

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

## Wind turbines

---

Part 22: Conformity testing and certification

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## National foreword

This British Standard is the UK implementation of EN 61400-22:2011, incorporating corrigendum April 2020.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by CENELEC corrigendum April 2020 is indicated in the text by AC1 AC1.

The UK participation in its preparation was entrusted to Technical Committee PEL/88, Wind turbines.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020  
Published by BSI Standards Limited 2020

ISBN 978 0 539 13643 2

ICS 27.180

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2011.

### Amendments/corrigenda issued since publication

Date	Text affected
31 May 2020	Implementation of CENELEC amendment AC:2020: Text added to European Foreword.

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

NORME EUROPÉENNE  
EUROPÄISCHE NORM

January 2011

ICS 27.180

English version

**Wind turbines -  
Part 22: Conformity testing and certification  
(IEC 61400-22:2010)**

Eoliennes -  
Partie 22: Essais de conformité et  
certification  
(CEI 61400-22:2010)

Windenergieanlagen -  
Teil 22: Konformitätsprüfung und  
Zertifizierung  
(IEC 61400-22:2010)

This European Standard was approved by CENELEC on 2011-01-02. 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 Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## Foreword

The text of document 88/365/FDIS, future edition 1 of IEC 61400-22, prepared by IEC TC 88, Wind turbines, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61400-22 on 2011-01-02.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2011-10-02
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2014-01-02

Annex ZA has been added by CENELEC.

**AC1** This standard continues to be applicable in facilitating the application and coherence of issued certificates (maintenance) and certificates under preparation.

For issuing new certificates, CENELEC recommends using the IECRE system, because this standard will be withdrawn in May 2023. **AC1**

---

## Endorsement notice

The text of the International Standard IEC 61400-22:2010 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 standards indicated:

- |             |                                |
|-------------|--------------------------------|
| IEC 60034-1 | NOTE Harmonized as EN 60034-1. |
| IEC 60076-1 | NOTE Harmonized as EN 60076-1. |

---

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## Annex ZA (normative)

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

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034	Series	Rotating electrical machines	EN 60034	Series
IEC 60050-415	-	International Electrotechnical Vocabulary - Part 415: Wind turbine generator systems	-	-
IEC 61400	Series	Wind turbines	EN 61400	Series
IEC 61400-1	-	Wind turbines - Part 1: Design requirements	EN 61400-1	-
IEC 61400-2	-	Wind turbine - Part 2: Design requirements for small wind turbines	EN 61400-2	-
IEC 61400-3	2009	Wind turbines - Part 3: Design requirements for offshore wind turbines	EN 61400-3	2009
IEC 61400-11	-	Wind turbine generator systems - Part 11: Acoustic noise measurement techniques	EN 61400-11	-
IEC 61400-12-1	-	Wind turbines - Part 12-1: Power performance measurements of electricity producing wind turbines	EN 61400-12-1	-
IEC/TS 61400-13	-	Wind turbine generator systems - Part 13: Measurement of mechanical loads	-	-
IEC 61400-21	-	Wind turbines - Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines	EN 61400-21	-
IEC/TS 61400-23	-	Wind turbine generator systems - Part 23: Full-scale structural testing of rotor blades	-	-
IEC 61400-24	-	Wind turbines - Part 24: Lightning protection	EN 61400-24	-
ISO/IEC 17020	-	General criteria for the operation of various types of bodies performing inspection	EN ISO/IEC 17020	-
ISO/IEC 17021	-	Conformity assessment - Requirements for bodies providing audit and certification of management systems	EN ISO/IEC 17021	-
ISO/IEC 17025	-	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025	-

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/IEC</u>	<u>Year</u>
ISO/IEC Guide 2	-	Standardization and related activities - General vocabulary	EN 45020	-
ISO/IEC Guide 65	-	General requirements for bodies operating product certification systems	EN 45011	-
ISO 81400-4	2005	Wind turbines - Part 4: Design and specification of gearboxes	-	-
ISO 9001	2008	Quality management systems - Requirements	EN ISO 9001	2008

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)



