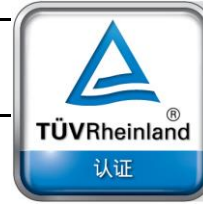


Country 国家	Greater China 大中华区
Safety Mark: 安全标志:	TÜV Rheinland China Mark TÜV 莱茵中国标志
Procedure Author: 程序作者:	Nan Gu (顾楠) TUV Rheinland (China) Ltd. 莱茵检测认证服务(中国)有限公司
Approved 批准	Miao Mai (麦苗) TUV Rheinland (China) Ltd. 莱茵检测认证服务(中国)有限公司
Revision date: 修订日期:	2022-07-19



德国莱茵TÜV
关键词 1
关键词 2
关键词 3

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1 Purpose 目的

This document describes the procedure for preparation, submittal, evaluation, and certification of products as defined in the scope for China Mark Approval of TÜV Rheinland (China) Ltd..

本文件阐述了莱茵检测认证服务(中国)有限公司 (TRCHN) 中国标志认证产品范围内规定的准备、提交、评估和认证程序。

2 Scope 范围

This document applies for the safety performance certification of wind turbines, this product is used for long periods of time in general outdoor weather conditions.

本规则适用于风力发电机组的安全性能认证，该产品是在一般室外气候条件下长期使用的。

3 Acc. Standards 依据标准

3.1 The standards for the accredited wind turbine 对获认可范围内的风力发电机组适用标准如下：

- GB/T 18451.1, Wind turbine generator systems - Design requirements
- GB/T 18451.1, 风力发电机组设计要求
- GB/T 35792, Wind turbines Part 22 : Conformity testing and certification
- GB/T 35792, 风力发电机组 第 22 部分：合格测试及认证
- IEC 61400 (all parts), Wind turbines
- IEC 61400 (所有部分), 风力发电机组
- IEC 61400-1 Wind energy generation systems – Part 1: Design requirements
- IEC 61400-1 风能发电系统 – 第 1 部分：设计要求
- IEC 61400-2, Wind turbines – Part 2: Design requirements for small wind turbines
- IEC 61400-2, 风力发电机组 – 第 2 部分: 小型风力发电机组安全要求
- IEC 61400-3, Wind turbines – Part 3: Design requirements for offshore wind turbines
- IEC 61400-3, 风力发电机组 – 第 3 部分: 海上风力发电机组设计要求
- IEC 61400-22, Wind turbines Part 22 : Conformity testing and certification
- IEC 61400-22, 风力发电机组 第 22 部分：合格测试及认证
- IEC 61400-24, Wind turbines – Part 24: Lightning protection
- IEC 61400-24, 风力发电机组 – 第 24 部分: 防雷保护
- IECRE OD-501, Type and Component Certification Scheme
- IECRE OD-501, 型式和部件认证方案
- GL 2010 Guideline for the Certification of Wind Turbines
- GL 2010 风力发电机组认证指南

- GL 2012 Guideline for the Certification of Offshore Wind Turbines
- GL 2012 海上风力发电机组认证指南
- DNVGL-ST-0437 Loads and site conditions for wind turbines
- DNVGL-ST-0437 风力发电机组的载荷和场址条件
- Other noted standards and specifications in design, manufacture and testing.
- 其他部件设计、制造、试验规范和大纲中引用的标准等。

The technical standards related to testing are as follows 和测试相关的技术标准如下：

- IEC 61400-12-1, Wind turbines – Part 12-1: Power performance measurements of electricity producing wind turbines
- IEC 61400-12-1, 风力发电机组 第 12-1 部分: 风力发电机组功率特性试验
- IEC 61400-11, Wind turbine generator systems – Part 11: Acoustic noise measurement techniques
- IEC 61400-11, 风力发电机组 – 第 11 部分: 噪声测量技术
- IEC/TS 61400-13, Wind turbine generator systems – Part 13: Measurement of mechanical loads
- IEC/TS 61400-13, 风力发电机组 – 第 13 部分: 机械载荷测试
- IEC 61400-21, Wind turbines – Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines
- IEC 61400-21, 风力发电机组 – 第 21 部分: 并网风力发电机组电能质量测量和评估方法
- IEC 61400-23, Wind turbine generator systems – Part 23: Full-scale structural testing of rotor blades
- IEC 61400-23, 风力发电机组 – 第 23 部分: 叶片全尺寸结构试验
- GB/T 18451.2, Power performance measurements of electricity producing wind turbines
- GB/T 18451.2, 风力发电机组 功率特性测试
- GB/T 37257-2018, Wind turbines—Measurement of mechanical loads
- GB/T 37257-2018, 风力发电机组 机械载荷测量

3.2 Keywords 关键词

Safety 安全合规

4 Type and purpose of Certification 认证目的及模式

Type certification shall confirm that the wind turbine type is designed in conformity with the design assumptions, specific standards and other technical requirements. It shall also confirm that the manufacturing process, component specifications, inspection and test procedures, and corresponding documentation are in conformity with the design documentation and that the manufacturer operates an accepted quality system. Furthermore, it covers the testing of the wind turbine.

