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Responsible committee: PEL/88 Wind turbines

Interested committees:

Title: Draft BS IEC 61400-40 Wind energy generation systems. Part 40: Electromagnetic Compatibility (EMC) - Requirements and test methods.

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- iii) requires additional national guidance or information

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## Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

## UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

## Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

## Template for comments and secretariat observations

|                  |                        |
|------------------|------------------------|
| Date: xx/xx/20xx | Document: ISO/DIS xxxx |
|------------------|------------------------|

| 1  | 2                                          | (3)                          | 4               | 5                                                                                                                                  | (6)                                                                      | 7                                                  |
|----|--------------------------------------------|------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------|
| MB | Clause No./ Subclause No./Annex (e.g. 3.1) | Paragraph/Figure/ Table/Note | Type of comment | Commend (justification for change) by the MB                                                                                       | Proposed change by the MB                                                | Secretariat observations on each comment submitted |
|    | 3.1                                        | Definition 1                 | ed              | Definition is ambiguous and needs clarifying.                                                                                      | Amend to read '...so that the mains connector to which no connection...' |                                                    |
|    | 6.4                                        | Paragraph 2                  | te              | The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK. | Delete reference to UV photometer.                                       |                                                    |



88/671/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

**IEC 61400-40 ED1**

DATE OF CIRCULATION:

**2018-03-30**

CLOSING DATE FOR COMMENTS:

**2018-06-22**

SUPERSEDES DOCUMENTS:

**88/573/NP, 88/582/RVN**

IEC TC 88 : WIND ENERGY GENERATION SYSTEMS

SECRETARIAT:

Denmark

SECRETARY:

Mrs Christine Weibøl Bertelsen

OF INTEREST TO THE FOLLOWING COMMITTEES:

SC 77A,CISPR,CIS/B

PROPOSED HORIZONTAL STANDARD:



Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☐ QUALITY ASSURANCE

☐ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

**Wind energy generation systems – Part 40: Electromagnetic Compatibility (EMC) – Requirements and test methods**

NOTE FROM TC/SC OFFICERS:

In order to assist PT 61400-40 when sorting and compiling the given comments on the CD document, it is of great importance that all comments given in the comments form refer to both clause and line numbers in the CD document.

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**WIND ENERGY GENERATION SYSTEMS -****Part 40: Electromagnetic compatibility (EMC) - Requirements and test method**

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International Standard IEC 61400-40 has been prepared by IEC technical committee 88: Wind energy generation systems.

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

|               |                  |
|---------------|------------------|
| Enquiry draft | Report on voting |
| XX/XX/FDIS    | XX/XX/RVD        |

50 Full information on the voting for the approval of this International Standard can be found in  
51 the report on voting indicated in the above table.

52

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

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

- 57 • reconfirmed,
- 58 • withdrawn,
- 59 • replaced by a revised edition, or
- 60 • amended.

61

62 The National Committees are requested to note that for this document the stability date  
63 is 20XX.

64 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE  
65 DELETED AT THE PUBLICATION STAGE.

66

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1  
2

## INTRODUCTION

- 3 The purpose of this part of IEC 61400 is to provide the EMC requirements and test methods  
4 that are applicable to all the equipment within its scope.  
5 This document is only applicable to Wind Turbines. Wind Farms will be introduced later.

6

**7 1 Scope**

8 This part of IEC 61400 applies to all type of electricity producing wind turbines.

9 This standard defines the requirements and test methods for the verification of  
10 electromagnetic emissions and the immunity against electromagnetic interferences of wind  
11 turbines producing electricity.

12

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

15 This standard is applicable to both electricity producing wind turbines to be installed in  
16 offshore and onshore locations.

17 Compliance with this standard can be done for:

18 • Type approval showing the requirements given of Annex A and B fulfilled for the Wind  
19 Turbine, or

20 • Single Wind turbine complying with all clauses of the main body of this standard.

**21 2 Normative references.**

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

26 CISPR11: 2015, Industrial, scientific and medical equipment - Radio-frequency disturbance  
27 characteristics - Limits and methods of measurement.

28 IEC 61000-4-2:2008, Electromagnetic compatibility (EMC) - Part 4-2: Testing and  
29 measurement techniques - Electrostatic discharge immunity test.

30 IEC 61000-4-3:2006+AMD1:2007+AMD2:2010CSV, Electromagnetic compatibility (EMC) -  
31 Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic  
32 field immunity test.

33 IEC 61000-4-4:2012RLV, Electromagnetic compatibility (EMC) – Part 4-4: Testing and  
34 measurement techniques – Electrical fast transient/burst immunity test.

35 IEC 61000-4-5:2014+AMD1:2017CSV, Electromagnetic compatibility (EMC) - Part 4-5: Testing  
36 and measurement techniques - Surge immunity test.

37 IEC 61000-4-6:2013, Electromagnetic compatibility (EMC) - Part 4-6: Testing and  
38 measurement techniques - Immunity to conducted disturbances, induced by radio-frequency  
39 fields.

40 IEC 61000-4-8:2009 RLV, Electromagnetic compatibility (EMC) – Part 4-8: Testing and  
41 measurement techniques – Power frequency magnetic field immunity test.

42 IEC 61000-4-11:2004+AMD1:2017CSV, Electromagnetic compatibility (EMC) - Part 4-11:  
43 Testing and measurement techniques - Voltage dips, short interruptions and voltage  
44 variations immunity tests.