Edition 1.0 2010-05

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



---

**Wind turbines –  
Part 22: Conformity testing and certification**

**Eoliennes –  
Partie 22: Essais de conformité et certification**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

PRICE CODE **XC**  
CODE PRIX

---

ICS 27.180

ISBN 978-2-88910-943-2

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	11
4 Symbols and abbreviations.....	13
4.1 Symbols .....	13
4.2 Abbreviations .....	13
5 Acceptance of operating bodies.....	13
5.1 General.....	13
5.2 Accreditation .....	13
5.3 Recognition arrangements.....	14
5.4 Advisory committee .....	14
6 Management of the certification system.....	14
6.1 General.....	14
6.2 Agreement on certification.....	15
6.3 Issue of certificates and conformity statements .....	15
6.4 Security of relevant documentation.....	15
6.5 Validity, maintenance and expiration of certificates .....	15
6.5.1 General .....	15
6.5.2 Maintenance of type certificate .....	16
6.5.3 Maintenance of project certificate .....	16
6.5.4 Dealing with outstanding matters .....	17
6.6 Corrective actions .....	17
7 The extent of certification .....	17
7.1 General.....	17
7.2 Type certification.....	18
7.3 Project certification.....	20
7.4 Component certification.....	21
7.5 Prototype certification.....	23
8 Type certification .....	23
8.1 General.....	23
8.2 Design basis evaluation.....	24
8.3 Design evaluation.....	24
8.3.1 General .....	24
8.3.2 Design control .....	25
8.3.3 Control and protection system .....	25
8.3.4 Loads and load cases.....	26
8.3.5 Rotor blades.....	26
8.3.6 Machine and structural components.....	27
8.3.7 Electrical components .....	27
8.3.8 Housings .....	28
8.3.9 Evaluation of component tests.....	29
8.3.10 Foundation design requirements.....	29
8.3.11 Manufacturing process .....	30
8.3.12 Transportation process.....	30



This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

8.3.13	Installation process.....	30
8.3.14	Maintenance process.....	31
8.3.15	Personnel safety.....	31
8.3.16	Design evaluation conformity statement.....	31
8.4	Type testing .....	32
8.4.1	General .....	32
8.4.2	Safety and function tests .....	33
8.4.3	Power performance measurements.....	33
8.4.4	Load measurements .....	33
8.4.5	Blade tests .....	34
8.4.6	Other tests .....	34
8.4.7	Test reports.....	34
8.4.8	Type test conformity statement.....	35
8.5	Manufacturing evaluation .....	35
8.5.1	General .....	35
8.5.2	Quality system evaluation.....	35
8.5.3	Manufacturing inspection.....	35
8.5.4	Manufacturing conformity statement .....	36
8.6	Foundation design evaluation.....	37
8.7	Foundation manufacturing evaluation .....	37
8.7.1	General .....	37
8.7.2	Quality system evaluation.....	37
8.7.3	Foundation manufacturing inspection .....	38
8.7.4	Foundation manufacturing conformity statement.....	38
8.8	Type characteristics measurements.....	39
8.8.1	General .....	39
8.8.2	Power quality measurements.....	40
8.8.3	Low voltage ride through measurement .....	40
8.8.4	Acoustic noise measurements .....	40
8.8.5	Test reports.....	40
8.8.6	Type characteristics measurements conformity statement .....	41
8.9	Final evaluation.....	41
8.10	Type certificate.....	41
9	Project certification.....	42
9.1	General.....	42
9.2	Site conditions evaluation.....	42
9.2.1	General .....	42
9.2.2	Site conditions evaluation requirements.....	42
9.2.3	Site conditions evaluation conformity statement.....	43
9.3	Design basis evaluation.....	43
9.3.1	General .....	43
9.3.2	Design basis requirements .....	43
9.3.3	Design basis conformity statement .....	44
9.4	Integrated load analysis .....	44
9.4.1	General .....	44
9.4.2	Integrated load analysis requirements .....	45
9.4.3	Integrated load analysis conformity statement .....	45
9.5	Site-specific wind turbine/RNA design evaluation .....	45

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

9.5.1	General .....	45
9.5.2	Site-specific wind turbine design requirements .....	45
9.5.3	Site-specific wind turbine design conformity statement .....	46
9.6	Site-specific support structure design evaluation .....	46
9.6.1	General .....	46
9.6.2	Site-specific support structure design evaluation requirements .....	47
9.6.3	Support structure design conformity statement .....	47
9.7	Other installations design evaluation .....	47
9.7.1	General .....	47
9.7.2	Other installations design evaluation requirements .....	47
9.7.3	Other installations design conformity statement .....	48
9.8	Wind turbine/RNA manufacturing surveillance .....	48
9.8.1	General .....	48
9.8.2	Surveillance requirements .....	48
9.8.3	Wind turbine/RNA manufacturing surveillance conformity statement .....	49
9.9	Support structure manufacturing surveillance .....	49
9.9.1	General .....	49
9.9.2	Surveillance requirements .....	49
9.9.3	Support structure manufacturing surveillance conformity statement .....	50
9.10	Other installations manufacturing surveillance .....	50
9.10.1	General .....	50
9.10.2	Surveillance requirements .....	50
9.10.3	Other installations manufacturing surveillance conformity statement .....	51
9.11	Project characteristics measurements .....	51
9.11.1	General .....	51
9.11.2	Grid connection compatibility according to grid codes .....	52
9.11.3	Verification of power performance .....	52
9.11.4	Verification of acoustic noise emission .....	52
9.11.5	Test reports .....	52
9.11.6	Project characteristics measurement conformity statement .....	53
9.12	Transportation and installation surveillance .....	53
9.12.1	General .....	53
9.12.2	Transportation and installation requirements .....	53
9.12.3	Transportation and installation conformity statement .....	53
9.13	Commissioning surveillance .....	54
9.13.1	General .....	54
9.13.2	Commissioning surveillance requirements .....	54
9.13.3	Commissioning surveillance conformity statement .....	54
9.14	Final evaluation .....	54
9.15	Project certificate .....	55
9.16	Operation and maintenance surveillance .....	55
9.16.1	General .....	55
9.16.2	Operation and maintenance surveillance requirements .....	55
9.16.3	Operation and maintenance conformity statement .....	56
Annex A (informative)	Design documentation (if applicable) .....	57
Annex B (informative)	Certificate example format .....	63
Annex C (informative)	Minimum requirements for load measurements .....	72
Annex D (informative)	Requirements for safety and function tests .....	73

