Wind energy generation systems - Part 50-1: Wind Measurement - Application of Meteorological Mast, Nacelle and Spinner Mounted Instruments

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English Version

Wind energy generation systems - Part 50-1: Wind measurement - Application of meteorological mast, nacelle and spinner mounted instruments (IEC 61400-50-1:2022)

Systèmes de génération d'énergie éolienne - Partie 50-1: Mesurages du vent - Application d'instruments météorologiques montés sur mât, nacelle et nez de rotor (IEC 61400-50-1:2022)

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European foreword

The text of document 88/902/FDIS, future edition 1 of IEC 61400-50-1, prepared by IEC/TC 88 "Wind energy generation systems" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61400-50-1:2022.

The following dates are fixed:

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IEC 61400-50-2	NOTE	Harmonized as EN IEC 61400-50-2
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Wind energy generation systems – Part 50-1: Wind measurement – Application of meteorological mast, nacelle and spinner mounted instruments

Systèmes de génération d'énergie éolienne Partie 50-1: Mesurages du vent – Application d'instruments météorologiques montés sur mât, nacelle et nez de rotor

IEC 61400-50-1:2022-11 (en-fr)

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Wind energy generation systems – Part 50-1: Wind measurement – Application of meteorological mast, nacelle and spinner mounted instruments

Systèmes de génération d'énergie éolienne Partie 50-1: Mesurages du vent – Application d'instruments météorologiques montés sur mât, nacelle et nez de rotor

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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WIND ENERGY GENERATION SYSTEMS –

Part 50-1: Wind measurement – Application of meteorological mast, nacelle and spinner mounted instruments

FOREWORD

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IEC 61400-50-1 has been prepared by IEC technical committee 88: Wind energy generation systems. It is an International Standard.

This first edition of IEC 61400-50-1 is part of a structural revision that cancels and replaces the performance standards IEC 61400-12-1:2017 and IEC 61400-12-2:2013. The structural revision contains no technical changes with respect to IEC 61400-12-1:2017 and IEC 61400-12-2:2013, but the parts that relate to wind measurements, measurement of site calibration and assessment of obstacle and terrain have been extracted into separate standards.

The purpose of the re-structure was to allow the future management and revision of the power performance standards to be carried out more efficiently in terms of time and cost and to provide a more logical division of the wind measurement requirements into a series of separate standards which could be referred to by other use case standards in the IEC 61400 series and subsequently maintained and developed by appropriate experts.

The text of this International Standard is based on the following documents:

Draft	Report on voting
88/902/FDIS	88/916/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

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

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 61400 specifies procedures and methods which ensure that wind measurements using cup or sonic anemometers mounted on meteorological masts or wind turbine nacelles/spinners are carried out and reported consistently and in accordance with best practice. This document does not define the purpose or use case of the wind measurements. However, as this document forms part of the IEC 61400 series of standards, it is anticipated that the wind measurements carried out in accordance with this standard will be used in relation to some form of wind energy testing or resource assessment.

The main clauses of this document are not mutually dependent. Therefore, it is possible that a user will refer to only certain of the main clauses rather than all clauses to adapt this document to their specific use case. However, the main clauses are presented in a logical sequence that could be applied in practice.

The technical content of this document could previously be found in IEC 61400-12-1:2017 and IEC 61400-12-2:2013.

NOTE A technical correction to the value of the tolerance of the anemometer mounting tube has been made in 10.2.

Due to the increasing complexity of these source documents, IEC TC 88 decided that a re-structuring of the IEC 61400-12 series of standards into a number of more specific parts would allow more efficient management and maintenance going forward. This document has been created as part of that re-structuring process. The requirements on wind measurement specific to the use cases described in IEC 61400-12-1:2017 and IEC 61400-12-2:2013 (for example, the required location of the meteorological mast relative to the test turbine and the height of wind measurement relative to hub height) remain within the new editions of IEC 61400-12-1 and IEC 61400-12-2.

WIND ENERGY GENERATION SYSTEMS –

Part 50-1: Wind measurement – Application of meteorological mast, nacelle and spinner mounted instruments

1 Scope

IEC 61400-50 specifies methods and requirements for the application of instruments to measure wind speed (and related parameters, e.g. wind direction, turbulence intensity). Such measurements are required as an input to some of the evaluation and testing procedures for wind energy and wind turbine technology (e.g. resource evaluation and turbine performance testing) described by other standards in the IEC 61400 series. This document is applicable specifically to the use of wind measurement instruments mounted on meteorological masts, turbine nacelles or turbine spinners which measure the wind at the location at which the instruments are mounted. This document excludes remote sensing devices which measure the wind at some location distant from the location at which the instrument is mounted (e.g. vertical profile or forward facing lidars). This document specifies the following:

a) the classification parameters for cup and sonic anemometers such that the uncertainty in wind speed measurement for a specific type and model of anemometer exposed to a certain class of environmental conditions can be assessed;

b) the procedure and requirements for classifying cup and sonic anemometers as, for example, part of the type testing of a specific anemometer model and type;

c) the procedures and requirements for wind tunnel calibration of anemometers;

d) an additional or alternative method of checking the consistency of the calibration of an anemometer in the field by carrying out an in-situ comparison with another anemometer;

e) the requirements for the mounting of anemometers and other instruments on meteorological masts;

f) the assessment of wind speed measurement uncertainty;

g) reporting requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2533:1975, *Standard atmosphere*

ISO 3966, *Measurement of fluid flow in closed conduits – Velocity area method using Pitot static tubes*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*