



**SESKO**

# **Katsaus tuulivoiman standardointiin – Uudet projektit ja standardijulkaisut**

12.9.2023

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# Uudet IEC TC 88 projektit vuonna 2023

## IEC TC 88 new work item topics:

- Lightning protection
- Standard file format for sharing power curve information
- Tower and foundation design requirements
- Use of scanning doppler lidars for wind measurements
- Electromagnetic Compatibility (EMC) Requirements and test methods
- Validation of computational models
- Structure and validation procedure of frequency domain models for harmonic propagation studies
- Structure and validation procedure of Electromagnetic Transients (EMT) models
- Operations and maintenance of blades

# Lightning protection

## Amendmend IEC 61400-24/AMD1 ED2 :

- Update to *Annex Lightning detection and measurement systems*
- Project stage: CDV (88/965/CDV)
- CLOSING DATE FOR VOTING (2023-11-17)

## Next edition IEC 61400-24 ED3:

- Project stage: RR (88/979/RR)
- DATE OF FIRST MEETING: 2023-11
- Proposed new structure:
  - IEC 61400-24-1: Lightning protection system design
  - IEC 61400-24-2: Lightning protection device test
  - IEC 61400-24-3: Lightning protection system maintenance

# Standard file format for sharing power curve information

## Project IEC 61400-16 ED1:

- Project stage: RVN (88/938/RVN)
- TARGET DATE FOR SUBMISSION OF CD:  
**2023-10-01**

## Approved scope of IEC 61400-16 ED1:

The proposed standard will establish minimum reporting requirements for OEMs to communicate wind turbine power curve information.

The design basis of the turbine associated with a particular power curve will always be tracked, to ensure that site suitability evaluations can be conducted in parallel with energy analysis.

A key objective of the proposed standard is to define a machine-readable file format that will benefit all stakeholders

# Tower and foundation design requirements

## Amendmend IEC 61400-6/AMD1 ED1 :

- Project stage: RR (88/937/RR)
- TARGET DATE FOR SUBMISSION OF CD:  
**2024-01-31**

## Approved scope of IEC 61400-6/AMD1 ED1:

The scope for the amendment is to introduce a limited set of revisions of text in IEC 61400-6:2020, based on above discussed topics (see 88/914/Q). The intention is not to address all issues, but only update critical sections. This includes:

- Section 6.5: Stability
- Section 6.7.4: Fatigue limit state analysis of bolted connections
- Sections which are affected by overlaps with Eurocodes (limited amount expected).

# Use of scanning doppler lidars for wind measurements

## Project IEC 61400-50-5 ED1:

- Project stage: RVN (88/967/RVN)
- TARGET DATE FOR SUBMISSION OF CD:  
**2025-01-05**

## Approved scope of IEC 61400-50-5 ED1:

This technical specification includes use cases such as pre-construction wind resource assessment and site suitability assessment, with a primary focus on wind measurements with scanning Doppler Lidar.

The technical specification includes guidance on:

- Lidar technology requirements
- Calibration and classification process
- Calculation of intermediate measurement uncertainty
- Lidar installation
- Data filtering and analysis
- Calculation of final measurement uncertainty
- Reporting format

The main challenge is to define requirements specific enough to ensure measurement consistency, repeatability and accuracy.

# Electromagnetic Compatibility (EMC) Requirements and test methods

## New work item proposal IEC 61400-40 ED1:

- Project stage: NP (88/976/NP)
- CLOSING DATE FOR VOTING (2023-10-06)
- PROPOSER: Secretariat, DK

## Proposed scope of IEC 61400-40 ED1:

This part of IEC 61400 applies to all type of wind turbine plants.

This standard defines the requirements and test methods for the verification of the wind turbine plants performance against emissions and their immunity against conducted and radiated interferences.

The requirements and test methods will be defined according the behaviour and the installations of this type of generating systems and all the sub systems included.

This standard is applicable to both wind turbine plants to be installed in offshore and onshore locations.

# Validation of computational models

## New work item proposal IEC/PAS 61400-60:

- Project stage: NP (88/980/NP)
- CLOSING DATE FOR VOTING (2023-11-17)
- PROPOSER: Secretariat, DK
- IECRE

## Proposed outline of IEC/PAS 61400-60:

Scope

Normative references, Terms and definitions, Symbols and abbreviations

Introduction to Model validation, Goal and definitions

Predictive capability, accuracy and uncertainty

Green/Blue/Red areas

Intended use, Model definition, Model as a “black box”

Preparation for model validation: validation requirements, verification, uncertainty

Measurements

Measurement uncertainty

Comparison of measured vs modelled data

Conclusion on model vs measurements

Extended parameter range

Overall uncertainty assigned to predictive capability of the model for the extended parameter range