45 IEC 61000-4-13:2002+AMD1:2009+AMD2:2015CSV, Electromagnetic compatibility (EMC) -  
46 Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including  
47 mains signalling at a.c. power port, low frequency immunity tests.

48 IEC61000-4-34:2005+AMD1:2009CSV, Electromagnetic compatibility (EMC) - Part 4-34:  
49 Testing and measurement techniques - Voltage dips, short interruptions and voltage  
50 variations immunity tests for equipment with mains current more than 16 A per phase.

51 CISPR TR 16-2-3: 2016, Specification for radio disturbance and immunity measuring  
 52 apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity -  
 53 Radiated disturbance measurements

54 IEC 61400-1: 2005, Wind turbines - Part 1: Design requirements

55 IEC 61400-2: 2013, Wind turbines - Part 2: Small wind turbines

56 CISPR TR 16-2-5: 2008, Specification for radio disturbance and immunity measuring  
 57 apparatus and methods - Part 2-5: In situ measurements for disturbing emissions produced by  
 58 physically large equipment

59 IEC/CISPR 16-4-2: 2011+amd:2014, Specification for radio disturbance and immunity  
 60 measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling -  
 61 Measurement instrumentation uncertainty

62 IEC 61400-21:2008, Wind turbines - Part 21: Measurement and assessment of power quality  
 63 characteristics of grid connected wind turbines

64 ISO/IEC 17025:2017, General requirements for the competence of testing and calibration  
 65 laboratories

66

### 67 **3 Terms and definitions.**

68 For the purposes of this document, the following terms and definitions apply.

69 ISO and IEC maintain terminological databases for use in standardization at the following  
 70 addresses:

- 71 • IEC Electropedia: available at <http://www.electropedia.org/>
- 72 • ISO Online browsing platform: available at <http://www.iso.org/obp>

73

74 For the purposes of this document, the terms and definitions are given in IEC 61400-1, IEC  
 75 61400-2 and CISPR 11.

76 Technical Construction file: documentation about the product under test refer to EMC matters.

### 77 **4 Symbols and units.**

78 See IEC 61400-1, IEC 61400-2, CISPR11 and the other referenced standards.

### 79 **5 Abbreviations.**

80 See IEC 61400-1, IEC 61400-2, CISPR11 and the other referenced standards.

### 81 **6 Marking and documentation.**

82 This is the minimum information to be provided by the manufacturer:

#### 83 **Wind turbine type specification:**

#### 84 **Machine parameters:**

##### 85 **Model**

86 WT manufacturer and country

87 IEC WT class

88 Rated power

[kW]

89 Rated wind speed  $V_r$

[m/s]

90 Rotor diameter

[m]

91 Hub height(s)

[m]

92 Hub height operating wind speed range  $V_{in} - V_{out}$

[m/s]

93 Design life time

[y]



94 **Wind conditions:**

|    |                                                                    |       |
|----|--------------------------------------------------------------------|-------|
| 95 | Characteristic turbulence intensity $I_{15}$ at $V_{hub} = 15$ m/s | [-]   |
| 96 | Annual average wind speed at hub height $V_{ave}$                  | [m/s] |
| 97 | Reference wind speed $V_{ref}$                                     | [m/s] |
| 98 | Mean flow inclination                                              | [deg] |
| 99 | Hub height 50-year extreme wind speed $V_{e50}$                    | [m/s] |

100 **Electrical network conditions:**

|     |                                                      |        |
|-----|------------------------------------------------------|--------|
| 101 | Normal supply voltage and range                      | [V]    |
| 102 | Normal supply frequency and range                    | [Hz]   |
| 103 | Voltage imbalance                                    | [V]    |
| 104 | Maximum duration of electrical power network outages | [days] |
| 105 | Number of electrical network outages                 | [1/y]  |

106 **Other environmental conditions (where taken into account):**

|     |                                                                               |                      |
|-----|-------------------------------------------------------------------------------|----------------------|
| 107 | Design conditions in case of offshore WT (water depth, wave conditions, etc.) |                      |
| 108 | Normal and extreme temperature ranges                                         | [°C]                 |
| 109 | Relative humidity of the air                                                  | [%]                  |
| 110 | Air density                                                                   | [kg/m <sup>3</sup> ] |
| 111 | Solar radiation                                                               | [W/m <sup>2</sup> ]  |
| 112 | Description of lightning protection system                                    |                      |
| 113 | Earthquake model and parameters                                               |                      |
| 114 | Salinity                                                                      | [g/m <sup>3</sup> ]  |

115 **Major components:**

|     |                |     |
|-----|----------------|-----|
| 116 | Blade type     | [-] |
| 117 | Gear box type  | [-] |
| 118 | Generator type | [-] |
| 119 | Tower type     | [-] |
| 120 | Main Converter |     |

121

122 **7 Test setup for Type tests.**

123 Test setup specific for this standard is included in the relevant chapters.

124 **8 Operation conditions during testing.**

125 Operating conditions specific for this standard are included in the relevant chapters.

126 **9 Emission requirements.**

127 All subsystems have to fulfil the emission requirements of the product standard or the relevant  
128 generic standard. But as minimum the emission levels for the complete turbine.

129 **9.1 Conducted emissions**

130  
131 Conducted emissions requirements do not apply for wind turbines under the scope of IEC  
132 61400-1.

133  
134 For wind turbines under the scope of IEC 61400-2 annex H of IEC 61400-2 is applicable.  
135

136 **Network communication ports:**

137  
138 Electrical communication ports shall comply with CISPR 32.  
139