型式认证应确认风力发电机组型式的设计符合设计假设、特定标准和其他技术要求。还应确认制造工艺、部件规范、检验和测试程序以及相应的文件符合设计文件，并且制造商运行一个可接受的质量体系。此外，还包括风力发电机组的试验。

The certification mode for wind turbine is: design evaluation + type test + manufacturing evaluation + supervision after certification.

风力发电机组的认证模式为：设计评估+型式试验+制造评估+获证后监督。

The type certification including but not limited 认证模式的基本环节包括：

- Application 认证的申请
- Design Basis evaluation 设计准则评估
- Design evaluation 设计评估
- Type testing 型式试验
- Manufacturing evaluation 制造评估
- Certification result assessment and approval 认证结果评价和批准
- Follow-up surveillance 获证后监督

5 The application of Certification 认证申请

5.1 Unit partition of the certified products 认证产品单元划分

In principle, according to the wind turbine type apply the certification.
原则上按产品型号申请认证。

5.2 Application documents 申请材料

- Application form 申请表
- Business license 营业执照
- Factory inspection report which approved by TÜV (if have)
TÜV莱茵批准的工厂检查报告 (如果有)
- Test report of TÜV Rheinland or any other TÜV Rheinland appointed ISO/IEC 17025 laboratory (if have)
TÜV莱茵测试报告或任何其他TÜV莱茵指定的符合ISO/IEC 17025要求的实验室出具的型式试验报告 (如果有)
- Codes and standards 设计规范和标准
- Design parameters, assumptions, methodologies and principles 设计参数、假设条件、方法和规则
- Other requirements, e.g. for manufacture, transportation, installation and commissioning as well as for operation and maintenance 风电机组参数、制造、运输、吊装、调试、试运行等规范
- Component design loads calculation report 设计载荷计算报告
- Design interface and boundary 设计接口和边界
- Material specification and dynamic characteristic 材料规范及动力学特性
- Component analysis report 设计计算报告
- List of components 部件清单
- List of spare parts for component 部件的子零部件清单
- Component structure design drawings 部件结构设计图纸
- Constructional drawing 部件生产图纸
- Type/data sheets (for mass-produced parts) 部件型号和数据表 (针对量产部件)
- Testing specification and testing report 部件测试大纲及测试报告
- Tower production & construction technical documents 部件生产制造技术文件
- Hydrology and geological survey report 水文和地勘报告
- User's manual and work instruction in English or Chinese language 中文或英文用户手册及作业指导书
- Photo-documentation (if not in the test report) 照片文件 (如果试验报告中未包括)

6 Design basis evaluation 设计准则评估

The purpose of design basis evaluation is to examine that the design basis is properly documented and sufficient for safe design of the wind turbine type. The design basis shall identify all requirements, assumptions and methodologies, which are essential for the design and the design documentation, including:

设计准则评估的目的是检查风力发电机组型号安全设计的充分性与设计准则的正确性。设计准则应列出所有对设计和设计文档至关重要的要求、假设条件及方法，包括：

- codes and standards 规范和标准
- design parameters, assumptions, methodologies and principles 设计参数、假设条件、方法和规则
- other requirements, e.g. for manufacture, transportation, installation and commissioning as well as for operation and maintenance 其他要求，如制造、运输、吊装、调试及运行和维护

Such identification may be carried out through references to this scheme, IEC 61400-1, IEC 61400-2 or IEC 61400-3 and other applied codes and standards, or by listing specific design aspects and parameters. In

particular, choices, supplementary information and deviations relating to the design issues shall be clearly stated in the design basis, e.g. for:

以上内容可参考本规则、IEC 61400-1、IEC 61400-2或IEC 61400-3及其他相关规范及标准来确认，或者列出特定的设计条件及参数来确认。设计准则中尤其要清楚地标明与设计关键点有关的选择、补充信息和偏差，如：

- external design parameters外部设计参数
- design load cases设计载荷工况
- load factors and load reduction factors载荷系数、载荷折减系数
- partial safety factors applied on loads and materials载荷和材料的局部安全系数
- duration of simulation as well as number of simulations仿真时间及仿真次数
- methods for extreme and fatigue design loads/response analysis极限和疲劳载荷分析方法
- environmental conditions relevant for installation和安装相关的环境条件
- inspection scope and frequency审查范围及频次
- target lifetime of components, systems and structures零部件、系统及结构的设计寿命
- requirements for condition monitoring systems状态监测系统的要求

7 Design evaluation 设计评估

The purpose of design evaluation is to examine whether the wind turbine type is designed and documented in conformity with the design assumptions, specific standards and other technical requirements.

设计评估的目的是为了检查风力发电机组是否按照设计假设条件、指定标准及其他技术要求来进行设计和记录的。

7.1 General 概述

The purpose of design evaluation is to examine whether the wind turbine type is designed and documented in conformity with the design assumptions, specific standards and other technical requirements. Normally, the design evaluation comprises all of the elements shown in Figure 1.

设计评估的目的是为了检查风力发电机组是否按照设计假设条件、指定标准及其他技术要求来进行设计和记录的。

通常设计评估包含的内容参见图1。

For SWT designed according to IEC 61400-2 all elements of Figure 4 and additionally, the element “evaluation of test for design data” shall be considered. The element “evaluation of the rotor blade” can be replaced by the element “evaluation of static blade test”.

