



**SLOVENSKI STANDARD**  
**SIST EN IEC 61400-50-1:2023**

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**Sistemi za proizvodnjo energije na veter - 50-1. del: Meritve vetra - Uporaba meteoroloških instrumentov, pritrjenih na steber, v gondolo in na obod vetrnic (IEC 61400-50-1:2022)**

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

Windenergieanlagen - Teil 50-1: Windmessungen - Einsatz von meteorologischen Mast-, Gondel- und Spinner-Instrumenten (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)

**Ta slovenski standard je istoveten z: EN IEC 61400-50-1:2022**

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**ICS:**

27.180            Vetrne elektrarne            Wind turbine energy systems

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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)

Windenergieanlagen - Teil 50-1: Windmessungen - Einsatz  
von meteorologischen Mast-, Gondel- und Spinner-  
Instrumenten  
(IEC 61400-50-1:2022)

This European Standard was approved by CENELEC on 2022-12-21. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**EN IEC 61400-50-1:2022 (E)****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:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-09-21
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-12-21

This document partially supersedes EN 61400-12-2:2013 and EN 61400-12-1:2017 and all of their amendments and corrigenda (if any).

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The text of the International Standard IEC 61400-50-1:2022 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

- |                  |      |  |
|------------------|------|--|
| IEC 61400-50-2   | NOTE | Harmonized as EN IEC 61400-50-2                  |
| IEC 61400-1:2019 | NOTE | Harmonized as EN IEC 61400-1:2019 (not modified) |

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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)	-	-

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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**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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## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	10
4 Symbols, units and abbreviated terms .....	11
5 General .....	16
6 Classification of cup and sonic anemometry .....	16
6.1 General.....	16
6.2 Classification classes.....	17
6.3 Influence parameter ranges .....	17
6.4 Classification of cup and sonic anemometers.....	17
6.5 Reporting format.....	19
7 Assessment of cup and sonic anemometry .....	19
7.1 General.....	19
7.2 Measurements of anemometer characteristics .....	19
7.2.1 Measurements in a wind tunnel for tilt angular response characteristics of cup anemometers .....	19
7.2.2 Wind tunnel measurements of directional characteristics of cup anemometers.....	21
7.2.3 Wind tunnel measurements of cup anemometer rotor torque characteristics .....	21
7.2.4 Wind tunnel measurements of step responses of cup anemometers .....	22
7.2.5 Measurement of temperature induced effects on anemometer performance .....	23
7.2.6 Wind tunnel measurements of directional characteristics of sonic anemometers.....	24
7.3 A cup anemometer classification method based on wind tunnel and laboratory tests and cup anemometer modelling .....	25
7.3.1 Method .....	25
7.3.2 Example of a cup anemometer model .....	25
7.4 A sonic anemometer classification method based on wind tunnel tests and sonic anemometer modelling.....	32
7.5 Free field comparison measurements.....	32
8 Wind tunnel calibration procedure for anemometers .....	32
8.1 General requirements .....	32
8.2 Requirements for the wind tunnel.....	33
8.3 Instrumentation and calibration setup requirements .....	35
8.4 Calibration procedure.....	35
8.4.1 General procedure for cup and sonic anemometers .....	35
8.4.2 Procedure for the calibration of sonic anemometers.....	36
8.4.3 Determination of the wind speed at the anemometer position .....	36
8.5 Data analysis .....	37
8.6 Uncertainty analysis.....	37
8.7 Reporting format.....	38
8.8 Example uncertainty calculation.....	39



9	In-situ comparison of anemometers .....	42
9.1	General.....	42
9.2	Prerequisite .....	42
9.3	Analysis method .....	42
9.4	Evaluation criteria.....	43
10	Mounting of instruments on the meteorological mast.....	45
10.1	General.....	45
10.2	Single top-mounted anemometer.....	46
10.3	Side-by-side top-mounted anemometers .....	47
10.4	Side-mounted instruments .....	49
10.4.1	General .....	49
10.4.2	Tubular meteorological masts .....	49
10.4.3	Lattice meteorological masts .....	51
10.4.4	Flow distortion correction of side-mounted anemometers.....	56
10.5	Lightning protection .....	56
10.6	Mounting of other meteorological instruments .....	56
10.7	Data acquisition system .....	57
11	Uncertainty of wind speed measurement .....	57
11.1	Category B uncertainties: Wind speed – Introduction .....	57
11.2	Category B uncertainties: Wind speed – Hardware.....	57
11.3	Category B uncertainties: Wind speed – Meteorological mast mounted sensors.....	57
11.3.1	General .....	57
11.3.2	Pre-calibration .....	58
11.3.3	Post-calibration .....	58
11.3.4	Classification .....	58
11.3.5	Mounting .....	59
11.3.6	Lightning finial .....	60
11.3.7	Data acquisition.....	60
11.4	Category B uncertainties: Method – Cold climate .....	60
11.5	Combining uncertainties.....	60
11.5.1	General .....	60
11.5.2	Combining uncertainties in the wind speed measurement ( $u_{V,i}$ ).....	61
11.5.3	Combining uncertainties in the wind speed measurement from cup or sonic anemometer ( $u_{VS,i}$ ) .....	61
12	Reporting.....	61
Annex A (informative)	Wind tunnel calibration procedure for wind direction sensors.....	63
A.1	General requirements .....	63
A.2	Requirements of the wind tunnel .....	63
A.3	Instrumentation and calibration setup requirements .....	64
A.4	Calibration procedure.....	65
A.5	Data analysis .....	66
A.6	Uncertainty analysis.....	66
A.7	Reporting format.....	67
A.8	Example of uncertainty calculation.....	68
A.8.1	General .....	68
A.8.2	Measurement uncertainties generated by determination of the flow direction in the wind tunnel .....	68

