads*

IEC 61400-14:2005, *Wind turbines – Part 14: Declaration of apparent sound power level and tonality values*

IEC/TS 61400-23:2001, *Wind turbine generator systems – Part 23: Full-scale structural testing of rotor blades*

IEC 61643-11:2011, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power distribution systems – Requirements and test methods*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 2394:1998, *General principles on reliability for structures*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
annual average
mean value of a set of measured data of sufficient size and duration to serve as an estimate of the expected value of the quantity

Note 1 to entry: The averaging time interval shall be an integer number of years to average out non-stationary effects such as seasonality.

3.2
annual average wind speed
$V_{\mathbf{ave}}$
wind speed averaged according to the definition of annual average

3.3
auto-reclosing cycles
event with a time period, varying from approximately 0,01 s to a few seconds, during which a breaker released after a grid fault is automatically reclosed and the line is reconnected to the network

3.4
brake
device capable of reducing the rotor speed or stopping rotation of a wind turbine system

3.5
catastrophic failure
disintegration or collapse of a component or structure, that results in loss of vital function which impairs safety of a wind turbine system

3.6
characteristic value
value (of a material property) having a prescribed probability of not being attained in a hypothetical unlimited test series