对于按IEC 61400-2设计的小型风力发电机组，除图1中所有内容外，还应考虑设计数据测试的评估。叶片评估可以被静态叶片测试所取代。

For SWT, the static blade test, test for design data and component tests can be performed inhouse by the manufacturer, if agreed with the certification body.

对于小型风力发电机组，如果认证机构同意，静态叶片测试、设计数据测试、部件测试可以由制造商自行厂内开展。

The certification body shall require an applicant to supply all documentation necessary for design evaluation. A list of design documentation is provided in Annex A. This list may be extended or reduced, depending on the wind turbine concept and complexity of the design.

申请人应向认证机构提交所有与设计评估相关的文档，附录A为设计文档列表。此列表可根据风力发电机组概念及设计的复杂程度进行扩展及删减。

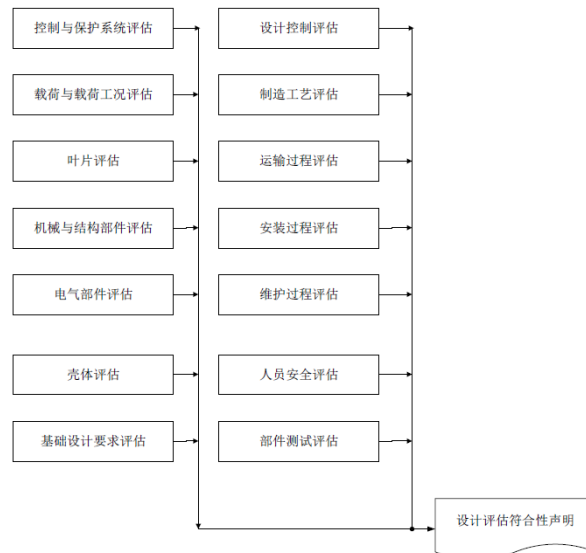


图1设计评估流程

7.2 Design control 设计控制

Evaluate the quality procedures used to control the design process. Design control procedures shall be required to:

评估用于控制设计过程的质量程序。应要求设计控制程序：

- comply with ISO 9001 Subclause 7.3, Design and development 符合ISO 9001第7.3款“设计和开发”的要求
- include control of documents such that the revision status of every document is clear to all parties 包括对文件的控制，以使各方清楚每个文件的修订状态

The requirement for evaluation is satisfied if the quality system of the applicant has been certified according to ISO 9001.

如果申请人的质量体系已根据ISO 9001认证，则满足评估要求。

7.3 Control and protection system 控制和保护系统

Evaluate the documentation of a control and protection system, comprising:

评估控制和保护系统的文件，包括：

- description of wind turbine modes of operation 风力发电机组运行模式说明
- design and functionality of all elements 所有零部件的设计和功
- fail-safe design of the protection system 保护系统的故障安全设计

7.4 Loads and load cases 载荷和载荷工况

Evaluate the loads and load cases for compliance with IEC 61400-1, IEC 61400-2 or IEC 61400-3 by independent analysis.

通过独立分析评估载荷和载荷工况是否符合IEC 61400-1、IEC 61400-2或IEC 61400-3。

Description of loads shall be provided in a format that enables to carry out independent analysis.

载荷说明的格式应确保能够进行独立分析。

The load values submitted shall be accompanied by the load case description, description of calculation models and input data such as:

提交的负荷值应附有负荷情况说明、计算模型说明和输入数据，例如：

- parameter values relating to aerodynamics 与空气动力学相关的参数值
- structural characteristics 结构特征
- parameter values relating to the control system 与控制系统相关的参数值

7.5 Rotor blades 叶片

Evaluate the design of the rotor blades.

应评估叶片的设计。

The rotor blades shall be evaluated for compliance with the requirements of this standard, IEC 61400-1, IEC 61400-2 or IEC 61400-3, IEC 61400-23) and the agreed additional codes and standards as defined in the design basis.

应评估叶片是否符合本标准、IEC 61400-1、IEC 61400-2或IEC 61400-3、IEC 61400-23) 的要求以及设计依据中规定的商定附加规范和标准。

The design documentation relating to rotor blades will normally consist of specifications, descriptions, drawings and design calculations, which may be combined with measurement/test reports, schematics and part lists. Require that the documentation clearly refers to the design basis and identifies the basis for the design. Additionally, the documentation shall contain sufficient information for evaluation of the design, such as

与叶片相关的设计文件通常包括规范、说明、图纸和设计计算，这些文件可以与测量/测试报告、示意图和零部件清单相结合。要求文件明确提及设计依据，并确定设计依据。此外，文件应包含足够的设计评估信息，例如

- codes, standards and references 规范、标准和参考文件
- design loads and relevant external conditions 设计载荷和相关外部条件
- static systems and boundary conditions 静态学模型和边界条件
- influence of adjacent structures and components 相邻结构和部件的影响
- materials and permissible stresses 材料和许用应力
- material and sub-component test program 材料和子零部件测试程序
- full-scale blade test program 全尺寸叶片测试程序
- manufacturing processes 制造过程
- tolerances influencing the design 影响设计的公差
- quality control procedures and level 质量控制程序和水平