Reporting results of model validation



# Structure and validation procedure of frequency domain models for harmonic propagation studies

## New work item proposal IEC 61400-27-3:

- Project stage: NP (88/963/NP)
- CLOSING DATE FOR VOTING (2023-09-15)
- PROPOSER: Secretariat, DK

## Proposed scope of IEC 61400-27-3 ED1:

IEC 61400-27-3 contains normative specifications for validation of frequency domain models of converter-based units, subsystems or components. The application range for IEC 61400-27-3 is limited to 0-9 kHz, i.e. sub-synchronous emission as well as harmonic emission, interharmonic emission and emission above harmonic range up to 9 kHz as defined in IEC 61000-4-7.

The model validation procedure specified in IEC 61400-27-3 is applicable to converter-based units which are used in renewable power plants, i.e. active power generation units like wind turbines and PV systems, energy conversion units like battery and electrolyser systems, and units with reactive power capability such as STATCOMs.

# Structure and validation procedure of Electromagnetic Transients (EMT) models

## New work item proposal IEC 61400-27-4:

- Project stage: NP (88/963/NP)
- CLOSING DATE FOR VOTING (2023-09-15)
- PROPOSER: Secretariat, DK

## Proposed scope of IEC 61400-27-4 ED1:

IEC 61400-27-4 contains normative specification for validation of EMT models of converter-based units, subsystems or components.

The specifications in IEC 61400-27-4 includes definitions, specification of model structure, specification of a model validation procedure, and specification of limits in the applicability of the models.

The model structure defines the model interface in terms of input parameters to and output parameters from the model, and the point of connection to the grid.

The model validation procedure provides quantitative measures for the model accuracy based on comparison of model outputs to measured values.

# Operations and maintenance of blades

## Project IEC 61400-32 ED1:

- Project stage: RVN (88/970/RVN)
- TARGET DATE FOR SUBMISSION OF CD:  
**2025-05-01**

## Approved scope of IEC 61400-32 ED1:

An international standard to provide general requirements and guidelines for the operation and maintenance (O&M) of wind turbine rotor blades from the time of departure from the blade factory through end of life.

The scope of this standard is not proposed to include requirements for original equipment manufacturers (OEMs) related to defining blade O&M requirements as may be defined as part of the original design of the blade, a subject already addressed in the IEC 61400-5 standard (Chapter 8).

# Uudet IEC TC 88 standardijulkaisut

## New IEC TC 88 publications:

- Marking and lighting of wind turbines
- Measurement and assessment of electrical characteristics - Wind power plants
- Reliability for wind energy generating systems
- Safety of wind turbine generators - General principles for design
- Through life management and life extension of wind power assets
- Siting Risk Assessment

# IEC TS 61400-29:2023

Good practice for aviation lighting and marking of wind turbines in both onshore and offshore domains

Technical requirements for marking and lighting of wind turbines with a tip height from/at 150 meters and below 315 meters Above Ground Level (AGL) or Above Mean Sea Level (AMSL) for offshore sites.

- Publication date: 2023-02-07
- Stability date: 2025



IEC TS 61400-29

Edition 1.0 2023-02

## TECHNICAL SPECIFICATION



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Wind energy generation systems –  
Part 29: Marking and lighting of wind turbines

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 27.180

ISBN 978-2-8322-6401-0

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# IEC 61400-21-2:2023

Specifies the quantities that are determined to characterize the electrical characteristics of grid-connected power plants (PPs).

Defines the measurement and test procedures for quantifying the electrical characteristics as basis for the verification of compliance of PPs.

Defines a uniform functionality test and measurement procedure for the power plant controller (PPC).

Defines the procedures for assessing compliance with electrical connection requirements.

- Publication date: 2023-03-29
- Stability date: 2026



IEC 61400-21-2

Edition 1.0 2023-03

## INTERNATIONAL STANDARD

## NORME INTERNATIONALE



Wind energy generation systems –  
Part 21-2: Measurement and assessment of electrical characteristics – Wind  
power plants

Systèmes de génération d'énergie éolienne –  
Partie 21-2: Mesurage et évaluation des caractéristiques électriques – Centrales  
éoliennes

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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INTERNATIONALE

ICS 27.180

ISBN 978-2-8322-6648-9

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# IEC TS 61400-26-4 ED1

Specifies terms and information categories from which reliability metrics are to be identified and reported.

Definitions apply to key components, any number of wind turbines, fleets of wind turbine types, a wind power station or a portfolio of wind power stations.

