
Irish Standard Recommendation
S.R. CLC/TS 61400-26-2:2017

# Wind turbines - Part 26-2: Production-based availability for wind turbines

**S.R. CLC/TS 61400-26-2:2017**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

S.R. CLC/TS 61400-26-2:2017 is the adopted Irish version of the European Document CLC/TS 61400-26-2:2017, Wind turbines - Part 26-2: Production-based availability for wind turbines

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*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

# CLC/TS 61400-26-2

September 2017

ICS 27.180

English Version

# Wind turbines - Part 26-2: Production-based availability for wind turbines (IEC/TS 61400-26-2:2014)

Éoliennes - Partie 26-2: Disponibilité fondée sur la production pour les éoliennes (IEC/TS 61400-26-2:2014)

Windenergieanlagen - Teil 26-2: Erzeugungsbasierte Verfügbarkeit von Windenergieanlagen (IEC/TS 61400-26-2:2014)

This Technical Specification was approved by CENELEC on 2017-07-17.

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

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

## European foreword

This document (CLC/TS 61400-26-2:2017) consists of the text of IEC/TS 61400-26-2:2014 prepared by IEC/TC 88 "Wind energy generation systems".

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

## Endorsement notice

The text of the International Standard IEC/TS 61400-26-2:2014 was approved by CENELEC as a Technical Specification without any modification.

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

| | | |
|---|---|---|
| IEC 61400-1:2005 | NOTE | Harmonized as EN 61400-1:2005 (not modified). |
| IEC 61400-12-1:2005 | NOTE | Harmonized as EN 61400-12-1:2006 (not modified). |
| IEC 61400-12-2:2013 | NOTE | Harmonized as EN 61400-12-2:2013 (not modified). |
| IEC 61400-25-1:2006 | NOTE | Harmonized as EN 61400-25-1:2007 (not modified). |
| IEC 61400-25-2:2006 | NOTE | Harmonized as EN 61400-25-2:2007 (not modified). |
| IEC 61400-25-3:2006 | NOTE | Harmonized as EN 61400-25-3:2007 (not modified). |
| IEC 61400-25-4:2008 | NOTE | Harmonized as EN 61400-25-4:2008 (not modified). |
| IEC 61400-25-5:2006 | NOTE | Harmonized as EN 61400-25-5:2007 (not modified). |
| IEC 61400-25-6:2010 | NOTE | Harmonized as EN 61400-25-6:2011 (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 When 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.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60050 | series | International Electrotechnical Vocabulary | - | - |
| IEC/TS 61400-26-1 | 2011 | Wind turbines - Part 26-1: Time-based availability for wind turbine generating systems | CLC/TS 61400-26-1 | 2017 |

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# IEC TS 61400-26-2

Edition 1.0 2014-06

# TECHNICAL SPECIFICATION

colour inside

## Wind turbines –
## Part 26-2: Production-based availability for wind turbines

IEC TS 61400-26-2:2014-06(en)

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# TECHNICAL SPECIFICATION


## Wind turbines –
## Part 26-2: Production-based availability for wind turbines

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# WIND TURBINES –

# Part 26-2: Production-based availability for wind turbines

## 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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- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 61400-26-2, which is a technical specification, has been prepared by IEC technical committee 88: Wind turbines.

The text of this technical specification is based on the following documents:

| Enquiry draft | Report on voting |
|---|---|
| 88/455/DTS | 88/483/RVC |

Full information on the voting for the approval of this technical specification 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.

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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual edition of this document may be issued at a later date.

**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.**

# INTRODUCTION

The intention of this technical specification is to define a common basis for exchange of information on performance indicators between owners, utilities, lenders, operators, manufacturers, consultants, regulatory bodies, certification bodies, insurance companies and other stakeholders in the wind power generation business. This is achieved by providing an information model specifying how time designations shall be split into information categories. The information model forms the basis for how to allocate time for reporting availability and reliability indicators.

The technical specification defines generic terms of wind turbine systems and environmental constraints in describing system and component availability, lifetime expectancy, repairs and criteria for determining overhaul intervals. The specification defines terminology and generic terms for reporting energy based generating unit availability measurement. A generating unit includes all equipment up to the point of electrical connection. Availability measurements are concerned with fractions of time and energy a unit is capable of providing during service, taking environmental aspects into account. Environmental aspects will be wind and other weather conditions, as well as grid and substation conditions. The specification furthermore defines terminology and terms for reporting performance indicators based on energy production. Mandatory information categories defined in the technical specification are written in capital letters; optional information categories defined in the technical specification are written in bold letters.

The project scope is accomplished by separating the technical specification into three parts:

- IEC TS 61400-26-1, which specifies terms for time-based availability of a wind turbine generating system;
- IEC TS 61400-26-2, which specifies terms for production-based availability of a wind turbine generating system;
- IEC/TS 61400-26-3, which specifies terms for time-based and production-based availability of a wind power station.

Part 2 is an extension of Part 1 that deals with the use of production elements based on the information model defined in Part 1. The structure and interrelations in the applied information model are defined in Part 1 and apply to the production based extensions made in Part 2.

The intention of Part 2 is to define a common basis for exchange of information on production-based availability. This is achieved by using the information model specifying how time and energy designations shall be split into information categories and assigned to production terms.

NOTE The point of electrical connection is defined individually from one project to the other, but is normally understood as the electrical low voltage or high voltage terminals of the wind turbine generating system connecting to the feeder cables.

# WIND TURBINES –

# Part 26-2: Production-based availability for wind turbines

## 1 Scope

This part of IEC 61400 provides a framework from which production-based performance indicators of a WTGS (wind turbine generator system) can be derived. It unambiguously describes how data is categorised and provides examples of how the data can be used to derive performance indicators.

The approach of this part of IEC 61400 is to expand the time allocation model, introduced in IEC TS 61400-26-1, with two additional layers for recording of the actual energy production and potential energy production associated with the concurrent time allocation.

It is not the intention of this Technical Specification to define how production-based availability shall be calculated. Nor is it the intention to form the basis for power curve performance measurements, which is the objective of IEC 61400-12.

This document also includes informative annexes with:

- examples of determination of lost production,
- examples of algorithms for production-based indicators,
- examples of other performance indicators,
- examples of application scenarios.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org/)

IEC TS 61400-26-1:2011, *Wind turbines – Part 26-1: Time-based availability for wind turbine generating systems*

## 3 Terms, definitions and abbreviations

For the purposes of the present document, the following terms, definitions and abbreviations apply, as well as the relevant terms and definitions contained in IEC TS 61400-26-1 and IEC 60050-415.

### 3.1 Terms and definitions

**3.1.1**
**site conditions**
conditions affecting the energy production of the WTGS, e.g. topographic, climatic and meteorological conditions, sector management, electrical environment and contractual constraints