7.6 Machine and structural components 机械和结构部件

Evaluate the design of all load-bearing machinery structures and components of the wind turbine such as:

评估风力发电机组所有承重机械结构和部件的设计，例如：

- casted, forged or welded structures 铸造、锻造或焊接结构
- nacelle frame 机舱底座
- tower 塔架
- pitch and yaw systems 变桨和偏航系统
- bearings and elastomer bushings 轴承和弹性衬套
- gearboxes 齿轮箱
- brakes, couplings and locking devices 制动器、联轴器和锁定装置
- bolts for connecting these structures and components 用于连接这些结构和部件的螺栓
- cooling and heating systems 冷却和加热系统
- hydraulic systems 液压系统

The machinery structures and components shall be evaluated for compliance with the requirements of this standard, IEC 61400-1, IEC 61400-2 or IEC 61400-3, and the agreed additional codes and standards as defined in the design basis.

应评估机械结构和零部件是否符合本标准、IEC 61400-1、IEC 61400-2或IEC 61400-3的要求，以及设计依据中规定的商定附加规范和标准。

The gearbox shall be evaluated for compliance with the requirements of ISO 81400-44.

应评估齿轮箱是否符合IEC 61400-4的要求。

Furthermore, requirements for testing of components during manufacturing and assembly shall be specified and evaluated.

此外，应规定和评估制造和装配期间的零部件测试要求。

The design documentation relating to machinery structures and components will normally consist of specifications, descriptions, drawings and design calculations, which may be combined with measurement/test reports, diagrams, data sheets, schematics and part lists. Require that the documentation clearly refers to the design basis and identifies the basis for the design. Additionally, the documentation shall contain sufficient information, for example on:

与机械结构和部件相关的设计文件通常包括规范、说明、图纸和设计计算，这些文件可以与测量/测试报告、图表、数据表、示意图和零件清单相结合。要求文件明确提及设计依据，并确定设计依据。此外，文件应包含足够的信息，例如：

- codes, standards and references 规范、标准和参考文件
- design loads and relevant external conditions 设计载荷和相关外部条件
- static systems and boundary conditions 静态学模型和边界条件
- influence of adjacent structures and components 相邻结构和部件的影响
- influence of drive train dynamics 传动链动力学的影响
- materials and permissible stresses 材料和许用应力
- type/data sheets (for mass-produced parts) 类型/数据表（用于批量生产的零部件）
- work instructions (for bolted connections) 作业指导书（用于螺栓连接）

7.7 Electrical components 电气部件

Evaluate the design of all electrical components of the wind turbine such as:

评估风力发电机组所有电气部件的设计，例如：

- generators 发电机
- transformers 变压器
- converters 换流器
- medium and high voltage components 中高压部件
- electrical drives 电气传动装置
- charging equipment and storage batteries 充电设备和蓄电池
- switchgear and protection equipment 开关设备和保护设备
- cables and electrical installation equipment 电缆和电气安装设备
- lightning protection 防雷保护

The electrical components shall be evaluated for compliance with the requirements of this standard, IEC 61400-1 and IEC 61400-2 or IEC 61400-3 as well as further IEC-standards and the agreed additional codes and standards as defined in the design basis.

应评估电气部件是否符合本标准、IEC 61400-1和IEC 61400-2或IEC 61400-3的要求，以及进一步的IEC标准和设计依据中定义的商定附加规范和标准。

For evaluation of lightning protection, reference is made to IEC 61400-24.

防雷评估参考IEC 61400-24。

Workshop tests for the generator according to IEC 60034 series shall be carried out and documented. The result of the workshop test shall be considered during the design evaluation.

应根据IEC 60034系列对发电机进行车间试验，并记录在案。在设计评估期间，应考虑车间测试的结果。

Furthermore, requirements for testing of components during manufacturing and assembly shall be specified and evaluated.

此外，应规定和评估制造和装配期间的部件测试要求

The design documentation relating to electrical components will normally consist of specifications, descriptions, drawings, diagrams, data sheets, type test reports and design calculations, which may be combined with schematics and part lists. The certification body shall require that the documentation clearly refers to the design basis and identifies the basis for the design. Additionally, the documentation shall contain sufficient information, for example on:

与电气部件相关的设计文件通常包括规范、说明、图纸、图表、数据表、型式试验报告和设计计算，这些文件可以与示意图和零件清单相结合。认证机构应要求文件明确提及设计依据，并确定设计依据。此外，文件应包含足够的信息，例如：

- codes, standards and references 规范、标准和参考文件
- design requirements and relevant external conditions 设计要求及相关外部条件
- boundary conditions 边界条件
- influence of adjacent structures and components 相邻结构和部件的影响
- materials 材料

7.8 Housings 壳体

The certification body shall evaluate the design of all housings such as:

认证机构应评估所有壳体的设计，例如：

- spinners 导流罩
- nacelle covers 机舱罩

Housings shall be evaluated for compliance with the requirements of this standard, IEC 61400-1, IEC 61400-2 or IEC 61400-3 and the agreed additional codes and standards as defined in the design basis.