- Fcst. Publ. Date: 2023-10
- Proposed Stability date: 2026

	<b>APPROVED</b>	<b>88/954/DTS</b>
DRAFT TECHNICAL SPECIFICATION (DTS)		
PROJECT NUMBER: IEC TS 61400-26-4 ED1		
DATE OF CIRCULATION: 2023-05-12	CLOSING DATE FOR VOTING: 2023-08-04	
SUPERSEDES DOCUMENTS: 88/901/CD, 88/921A/CC		
IEC TC 88 : WIND ENERGY GENERATION SYSTEMS		
SECRETARIAT: Denmark	SECRETARY: Mrs Christine Weibøl Bertelsen	
OF INTEREST TO THE FOLLOWING COMMITTEES:		
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY		
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TITLE: Wind energy generation systems – Part 26-4: Reliability for wind energy generating systems		
PROPOSED STABILITY DATE: 2026		
NOTE FROM TC/SC OFFICERS:		

# IEC TS 61400-30 ED1

Specifies the Essential Health and Safety Requirements related to the design of wind turbines with horizontal axes and a rotor area  $\geq 200 \text{ m}^2$

Standard focuses on requirements for safe operation, inspection, maintenance, installation, and decommissioning.

- Fcst. Publ. Date: 2023-10
- Proposed Stability date: 2026



APPROVED

88/910/DTS

DRAFT TECHNICAL SPECIFICATION (DTS)

PROJECT NUMBER:

IEC TS 61400-30 ED1

DATE OF CIRCULATION:

2022-09-30

CLOSING DATE FOR VOTING:

2022-12-23

SUPERSEDES DOCUMENTS:

88/842/CD, 88/909/CC

IEC TC 88 : WIND ENERGY GENERATION SYSTEMS

SECRETARIAT:

Denmark

SECRETARY:

Mrs Christine Weibøl Bertelsen

OF INTEREST TO THE FOLLOWING COMMITTEES:

FUNCTIONS CONCERNED:

EMC

ENVIRONMENT

QUALITY ASSURANCE

SAFETY

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TITLE:

Wind energy generation systems – Part 30: Safety of wind turbine generators – General principles for design

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:



# IEC TS 61400-28 ED1

Sets out minimum requirements for actions, investigations and assessments to ensure the continued structural integrity of wind farm assets, particularly wind turbines, aimed at verifying that they remain safe for personnel to operate.

Guidance is also given on how best to manage a wind farm throughout the operational life.

- Fcst. Publ. Date: 2023-10
- Proposed Stability date: 2026



APPROVED

88/955/DTS

DRAFT TECHNICAL SPECIFICATION (DTS)

PROJECT NUMBER: IEC TS 61400-28 ED1	
DATE OF CIRCULATION: 2023-05-12	CLOSING DATE FOR VOTING: 2023-08-04
SUPERSEDES DOCUMENTS: 88/798/CD, 88/944A/CC	

IEC TC 88 : WIND ENERGY GENERATION SYSTEMS	
SECRETARIAT: Denmark	SECRETARY: Mrs Christine Weibøl Bertelsen
OF INTEREST TO THE FOLLOWING COMMITTEES:	
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	

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TITLE: Wind energy generation systems – Part 28: Through life management and life extension of wind power assets
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PROPOSED STABILITY DATE: 2026
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NOTE FROM TC/SC OFFICERS:
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# IEC TS 61400-31 ED1

Establishes a guideline for the assessment of the risks which a wind turbine may pose to the general public.

This Technical Specification covers only onshore wind turbines with a horizontal axis and a swept area greater than 200 m<sup>2</sup>.

This Technical Specification covers risk due to internal or external causes, such as technical failures, human errors, extreme wind conditions, turbine icing, lightning strikes, earthquakes, flooding, landslides or fire.

This Technical Specification describes risks during operation of the wind turbine including maintenance, idling and standstill.

- Fcst. Publ. Date: 2023-09
- Proposed Stability date: 2026

	<b>APPROVED</b>	88/936/DTS
DRAFT TECHNICAL SPECIFICATION (DTS)		
PROJECT NUMBER: IEC TS 61400-31 ED1		
DATE OF CIRCULATION: 2023-01-20	CLOSING DATE FOR VOTING: 2023-04-14	
SUPERSEDES DOCUMENTS: 88/884/CD, 88/899A/CC		
IEC TC 88 : WIND ENERGY GENERATION SYSTEMS		
SECRETARIAT: Denmark	SECRETARY: Mrs Christine Weibøl Bertelsen	
OF INTEREST TO THE FOLLOWING COMMITTEES:		
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> SAFETY		
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TITLE: Wind energy generation systems – Part 31: Siting Risk Assessment		
PROPOSED STABILITY DATE: 2026		
NOTE FROM TC/SC OFFICERS:		