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**Wind turbines -- Measurement of mechanical loads**

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### Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard uses the translation method equivalent to IEC 61400-13:2015 "Wind Generator Section 13. Mechanical Load Measurement".

The documents of our country that have a consistent correspondence with the international documents referenced in this standard are as follows.

---GB/T 2900.53-2001 Electrotechnical terminology wind turbine (idt IEC 60050-415:1999)

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

---GB/T 18451.2-2012 Wind Turbine Power Characteristics Test (IEC 61400-12-1:2005, IDT)

This standard has made the following editorial changes.

--- Modified the standard name.

This standard was proposed by the China Machinery Industry Federation.

This standard is under the jurisdiction of the National Wind Machinery Standardization Technical Committee (SAC/TC50).

This standard is mainly drafted by: Zhejiang Yunda Wind Power Co., Ltd., China Electric Power Research Institute Co., Ltd., Beijing Jianheng Certification

Center Co., Ltd., China Resources Power Technology Research Institute Co., Ltd., China Classification Society Quality Certification Company, Xinjiang Goldwind Technology Co., Ltd.

China Shipbuilding Industry Group Haizhuang Wind Power Co., Ltd., Gemei Wind Power (Tianjin) Co., Ltd., Shanghai Tianxiang Quality Technology Service Co., Ltd.

Division, Beijing Xinye New Energy Technology Co., Ltd.

## Introduction

In the structural design of wind turbines, a comprehensive understanding and accurate quantification of loads is extremely important.

In the design phase, the load can be predicted using aeroelastic models and related standards. However, due to the flaws in this model

Uncertainty usually needs to be verified by measurement.

Mechanical load measurement can be used as the basis for design and certification. The design of the wind turbine is detailed in IEC 61400-1, and the certification procedure is

Described in GB/T 20319. This standard is for test institutions, wind turbine manufacturers and certification bodies, and specifies the mechanical load.

The minimum requirements for the load test are to achieve highly consistent, high quality, repeatable test results.

Wind turbine generator mechanical load measurement

## 1 Scope

In order to carry out the load simulation model verification, this standard describes the measurement of the basic structural load of the wind turbine. This standard specifies the field

Ground selection, signal screening, data acquisition, calibration, data validation, load measurement conditions, capture matrices, post-processing, uncertainty calculations, and reporting

Requirements and recommendations. In addition, informative appendices are provided to increase the level of awareness of test methods.

The method described in this standard can also be used for mechanical load measurement for other purposes, such as statistical analysis of measured loads, straight design loads.

Measurements, safety and functional tests or component load measurements. If these methods are used for other purposes or for unconventional wind turbines

Design, the required signals, measured load conditions, capture matrix and post-processing methods need to be evaluated and adjusted as needed to

Reach the corresponding goal.

These methods are applicable to land horizontal axis wind turbines (HAWT) with a wind turbine sweeping area greater than 200 m<sup>2</sup>. However, the method can also

It is suitable for other wind turbines (for example, small wind turbines, ducted wind turbines,

vertical axis wind turbines).

## 2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

IEC 60050 (all parts) International Electrotechnical Vocabulary

IEC 61400-1:2005 Wind turbines Part 1. Design requirements (Wind turbines-Part 1. Design requirements-

Mess)

IEC 61400-12-1 Wind Turbines Part 12-1. Power Generation Wind Turbine Power Characteristics Test (Wind turbines-

Part 12-1. Power performance measurements of electricity producing wind turbines)

ISO / IEC Guide 98-3 Uncertainty of measurement Part 3. Representation of uncertainty in measurement (Uncertainty of meas-

urement-Part 3. Guide to the expression of uncertainty in measurement)

## 3 Terms and definitions

The following terms and definitions as defined in IEC 60050-415 apply to this document.

### 3.1

Blade blade

The rotor rotates to produce aerodynamic components.

### 3.2

Leaf root blade root

The part of the blade that is connected to the hub.

### 3.3

Brake state brake status

The state of brake input or not.

### 3.4

Calibration

Determine the transfer function from the sensor output to the physical quantity and its coefficients.

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