应评估外壳是否符合本标准、IEC 61400-1、IEC 6140-2 或 IEC 61400-3 的要求以及设计依据中规定的商定附加规范和标准。

The design documentation relating to housings will normally consist of specifications, descriptions, drawings and design calculations, which may be combined with measurement/test reports, schematics and part lists. The certification body shall require that the documentation clearly refers to the design basis and identifies the basis for the design.

与壳体相关的设计文件通常包括规范、说明、图纸和设计计算，这些文件可以与测量/测试报告、示意图和零部件清单相结合。认证机构应要求文件明确提及设计依据，并确定设计依据。

Additionally, the documentation shall contain sufficient information, for example on:

此外，文件应包含足够的信息，例如：

- codes, standards and references 规范、标准和参考文件
- design loads and relevant external conditions 设计载荷和相关外部条件
- static systems and boundary conditions 静态学模型和边界条件
- influence of adjacent structures and components 相邻结构和部件的影响
- materials and permissible stresses 材料和许用应力

7.9 Evaluation of component tests 部件测试评估

The strength and other functional requirements of some structural, mechanical or electrical components may be documented by measurements or test results only.

某些结构、机械或电气部件的强度和其他功能要求只能通过测量或测试结果记录。

When the relevant analysis for a component is found to be inadequate, the certification body may require additional component tests and/or measurements to be carried out as an alternative to further analysis. The certification body shall evaluate the design of such a component on the basis of the measurements and test reports and establish that test results are properly implemented in the design.

当发现部件的相关分析不充分时，认证机构可能要求进行额外的部件测试和/或测量，作为进一步分析的替代方案。

认证机构应根据测量和测试报告评估此类部件的设计，并确定测试结果在设计中得到了正确实施。

The certification body shall require that measurement and test reports clearly identify the component, the test standards or procedures, as well as the conditions for which the tests have been carried out.

认证机构应要求测量和测试报告清楚地识别部件、测试标准或程序，以及进行测试的条件。

7.10 Foundation design requirements 基础设计要求

The certification body shall evaluate the foundation design requirements detailed in the design documentation for a turbine with respect to compliance of one or more foundation design(s) with IEC 61400-1, IEC 61400-2 or IEC 61400-3 and relevant agreed structural codes. In addition, the evaluation shall establish that the foundation design(s) conform to interface geometry requirements (flatness, level, and bolt pattern tolerances) and the strength requirements defined in the turbine design documentation.

认证机构应评估风力发电机组设计文件中详述的基础设计要求，以确保一个或多个基础设计符合IEC 61400-1、IEC 61400-2或IEC 61400-3和相关商定的结构规范。此外，评估应确定基础设计符合接口几何要求（平面度、水平度和螺栓模式公差）和风力发电机组设计文件中定义的强度要求。

For offshore wind turbines, the foundation design requirements shall also include design requirements for the sub-structure connecting the tower to the foundation.

对于海上风力发电机组，基础设计要求还应包括连接塔架与基础之间的下部结构的设计要求。。

The characteristic and design loads at the interfaces of tower, sub-structure and foundation stated in the design documentation shall be used as a basis for this evaluation. These loads shall include both horizontal and vertical forces as well as any moments about horizontal and vertical axes at the interface. The extreme dynamic loads as well as fatigue loads resulting from the combination of all relevant load cases shall be considered in the design evaluation. Because overall turbine and support structure system natural vibration frequencies and modes can be affected by foundation flexibility, a permissible range for horizontal, vertical and rotational foundation flexibility at the interface between foundation and sub-structure or tower shall be stated.

设计文件中所述的塔架、下部结构与基础的结合面的特征和设计载荷应作为该评估的基础。这些设计载荷必须包括水平和垂直方向的力以及结合面处水平轴和垂直轴方向上的任何力矩。设计评估中应考虑由相关载荷工况组合产生的极限动态载荷和疲劳载荷。由于基础刚度会影响到整机和支承结构的固有频率与模态，因此应当说明基础与下部结构或塔架结合面上水平、垂直和转动基础刚度的允许范围。

The resistance and flexibility of the foundation shall be evaluated in terms of representative soil conditions at sites suitable for installation of the foundation. These soil conditions shall be described in the foundation design documentation.

风力发电机组基础的承载力和刚度计算值需要依据风力发电机组基础施工现场的土壤条件才能进行评估。这些土壤条件必须在基础设计文件中进行描述。

7.11 Manufacturing process 制造过程

The certification body shall verify that the turbine design can be manufactured according to any quality requirements identified in the design documentation. The quality-relevant manufacturing processes shall be described.

认证机构应确认风力发电机组能够按照设计文件中规定的所有质量要求进行制造。与质量相关的制造过程应被描述。

The manufacturing process may be documented in preliminary

初步应该记录制造过程文件

- manufacturing specifications 制造技术规范
- work instructions, purchase specifications 作业指导书，采购规范
- quality control procedures 质量控制程序

In addition, requirements for workshop tests shall be specified.

另外，还应指定车间测试要求。

The evaluation of the final version of these documents, at the latest, shall be part of final evaluation, Subclause 8.9.

