88/1020/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 61400-5/AMD1 ED1	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2024-05-17	**2024-08-09**
SUPERSEDES DOCUMENTS:	
88/1017/RR	

IEC TC 88 : WIND ENERGY GENERATION SYSTEMS

SECRETARIAT:	SECRETARY:
Denmark	Mrs Christine Weibøl Bertelsen
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

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.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (See AC/22/2007 or new GUIDANCE DOC).

TITLE:

Amendment 1 – Wind energy generation systems – Part 5: Wind turbine blades

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

At the IEC TC 88 meeting held in Jeju Island, Korea the following decision was taken:

Decision 2(6): The option to go from NP with a CD attached directly to CDV stage shall not be used except in limited cases, with explicit permission from the TC 88 officers. The intention to go from NP to CDV shall be indicated on the NP form.

The TC 88 Officers have on basis of this action taken the decision, that the CD stage will be skipped for the following reasons:

- The existing Maintenance Team (MT 5) has broad NC participation
- All MT 5 experts have had possibility to comment/be involved in the work
- The amendment does not contain any controversial items

FOREWORD

This amendment has been prepared IEC technical committee 88: Wind energy generation systems.

The text of this amendment is based on the following documents:

FDIS	Report on voting
88/XXX/FDIS	88/XXX/RVD

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

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

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

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

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

INTRODUCTION

This amendment to IEC 61400-5:2020 removes conflicts with IECRE on the topic of certification and addresses errors and lack of clarity in the original document.

Scope

Delete: *", 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"

Normative References

Delete: *"ISO/IEC 17021-1, Conformity assessment – Requirements for bodies providing audit and certification of management systems – Part 1: Requirements"*

6 Design

6.4 Material requirements

6.4.2 Material properties for blade design

6.4.2.1 Characterization

Replace: *"For certification purposes, the tests for establishing design values for structural verification shall be performed according to requirements specified in the relevant certification scheme, e.g.:*

an accredited test organization;

a company approved by a suitable certification agency;

a non-certified company witnessed by the certification agency.

With: *"Test laboratories shall meet the technical requirements defined in ISO17025 or similar standards."*

6.6 Structural design

6.6.2 Structural analysis

6.6.2.3 Stability analysis

Replace: *"Primary load-carrying structures (e.g., spar caps, shear webs, trailing edge spars) shall be shown to be free of buckling when the structure is subjected to the design loads."*

With: "*Primary load-carrying structures (e.g., spar caps, shear webs, trailing edge spars) shall be shown to be free of buckling when the structure is subjected to the design loads. Buckling shall not occur in any component under the characteristic load."*

6.6.3 Verification requirements

6.6.3.2 Validation of global model by testing

Replace: *"For certification, a general validation of the design through a comparison with obtained results from full scale blade testing applies. This includes as a minimum"*

With: *"When the design created in accordance with the requirements of this standard is validated through a comparison with obtained results from full scale blade testing, the following applies:"*

Replace: *"Deviations of at most ± 7 % for the global bending deflection at the outermost loading station, ± 5 % for the first natural frequencies in two main directions and ± 10 % for the axial strains are*

permissible without further justification at load levels of the testing performed in accordance with IEC 61400-23."

With: *"Deviations of at most ± 7 % for the global bending deflection at the outermost loading station, ± 5 % for the first natural frequencies in two main directions and ± 10 % for the axial strains are permissible without further justification at load levels of the testing performed in accordance with IEC 61400-23 or other relevant standards."*

6.6.3.3 Validation of analytical models and methods

Delete "and/or certified"

6.6.4 Partial safety factors for materials

6.6.4.1 Definitions

Replace: *"γ_{m5} is the factor for load characterization."*

With: *"γ_{m5} is the factor for load characterization.*

The combined partial safety factor for materials in this standard shall not be less than the minimum partial safety factor for resistance specified in IEC 61400-1."

6.6.5 Structural design verification

6.6.5.5 Sandwich core ultimate strength verification

Replace: *"For ultimate strength verification of sandwich cores, the product of γ_{m0} and the factors γ_{m1} through γ_{m5} listed below shall be applied to the core material mean strength values."*

With: *"For ultimate strength verification of sandwich cores, the product of γ_{m0} and the factors γ_{m1} through γ_{m5} listed below shall be applied to the core material statistically derived characteristic strength values."*

6.6.5.6 Global static stability (global buckling)

Replace: *"The analyses shall be conducted using mean values of the material stiffness.*

Thicknesses of sandwich cores shall be conservatively estimated, including potential compression related to the selected method of manufacturing.

The suitability of the FE mesh density shall be demonstrated by a convergence study. A sufficient accuracy of the mesh may be assumed when the (linear) buckling eigenvalue does not change by more than 5 % if the mesh density is doubled in the region of the model pertinent to the buckling mode in question.

For geometric non-linear FE-analyses, the load vector directions shall be considered and related to the deformation of the blade and consistent with the external loading. A stress-free pre-deformation proportional to the relevant linear buckling eigenforms shall be applied to the structure with an appropriate scaling of the height. In the absence of further justification (e.g., geometric imperfections related to production tolerances), the height of the imperfection shall be 0,25 % of the relevant eigenform wavelength.

Stable post-buckling behavior is permitted under the following conditions:

- *Buckling shall not result in failure of any structural members at the design load. All relevant failure modes shall be examined in the buckled condition, as per the remaining requirements of this document.*