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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 17646-2013**

Replacing GB 17646-1998

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**Design requirements for small wind turbine  
(English Translation)**

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## Foreword

This Standard is drafted according to the rules provided in GB/T 1.1-2009.

This Standard replaces GB 17646-1998/IEC 61400-2:1996 Safety of small wind turbine generator systems.

Compared with GB 17646-1998/IEC 61400-2:1996 Safety of small wind turbine generator systems, there are many substantial changes, except for the editorial, in which, the major technical differences are as follows.

- The reduced equations are modified according to the latest testing and research findings;
- Several parameters in the reduced equations shall now be based on the testing results;

- The option of substituting aeroelastic models for reduced equations are added;
- Testing requirements are expanded.

This Standard uses translation method to equivalently adopt the international standard IEC 61400-2:2006 Wind turbines - Part 2: Design requirements for small wind turbines.

The standards in our country which have consistent corresponding relationship with the international documents that are quoted in normative references of this Standard are as follows.

GB/T 156-2007 Standard voltage (IEC 60038:2002, MOD)

GB 755-2008 Rotating electrical machines - Rating and performance (IEC 60034-1:2004, IDT)

GB/T 755.2-2003 Methods for determining losses and efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles) (IEC 60034-2:1972, the 3rd edition, including No.1 modification in 1995 and No.2 modification in 1996, IDT)

GB 1971-2006 Rotating electrical machines - Terminal markings and direction of rotation (IEC 60034-8:2002, IDT)

GB/T 4797.1-2005 Environmental conditions appearing in nature of electric and electronic products Temperature and humidity (IEC 60721-2-1:2002, MOD)

GB/T 4942.1-2006 Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification (IEC 60034-5:2000, IDT)

GB 5226.1-2008 Electrical safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005, IDT)

GB 16895.3-2004 Electrical installations of buildings - Part 5-54. Selection and erection of electrical equipment - Earthing arrangements, protective conductors and protective bonding conductors (IEC 60364-5-54:2002, IDT)

GB 18802.1-2011 Low-voltage surge protective devices - Part 1: Surge protective devices connected to low-voltage power distribution systems - Requirements and tests (IEC 61643-1:2005, MOD)

GB/T 25384-2010 Turbine blade of wind turbine generator systems - Full-scale structural testing of rotor blades (IEC 61400-23:2001, MOD)

GB/Z 25426-2010 Wind turbine generator systems measurement of mechanical loads (IEC 61400-13:2001, MOD)

GB/T 18451.1-2012 Wind turbine generator systems - Design requirements (IEC 61400-1:2005, IDT)

GB/T 18451.2-2012 Power performance measurements of electricity producing wind turbines (IEC 61400-12-1:2005, MOD)

For ease of use, this Standard makes the following editorial changes.

- a) Change "this Part in IEC 61400" to this Standard;
- b) Delete the informative preliminary elements in IEC 61400-2:2005 (including the cover-page and the foreword);
- c) Rename the standard and add the "foreword" of this Standard;
- d) Replace IEC 60038:1983 with the applicable IEC 60038:2002;
- e) Correct some errors in IEC 61400-2:2006.

## 1 Scope

This Standard 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 SWT such as protection mechanisms, internal electrical systems, mechanical systems, support structures, foundations and the electrical interconnection with the load.

While this Standard is similar to IEC 61400-1, it does simplify and make significant changes in order to be applicable to small turbines.

This Standard applies to wind turbines with a rotor swept area smaller than 200 m<sup>2</sup>, generating at a voltage below 1 000 V a.c. or 1 500 V d.c.

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

## 2 Normative references

The articles contained in the following documents have become this document when they are quoted herein. For the dated documents so quoted, all the modifications (Including all corrections) or revisions made thereafter shall be applicable to this document.

GB/T 27025-2008 General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)

IEC 60034-1 Rotating electrical machines - Part 1: Rating and performance

IEC 60034-2 Rotating electrical machines - Part 2: Methods for determining losses and

efficiency of rotating electrical machinery from tests (excluding machines for traction vehicles)

IEC 60034-5 Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

IEC 60034-8 Rotating electrical machines - Part 8: Terminal markings and direction of rotation Bibliography

- 1) IEC WT01:2001, IEC system for conformity testing and certification of wind turbine generator systems - Rules and procedures
- 2) IEC 61400-24:2002, Wind turbine generator systems - Part 24: Lightning protection
- 3) ISO/IEC 17020:1998, General criteria for the operation of various types of bodies performing inspection
- 4) ISO 9001:2000, Quality systems - Model for quality assurance in design, development, production, installation and servicing
- 5) ISO 9002:1994, Quality systems - Model for quality assurance in production, installation and servicing
- 6) ISO 9003:1994, Quality systems - Model for quality assurance in final inspection and test
- 7) ECN-C-96-033, Verification of design loads for small wind turbines, F.J.L. Van Hulle et al.
- 8) AIAA 2003-1048, Investigation of the IEC safety standard for small wind turbine design through modelling and testing, Jason Jonkman et al.
- 9) AGMA/AWEA 921-A97. Recommended practices for design and specification of gearboxes for wind turbine generator systems
- 10) Expert group study on recommended practices for wind turbine testing, 9. Lightning protection for wind turbine installations, IEA, 1997