

TECHNICAL REPORT

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**Wind turbines –
Electromagnetic compatibility**

Eoliennes –
Compatibilité électromagnétique

Windturbinen –
Elektromagnetische Verträglichkeit

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CENELEC

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

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Foreword

This Technical Report was prepared by the Technical Committee CENELEC TC 88 (former CLC/BTTF 83-2), Wind turbine systems.

The text of the draft was submitted to the formal vote and was approved by CENELEC as CLC/TR 50373 on 2004-03-16.

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Introduction

This Technical Report is intended to provide guidance, to manufacturers, vendors, purchasers and users of wind turbines, on the application of Electromagnetic Compatibility (EMC) standards. The extent to which EMC phenomena are covered is indicated in the scope of this Technical Report.

Manufacturers and vendors of wind turbines should refer also to Article 10 of the Council Directive 89/336/EEC of 3 May 1989 (the Electromagnetic Compatibility (EMC) Directive), which covers such matters as declarations of conformity and CE marks.

1 Scope

This Technical Report provides guidance on requirements for the electromagnetic compatibility of wind turbines of all sizes to assist with achieving compliance with EMC standards. This Technical Report includes guidance on emissions, and for immunity to external disturbances.

Safety related aspects are not included in this Technical Report. They are the subject of relevant parts of EN 61400.

This Technical Report is applicable to electromagnetic emissions and immunity, both conducted and radiated, in the range 0 Hz to 400 GHz (although generally EMC standards do not at present contain test methods or limits at frequencies above 1 GHz). Fault conditions are not taken into account.

This Technical Report does not include test procedures, conditions, limits, or reference values; these requirements are included in relevant parts of EN 61000, which are referred to in this Technical Report where necessary.

This Technical Report also provides guidance for wind turbine installations (wind farms or single machines).

The electromagnetic compatibility of components within the wind turbine (i.e. within enclosed parts of the wind turbine, which may include the hub, nacelle and tubular tower) with each other is solely a matter for the wind turbine manufacturer.

The physical impact of the structure on the reception of radio services in the vicinity needs to be considered as a separate issue, and is not dealt with in this Technical Report. It should be noted that although experience to date has shown that physical interference to broadcasting services has caused the majority of complaints, wind turbines are capable of interfering with all radio services to some extent.

2 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.

- | | |
|--------------|---|
| EN 55011 | Industrial, scientific and medical (ISM) radio-frequency equipment - Radiodisturbance characteristics - Limits and methods of measurement (CISPR 11) |
| EN 61000-5 | Electromagnetic compatibility (EMC) – Part 5: Installation and mitigation guidelines (IEC 61000-5) |
| EN 61000-6-1 | Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1, mod) |

- EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments (IEC 61000-6-2, mod)
- EN 61000-6-3 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3, mod)
- EN 61000-6-4 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4, mod)
- EN 61400-21 Wind turbine generator systems - Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines (IEC 61400-21)

3 Definitions

Definitions related to EMC and to relevant phenomena may be found in the EMC Directive, in Chapter 161 of the IECV (IEC 60050) and in CISPR publications. The definitions stated in the EMC Directive take precedence.

For the purposes of this Technical Report, the following definitions apply:

3.1

low voltage (LV)

in this document, LV refers to $U_n \leq 1 \text{ kV}$

3.2

medium voltage (MV)

in this document, MV refers to $1 \text{ kV} < U_n \leq 35 \text{ kV}$

3.3

high voltage (HV)

in this document, HV refers to $U_n > 35 \text{ kV}$

3.4

port

particular interface of the specified apparatus with the external electromagnetic environment [EN 61000-6-3]

NOTE Definitions of particular types of port are provided in EN 61000 series.

3.5

wind turbine, wind turbine generator system (WTGS)

a system which converts kinetic energy in the wind into electrical energy [IEC 61400-1]

4 Symbols and abbreviations

EMC Electromagnetic Compatibility

U_n Phase to phase nominal voltage (V)