

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Wind energy generation systems –
Part 5: Wind turbine blades**

**Systèmes de génération d'énergie éolienne –
Partie 5: Pales d'éoliennes**



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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 27.180

ISBN 978-2-8322-8335-6

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Notation.....	10
4.1 Symbols.....	10
4.2 Greek symbols.....	11
4.3 Subscripts.....	11
4.4 Coordinate systems	11
5 Design environmental conditions	12
6 Design.....	13
6.1 Structural design process.....	13
6.1.1 General requirements	13
6.1.2 Building block approach for composite structural design.....	13
6.1.3 General blade design process	14
6.1.4 Design loads.....	17
6.2 Blade characteristics.....	18
6.2.1 Blade properties	18
6.2.2 Functional design tolerances	18
6.3 Aerodynamic design.....	19
6.3.1 General	19
6.3.2 Aerodynamic characteristics	19
6.3.3 Power performance characterization (informative)	20
6.3.4 Airfoil noise (informative).....	20
6.4 Material requirements	20
6.4.1 General	20
6.4.2 Material properties for blade design.....	20
6.4.3 Qualification of materials for manufacture	24
6.5 Design for manufacturing	25
6.5.1 General	25
6.5.2 Requirement for manufacturing tolerances.....	25
6.6 Structural design.....	26
6.6.1 General design approach.....	26
6.6.2 Structural analysis	27
6.6.3 Verification requirements	29
6.6.4 Partial safety factors for materials	30
6.6.5 Structural design verification.....	34
6.6.6 Additional failure modes	47
7 Manufacturing requirements	48
7.1 Manufacturing process	48
7.2 Workshop requirements	48
7.2.1 General	48
7.2.2 Workshop facilities	49
7.2.3 Material handling and storage facilities	49
7.2.4 Tools and equipment	50

7.2.5	Personnel	51
7.3	Quality management system requirements	52
7.4	Manufacturing process requirements	52
7.4.1	General manufacturing requirements	52
7.4.2	Gelcoat application to the mould	52
7.4.3	Building up the laminate	53
7.4.4	Adhesive bonding process	54
7.4.5	Curing	55
7.4.6	Demoulding	55
7.4.7	Trimming, cutting, and grinding	55
7.4.8	Surface finish	56
7.4.9	Sealing	56
7.4.10	Additional component assembly processes	56
7.4.11	Mass and balance	57
7.4.12	Manufacturing and assembly processes outside controlled environment	57
7.5	Manufacture of natural fiber-reinforced rotor blades	57
7.6	Other manufacturing processes	58
7.7	Quality control process	58
7.7.1	Manufacturing quality plan	58
7.7.2	Incoming inspection	58
7.7.3	Manufacturing and quality control records	58
7.7.4	Non-conformity process	59
7.7.5	In manufacture corrective action processes	59
7.7.6	Final manufacturing inspection and conformity review	60
7.7.7	Documentation	60
7.8	Requirements for manufacturing evaluation	61
8	Blade Installation, operation and maintenance	62
8.1	General	62
8.2	Transportation, handling and installation	62
8.3	Maintenance	63
8.3.1	General	63
8.3.2	Scheduled inspections	63
	Figure 1 – Chordwise (flapwise, edgewise) coordinate system	11
	Figure 2 – Rotor (flapwise, lead-lag) coordinate system	12
	Figure 3 – The building block approach	13
	Figure 4 – Typical process for design and analytical evaluation of blade	15
	Figure 5 – Application of limit states design approach for blade verification	16
	Table 1 – Typical manufacturing effects	33

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WIND ENERGY GENERATION SYSTEMS –

Part 5: Wind turbine blades

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FDIS	Report on voting
88/759/FDIS	88/767/RVD

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

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

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

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INTRODUCTION

The blades of a wind turbine rotor are generally regarded as one of the most critical components of the wind turbine system. In this International Standard, a minimum set of requirements for the design and manufacturing of wind turbine blades are defined.

An approach to a structural design process for the blade is set forth in the general areas of blade characteristics, aerodynamic design, material requirements and structural design. Furthermore, in order to efficiently facilitate the transfer of a blade design to the production environment, this document includes demands for designing for manufacturing.

The requirements for structural design of the wind turbine blade have been developed in a manner to reward innovation, validation, quality and testing. Specifically, the designer will be able claim lower partial safety factors based on, among other items, the diligence of the validation of models and the correlation to testing results.

To ensure a production environment that can facilitate the manufacturing of a blade in accordance with the design, the manufacturing requirements included in this document provide a minimum basis for a quality management system and workshop requirements. In addition, requirements for blade handling, operation and maintenance are described in the close of this document.

WIND ENERGY GENERATION SYSTEMS –

Part 5: Wind turbine blades

1 Scope

This part of IEC 61400 specifies requirements to ensure the engineering integrity of wind turbine blades as well as an appropriate level of operational safety throughout the design lifetime. It includes requirements for:

- aerodynamic and structural design,
- material selection, evaluation and testing,
- manufacture (including associated quality management),
- transportation, installation, operation and maintenance of the blades.

The purpose of this document is to provide a technical reference for designers, manufacturers, purchasers, operators, third party organizations and material suppliers, as well as to define requirements for certification.

With respect to certification, this document provides the detailed basis for fulfilling the current requirements of the IECRE system, as well as other IEC standards relevant to wind turbine blades. When used for certification, the applicability of each portion of this document should be determined based on the extent of certification and associated certification modules per the IECRE system.

The rotor blade is defined as all components integrated in the blade design, excluding removable bolts in the blade root connection and support structures for installation.

This document is intended to be applied to rotor blades for all wind turbines. For rotor blades used on small wind turbines according to IEC 61400-2, the requirements in that document are applicable.

At the time this document was written, most blades were produced for horizontal axis wind turbines. The blades were mostly made of fiber reinforced plastics. However, most principles given in this document would be applicable to any rotor blade configuration, size and material.

2 Normative references

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.

IEC 60050-415, *International Electrotechnical Vocabulary (IEV) – Part 415: Wind turbine generator systems*

IEC 61400-1, *Wind energy generation systems – Part 1: Design requirements*

IEC 61400-2, *Wind turbines – Part 2: Small wind turbines*

IEC 61400-3-1, *Wind energy generation systems – Part 3-1: Design requirements for fixed offshore wind turbines*