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

Annex E (informative) Condition monitoring systems for wind turbines .....	76
Bibliography.....	78
Figure 1 – Modules of type certification.....	19
Figure 2 – Modules in project certification .....	21
Figure 3 – Modules in component certification and their applications for type certification .....	22
Figure 4 – Elements of design evaluation.....	25
Figure 5 – Type testing elements .....	32
Figure 6 – Type characteristics measurements elements .....	39
Table A.1 – Design documentation (if applicable).....	57

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### WIND TURBINES –

### Part 22: Conformity testing and certification

#### 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61400-22 has been prepared by IEC technical committee 88: Wind turbines.

This standard cancels and replaces IEC WT 01 (2001): IEC System for Conformity Testing and Certification of Wind Turbines – Rules and Procedures.

The text of this standard is based on the following documents:

FDIS	Report on voting
88/365/FDIS	88/368/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

A list of all parts of the IEC 61400 series, under the general title: *Wind turbines*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

**IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.**

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## INTRODUCTION

This International Standard defines rules and procedures for conformity testing and certification of wind turbines with respect to standards and technical requirements for wind turbines and wind farms. It is intended to facilitate mutual recognition (reciprocal acceptance) by participants of test results and certificates issued by other participants for obtaining certification at national level and operates within the scope of the IEC 61400 series of standards and technical specifications for wind turbines.

The certification procedures in this standard constitute a complete third party conformity evaluation of a wind turbine type, a major component type or one or more wind turbines at a specific location.

In addition to design verification and testing, this standard provides information for the recognition of or assessment for approval of the supplier's quality system, regular surveillance through inspection of the supplier's quality system and quality plans, and audit testing of samples. The standard is amongst others intended to result in significant benefit to the applicant by reducing the number of steps necessary to obtain certification or approval at national level.

This is a preview of "BS EN 61400-22:2011". [Click here to purchase the full version from the ANSI store.](#)

## WIND TURBINES –

### Part 22: Conformity testing and certification

#### 1 Scope

This International Standard defines rules and procedures for a certification system for wind turbines (WT) that comprises both type certification and certification of wind turbine projects installed on land or off-shore. This system specifies rules for procedures and management for carrying out conformity evaluation of WT and wind farms, with respect to specific standards and other technical requirements, relating to safety, reliability, performance, testing and interaction with electrical power networks. It provides:

- definitions of the elements in a wind turbine certification process;
- procedures for conformity evaluation in a wind turbine certification system;
- procedures for conformity surveillance;
- rules for the documentation that is to be supplied by an applicant for the conformity evaluation; and
- requirements for certification and inspection bodies and testing laboratories.

The rules and procedures are not limited to WT of any particular size or type. However, special rules and procedures apply for small wind turbines (SWT). Some elements of certification are mandatory, whilst provision is specifically made for others to be optional. For type certification, the document describes procedures relating to conformity testing, design, manufacture, and the plans for transportation, erection, installation and maintenance. The procedures deal with the assessment of loads and safety, testing, characteristics measurements and surveillance of manufacturing. For project certification, the document describes procedures relating to the assessment that particular wind turbines and support structure/foundation designs in a project are appropriate for the application and relating to transportation, installation, commissioning, operation and maintenance. The procedures deal with assessment in accordance with all modules in this document, e.g. the site conditions, the design of site-specific components and surveillance of manufacturing, transportation, installation and operation.

The purpose of the rules and procedures is to provide a common basis for certification of wind turbines and wind turbine projects, including a basis for acceptance of operating bodies (i.e. certification bodies, inspection bodies and testing laboratories) and mutual recognition of certificates.

The rules and procedures are intended to be used in conjunction with the appropriate IEC/ISO standards and Guides, see Clause 2.

#### 2 Normative references

The following referenced documents are indispensable for the application 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 In the case where an earlier or withdrawn edition of the referenced normative document is used together with this document, these earlier editions must be specified in the Agreement for Certification, see Subclause 6.2, and in conformity statements and certificates.

IEC 60034 (all parts), *Rotating electrical machines*