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**NATIONAL STANDARD OF THE
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GB/T 42592-2023

**Wind turbine generator systems - Ultrasonic nondestructive
testing methods for rotor blades**

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Foreword

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Liwei, Feng Xuebin, Wang Jianwei, Zhu Zhiqun, Wu Zhiqun, Zhang Jinfeng, Liu Shanchao, Wang Yanli, Ren Jun, Li Peixin, Li Lei, Zhou Xiaoliang, Wang Jiechang, Wu Chuang, Li Chengliang: Ultrasonic detection method of wind turbine blades

1 Scope

GB/T 42592-2023 specifies how to look inside a wind turbine blade without cutting it open. A modern blade is a thick composite laminate, glass or carbon fibre in resin, tens of metres long, and the defects that matter - delaminations, voids, incomplete bonding at the shear web or the trailing edge - are internal and invisible. They also sit in the parts of the blade carrying the most load, so finding them is the difference between a repair and a blade off the rotor. This document sets out contact ultrasonic testing by the pulse-reflection and through-transmission methods: the general requirements, the qualification of the arrangement, the inspection procedure, and the processing and reporting of results. It applies to the detection of internal defects in glass fibre and carbon fibre reinforced composite rotor blades, and may be used on the main structural elements of the blade. Under ICS 27.180 and CCS F11, it is written for blade manufacturers doing production inspection, for the service companies that inspect blades in the field, and for the certification bodies and owners who have to decide whether an indication found in a blade is acceptable.

This document specifies the general requirements, inspection procedures and requirements for contact ultrasonic pulse reflection/penetration testing of wind turbine blades: Result processing: This document applies to contact ultrasonic pulse reflection for internal defects in glass fiber or carbon fiber reinforced composite wind turbine blades Method/penetration method inspection: This document can be used for main girder pultrusion and infusion molding processes: Main girder prepreg process and hand lay-up process For higher porosity, ultrasonic testing can refer to this document, but the influence of acoustic characteristics needs to be considered:

2 Normative references

The contents of the following documents constitute the essential provisions of the documents through normative references in the text: Among them, dated references For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document: GB/T 2900:

53 Electrotechnical Terminology for Wind Turbine Generating Sets

GB/T 3608 Classification of working at heights

GB/T 9445 Qualification and certification of non-destructive testing personnel GB/T 12604:

3 Terms and Definitions

GB/T 17646, GB/T 2900:53, GB/T 12604:1 and the following terms and definitions apply to this document: 3:

1 Ultrasonic pulse-echocontact testing Using the contact method, according to the reflection echo generated by the discontinuity and (or) the bottom surface of the material when the ultrasonic wave propagates in the workpiece: backwall echo to inspect for flaws or to assess material: 3:

2 Penetrating method Two probes are used, placed on opposite sides of the workpiece, one emits ultrasonic waves and the other receives ultrasonic waves: After penetrating the workpiece according to ultrasound