PD IEC TS 61400-31:2023

BSI Standards Publication

Wind energy generation systems

Part 31: Siting risk assessment

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National foreword

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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 committee manager.

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Published by BSI Standards Limited 2023

ISBN 978 0 539 16535 7

ICS 27.180

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 November 2023.

Amendments/corrigenda issued since publication

Date	Text affected

IEC TS 61400-31

Edition 1.0 2023-11

TECHNICAL SPECIFICATION

colour inside

Wind energy generation systems – Part 31: Siting risk assessment

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 27.180

ISBN 978-2-8322-7744-7

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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WIND ENERGY GENERATION SYSTEMS –

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FOREWORD

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IEC TS 61400-31 has been prepared by subcommittee PT 61400-31: Wind energy generation systems – Part 31: Siting Risk Assessment, of IEC technical committee 88: Wind energy generation systems. It is a Technical Specification.

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
88/936/DTS	88/956/RVDTS

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

A list of all parts in the IEC 61400 series, published under the general title *Wind energy generation systems*, can be found on the IEC website.

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

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WIND ENERGY GENERATION SYSTEMS –

Part 31: Siting risk assessment

1 Scope

This part of IEC 61400, which is a Technical Specifiation, establishes a guideline for the assessment of the risks which a wind turbine may pose to the general public.

Incidents in wind farms causing harm to the general public are very rare events. However, there are requirements to cover this topic in the permitting procedures of several countries. This document aims to facilitate a uniform scope and a uniform use of methods in wind turbine risk assessments.

This document covers harm to the general public. It does not cover occupational exposure, e.g. of personnel involved in the operation and maintenance of the turbine, since occupational risks are usually dealt with in occupational health and safety regulations. The risk of damage to structures or other objects is also not part of this document unless such damage in turn poses a risk to the public.

Harm according to this document can be direct harm or indirect harm via damage to buildings or infrastructure, e.g. gas pipelines, nuclear facilities, dykes, rail infrastructure or roads.

This document 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. However, the specific cause of an incident (e.g. an incident such as a turbine collapse) is irrelevant to the assessment of the consequences. The only relevant factor is the expected probability of occurrence for the incident considered.

In terms of transmission of the hazard to the people affected, this document describes tower collapses, shedding of the nacelle, blade failures, falling or throwing of ice pieces and fire spread.

This document does not cover risks from visual distraction and environmental risk such as noise or shadow flicker.

Wind turbines may pose a hazard to aviation through incidents such as collisions with aircrafts or disturbance of air traffic control radar. These hazards are not covered in this document. In order to mitigate the hazard of aircrafts colliding with wind turbines, aviation lights are installed on wind turbines as covered in IEC 61400-29[1][1].

Risks connected to terrorist attacks and other malicious actions are not covered by this document.

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1 Numbers in square brackets refer to the Bibliography.

This document covers only onshore wind turbines with a horizontal axis and a swept area greater than 200 m^2. Substations and other external structures are excluded. Other tall structures associated with a wind farm or wind turbine (e.g. temporary or permanent meteorological masts) also introduce risks related to their possible collapse or failure. Such structures are not covered by this document. Guidance on the risks can be inferred from the reliability classes of the tall structure as determined with reference to EN 1993 Eurocode 3: Design of steel structures [2], including the national annexes where local design requirements are specified.

As to the extent of the harm, this document is limited to the immediate, potentially lethal, physical harm. Non-lethal harm is indirectly covered as described in Clause 6.

This document describes risks during operation of the wind turbine including maintenance, idling and standstill. It does not describe risks during construction, civil works, crane operations, assembly or decommissioning.

Risks according to this document are assessed by prescriptive and/or risk-based methods.

In evaluating risk, the risk is first expressed as a localized risk. Along with the probability of people being present at the location, a risk of lethal harm per year will be used to quantify the risk of harm to people.

This document covers risk reduction measures that might be necessary to reduce risk to a tolerable level.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and symbols

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
risk
combination of the probability of occurrence of harm and the severity of that harm

[SOURCE: IEC 60050-903:2013, 903-01-07]

3.1.2
harm
physical injury or damage to persons, property, and livestock

Note 1 to entry: Harm to property and to livestock is excluded from the scope of this document.

[SOURCE: IEC 60050-903:2013, 903-01-01, modified – addition of Note 1 to entry]