最终制造过程文件的评估将作为最终评估的一部分，详见8.9。

7.12 Transportation process 运输过程

The certification body shall verify that the turbine can be transported according to any requirements identified in the design documentation.

认证机构必须确认风力发电机组能够按照设计文件中规定的任何要求进行运输。

This description of the transportation process shall, if applicable, include:

如果适用，运输过程的描述应当包括：

- technical specifications applicable for the transportation 可适用的运输技术规范
- limiting environmental conditions 限定的环境条件
- transportation arrangement including required fixtures, tooling and equipment 运输准备, 包括所需的固定装置、工具和设备
- transportation loads and load conditions 运输载荷和载荷工况

The transportation process may be documented in a preliminary transportation/installation manual. The final description of the transportation process shall be evaluated at the latest during final evaluation, Subclause 8.9. 可以在初步的运输或安装手册中描述运输过程。最终运输过程文件的评估将作为最终评估的一部分, 详见8.9。

7.13 Installation process 安装过程

The installation process shall be sufficiently described to allow the certification body to verify the adequacy of the turbine design, taking into account specified installation processes, including commissioning. This description of the installation process shall, if applicable, include:

应充分描述安装过程, 以便于认证机构核查风力发电机组设计的充分性, 确认考虑了含调试在内的特定安装过程。如果适用, 安装过程的描述应包括:

- identification of human resource requirements and skills 人员资质与技能要求的证明
- identification of interface points and any required technical specifications for civil and electrical construction works including earthing system 对包括接地系统在内的土木结构及电气结构的接触点和任何技术要求的标识
- identification of specialised tooling and required lifting fixtures or equipment 特殊工具和提升用固定装置或设备的标识
- quality control check points, measurements and inspections, required by the design 设计中要求的质量控制检查点, 测量和检查
- description of personnel safety and planned environmental protection measures 人员安全和环境保护措施的描述
- outline of planned installation manual 安装手册大纲
- commissioning procedures and check-list 调试程序和检验单
- quality recording and record keeping processes 质量记录和记录保管程序

The installation process may be documented in a preliminary installation/commissioning manual. The final description of the installation process shall be evaluated at the latest during Final Evaluation, Subclause 8.9. 安装过程可以在初步的安装/调试手册中进行描述, 在最终评估过程中应评估最终的安装过程/方案, 详见8.9。

7.14 Maintenance process 维护过程

The maintenance process shall be sufficiently described to allow the certification body to verify the adequacy of the turbine design, taking into account specified maintenance processes. This description of the maintenance process shall, if applicable, include:

维护过程必须充分详细的描述以便于认证机构核查风力发电机组设计的充分性, 同时应考虑特定的维护过程。如果适用, 维护过程的描述应包括:

- scheduled maintenance actions including inspection intervals and routine actions 维护工作计划, 包括检查周期和日常检查工作
- identification of all safety-related operational procedures or maintenance activities 所有安全相关的运行过程或维护工作的识别
- description of planned environmental protection measures 环境保护措施计划的描述
- identification of required specialised tooling and maintenance equipment 符合规定的特殊工具和维护设备的标识
- identification of human resource requirements and skills 人员身份证明和技能证明
- outline of planned operating instructions and maintenance manual 计划的操作指令和维护手册大纲
- description of quality recording and record keeping processes 质量记录和记录保管程序

The maintenance process may be documented in a preliminary O&M manual. The final description of the maintenance process shall be evaluated at the latest during final evaluation, Subclause 8.9.

维护过程可以在初步的运行与维护手册中描述，最终的维护过程描述必须在最终评估过程中进行评估，详见8.9。

7.15 Personnel safety 人员安全

The certification body shall evaluate personnel safety aspects in the design documentation (drawings, specifications and instructions) for compliance with IEC 61400-1, IEC 61400-2 or IEC 61400-3 and the agreed additional codes and standards.

认证机构应评估设计文件（图纸、规范和说明）中的人员安全方面是否符合IEC 61400-1、IEC 61400-2或IEC 61400-3以及商定的附加规范和标准。

Personnel safety aspects to be considered include:

人员安全内容包括：

- safety instructions 安全指南
- climbing facilities 攀爬设备
- access ways and passages 进出通道及过道
- standing places, platforms and floors 站立位置、平台和地板
- hand rails and fixing points 扶手和固定点
- lighting 照明
- electrical and earthing system 电气和接地系统
- fire resistance 防火
- emergency switching off buttons 紧急停机按钮
- provision of alternative escape routes 备用的可选逃生通道
- provision for emergency stay in an for offshore wind turbine for one week 海上风力发电机组具备可供一周紧急避难的设施
- offshore specific safety equipment for an offshore wind turbine 海上风力发电机组的特殊安全设备

The certification body shall require an applicant to identify elements in the design documentation that pertain to personnel safety.