A.8.3	Uncertainty contribution by uncertainties in the determination of the geometrical centreline $\alpha_{CL}$ (wind tunnel centreline) .....	68
A.8.4	Contribution by uncertainties in the determination of flow direction $\alpha_{dir}$ .....	68
Annex B (informative)	Mast flow distortion correction for lattice masts .....	73
Annex C (informative)	Nacelle instrument mounting .....	76
C.1	General.....	76
C.2	Preferred method of anemometer's mounting .....	76
C.3	Preferred position of anemometer .....	76
Annex D (informative)	Spinner anemometers .....	78
Bibliography	.....	79
Figure 1	Tilt angular response $V_{\alpha}/V_{\alpha=0}$ of a cup anemometer as a function of flow angle $\alpha$ compared to cosine response .....	21
Figure 2	Wind tunnel torque measurements $Q_A - Q_F$ as a function of angular speed $\omega$ of a cup anemometer rotor at 8 m/s .....	22
Figure 3	Example of bearing friction torque $Q_F$ as function of temperature for a range of angular speeds $\omega$ .....	24
Figure 4	Example of rotor torque coefficient $C_{QA}$ as a function of speed ratio $\lambda$ derived from step responses with $\kappa_{low}$ equal to -5,5 and $\kappa_{high}$ equal to -6,5 .....	27
Figure 5	Classification deviations of example cup anemometer showing a class 1,69A (upper) and a class 6,56B (lower) .....	30
Figure 6	Classification deviations of example cup anemometer showing a class 8,01C (upper) and a class 9,94D (lower).....	31
Figure 7	Definition of volume for flow uniformity test .....	34
Figure 8	Example valid control anemometer direction sector for a single top-mounted anemometer on a triangular lattice meteorological mast.....	44
Figure 9	Example valid control anemometer direction sector for a single top-mounted anemometer on a tubular meteorological mast.....	45
Figure 10	Example of a top-mounted anemometer and requirements for mounting.....	47
Figure 11	Example of alternative top-mounted primary and control anemometers positioned side-by-side and wind vane and other instruments on the boom.....	48
Figure 12	Iso-speed plot of local flow speed around a cylindrical meteorological mast .....	50
Figure 13	Centreline relative wind speed as a function of distance $R_D$ from the centre of a tubular meteorological mast and meteorological mast diameter $d$ .....	51
Figure 14	Representation of a three-legged lattice meteorological mast.....	51
Figure 15	Iso-speed plot of local flow speed around a triangular lattice meteorological mast with a $C_T$ of 0,5 .....	52
Figure 16	Centreline relative wind speed as a function of distance $R_D$ from the centre of a triangular lattice meteorological mast of leg distance $L_m$ for various $C_T$ values.....	53
Figure 17	3D CFD derived flow distortion for two different wind directions around a triangular lattice meteorological mast ( $C_T = 0,27$ ) .....	55
Figure A.1	Example of calibration setup of a wind direction sensor in a wind tunnel.....	65
Figure B.1	Example of mast flow distortion .....	73
Figure B.2	Flow distortion residuals versus wind direction.....	75
Figure C.1	Mounting of anemometer on top of nacelle .....	77

Table 1 – Influence parameter ranges (10 min averages) of classes A, B, C, D and S.....	18
Table 2 – Tilt angle response of example cup anemometer .....	28
Table 3 – Friction coefficients of example cup anemometer .....	29
Table 4 – Miscellaneous data related to classification of example cup anemometer .....	29
Table 5 – Example of evaluation of anemometer calibration .....	39
Table 6 – Estimation method for $C_T$ for various types of lattice mast.....	54
Table A.1 – Uncertainty contributions in wind directions sensor calibration .....	71
Table A.2 – Uncertainty contributions and total standard uncertainty in wind direction sensor calibration .....	72

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**WIND ENERGY GENERATION SYSTEMS –****Part 50-1: Wind measurement – Application of meteorological mast,  
nacelle and spinner mounted instruments**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

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

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## 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.

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## 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)*