认证机构应要求申请人在设计文件中明确人员安全的内容。

7.16 Design evaluation conformity statement 设计评估符合性声明

The certification body shall issue a conformity statement based on satisfactory evaluation of a design evaluation report(s). The conformity statement shall include:

认证机构基于符合要求的设计评估报告颁发设计评估符合性声明，该声明应包含下列内容：

- identification of the wind turbine type 风力发电机组型号
- identification of the applicant 申请人
- list of IEC 61400 series standards used 采用的IEC 61400系列标准清单
- specification of external conditions with reference to the WT class and other principal data 和风力发电机组等级及其他主要参数相关的外部条件的说明
- specific reference to evaluation report(s) 具体参考的评估报告

8 Type testing 型式测试

8.1 General 概述

The purpose of type testing is to provide data needed to verify power performance, aspects that are vital to safety and need additional experimental verification, and any other aspects that cannot be reliably evaluated by analysis. Type testing comprises the elements shown in Figure 2.

型式测试的目的是提供必要的的数据确认功率特性、对安全关系重大的内容、必要的附加测试验证，以及通过分析方法不能进行可靠评估的其他方面，型式测试包括的内容见图2。

The certification body shall evaluate that testing of these aspects, as applicable, has been carried out on a turbine

or component of a turbine representative of the type to be certified. Inspection records shall be completed, preferably prior to the tests, to demonstrate satisfactory conformity of the turbine or component with the design documentation.

认证机构应对代表所认证的风力发电机组或部件进行测试评估。测试前，应完成检查并记录，以证明风力发电机组或部件满足设计文件的要求。

The detailed test program shall be defined by the applicant and be subject to approval by the certification body on a case by case basis.

申请人应依据具体的项目制定详细的测试大纲并提交认证机构批准。

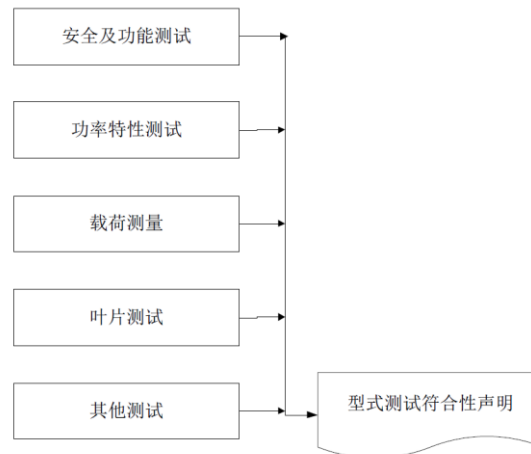


图2 型式测试项目

The type testing elements given in Figure 2 and the duration test shall be carried out by an accredited testing laboratory or the certification body shall verify that the party conducting the testing complies with at least the criteria of ISO/IEC 17025 or ISO/IEC 17020, as applicable. The requirements for the duration test are described in IEC 61400-2.

图2给出了型式测试项目，如果适用，耐久测试应由认可实验室或者认证机构审核至少符合标准ISO/IEC 17025或ISO/IEC 17020的机构进行测试。耐久性测试的要求参见IEC 61400-2。

The certification body shall require that the testing and the test results be documented in a test report. This test report shall be evaluated by the certification body to ensure that the tests have been carried out in accordance with the approved detailed test program and that the test report properly documents the aspects required for certification. The certification body shall verify by inspection that critical personnel safety features have been satisfactorily implemented in the installed wind turbine to be tested.

认证机构应要求测试及测试结果以文件形式出具测试报告，测试报告交由认证机构评估，确定测试符合已批准的测试大纲以及认证要求。认证机构应通过检查验证有关人员安全的关键要求已在安装风力发电机组上实施。

A satisfactory evaluation is concluded with a conformity statement. The signatories of the conformity statement shall be different from the persons responsible for the test reports, attestation of the tests and accreditation of the test laboratories.

评估符合要求后可签发相应的符合性声明，符合性声明的签字人应不同于测试编写、审核人员和实验室授权签字人。

For SWT designed according to IEC 61400-2 the “load measurements” and “blade tests” have to be replaced by the “duration test”.

按照IEC 61400-2设计的小型风力发电机，由耐久性测试代替载荷测试和叶片测试。

8.2 Safety and function tests 安全及功能测试

The purpose of safety and function testing is to verify that the wind turbine under test displays the behaviour predicted in the design.

安全及功能测试的目的是验证测试结果与设计预期的符合性。

The certification body shall verify satisfactory demonstration of the control and protection system functions with reference to the approved test plan see 8.3. The test plan shall at least include testing of the protection functions

below. In addition, the dynamic behaviour of the wind turbine at rated wind speed or above shall be verified by testing if this has not been verified within the scope of the load measurements.

认证机构应验证控制和保护系统功能符合8.3已批准的测试大纲，测试大纲至少包括保护功能测试。此外，在未被载荷测试验证的情况下，应测试风力发电机组在额定风速或额定风速以上的动力学特性。

The protection functions under test shall include functions with a single fault in the control and protection system. 保护功能测试应包括控制和保护系统单一故障功能。

8.3 Power performance measurements 功率特性测量

The purpose of power performance measurements is to document a measured power curve and predicted annual energy production for the wind turbine type, in accordance with IEC 61400-12-1.

功率性能测量的目的是根据IEC 61400-12-1要求获取功率曲线及预测风力发电机组年发电量。

The certification body shall verify that the measurement procedures conform with IEC 61400-12-1 and that the measurement conditions, instrumentation, calibrations, and analyses are described in a test report, also in accordance with IEC 61400-12-1.

认证机构应验证测量程序是否符合IEC 61400-12-1，以及测试报告中是否描述了测量条件、仪器、校准和分析，也应符合IEC 6140-12-2。

8.4 Load measurements 载荷测量

The purpose of load measurements is to validate design calculations and to determine the magnitude of loads under specific conditions.

载荷测量的目的是验证设计计算有效性，并确定特定条件下的载荷大小。

The certification body shall evaluate load measurements carried out for type certification and review the analysis of measured data, supplied by the applicant.

认证机构应对用于型式认证的载荷测量进行评估，并且复核申请人提交的测量数据分析。

Measurements shall be made on a wind turbine that is dynamically and structurally similar to, but may differ in detail (such as alternative tower designs) from, the turbine submitted for certification. In case of differences, the applicant shall evaluate the differences, e.g. perform load and dynamic behaviour predictions for the wind turbine under test.

测量所用的风力发电机组与所提交认证的风力发电机组在动力特性及结构上应相似，但允许有细小差别（例如不同的塔架设计）。当两者不完全相同时，申请人应评估这些不同，如针对测量的风力发电机组开展载荷和动力学行为预测。

Guidance for test procedures and evaluation of tests may be found in IEC/TS 61400-13.

测量过程和测量评估导则应符合IEC/TS 61400-13要求。

8.5 Blade tests 叶片测试

The purpose of blade tests is to verify blade structural design and to assess the suitability of manufacturing processes. Full-scale structural testing is required for every new type of blade. A type of blade is described not only in terms of its size and shape but also in terms of its internal construction and structure. Fatigue tests as well as static tests are required. Guidance for test procedures and evaluation of the tests may be found in specifications for structural testing of blades within the IEC 61400 series.

叶片试验的目的是验证叶片结构设计并评估制造工艺的适用性。每种新型叶片都需要进行全尺寸结构测试。一种叶片不仅根据其尺寸和形状描述，而且还根据其内部结构和结构描述。需要进行疲劳试验和静态试验。IEC 61400系列叶片结构试验规范中提供了试验程序和试验评估指南。

Test blades shall be representative for the blade design considered for design evaluation. Deviations shall be subject to approval by the certification body. If the blade design is changed, the certification body shall determine the need and requirements for any new tests, through consultation with the manufacturer. New tests shall be required following any significant changes in blade design. Changes in the following, for example, may be significant:

试验叶片应代表设计评估中考虑的叶片设计。偏差应得到认证机构的批准。如果叶片设计发生变化，认证机构应通过与制造商协商确定任何新试验的需要和要求。叶片设计发生任何重大变化后，应要求进行新的试验。例如，以下方面的变化可能非常显著：

- the structural system, including the internal stiffening arrangement 结构系统，包括内部加强装置
- the aerodynamic profile 空气动力学剖面
- material for critical load carrying parts 关键承载部件的材料
- transition zones in the blade root 叶根中的过渡区域

8.6 Other tests 其他测试

The certification body may require other tests and/or measurements to be carried out. Other tests may also be requested by an applicant for inclusion in type testing. Such tests may include:

认证机构可要求开展其他测试和/或测量，申请人也可以要求进行包含在型式测试中的其他测试。这些测试包括以下：

- thermal conditions of main mechanical and electrical components 主要机械和电气部件的热力学条件
- mechanical conditions (vibrations, clearances, response) of main mechanical and electrical components 主要机械和电气部件的机械条件（振动、气隙、响应）
- environmental testing of electronic assemblies 电子设备的环境测试
- electromagnetic compatibility testing 电磁兼容测试

The type test for a wind turbine equipped with main gearbox(es) shall additionally include a field test for main gearboxes as required in IEC 61400-4.

有主齿轮箱的风力发电机组，主齿轮箱应按照IEC 61400-4的要求进行现场测试。

8.7 Test reports 测试报告

Type test reports shall conform with the requirements of ISO/IEC 17025 and relevant standards used to define the test requirements. In addition, test reports shall include a description of:

型式测试报告应符合ISO/IEC 17025和用来定义测试要求的相关标准规定的要求，测试报告包括以下内容：

- the wind turbine or component, with identification by means of serial number (and control system software revision number(s), where applicable) 风力发电机组或部件的序列号（包括适用的控制软件版本号）
- any differences between the wind turbine or component under test with the corresponding part included in the certification 测试用的风力发电机组或部件与认证用的风力发电机组或部件的任何差异说明
- any significant unexpected behaviour 任何重要的非预期行为

Attestation by the certification body shall be clearly marked on the final type test report(s)

认证机构的证明应清晰标识在最终型式测试报告上。

8.8 Type test conformity statement 型式试验符合性声明

The certification body shall issue a conformity statement based on satisfactory evaluation of the test reports. The conformity statement shall specify:

认证机构基于测试报告的合格评估颁发型式试验符合性声明，该声明应包含下列内容：

- the tests carried out 完成的测试项目
- the test standards applied 测试采用的标准
- identification of the test reports 测试报告

9 Manufacturing evaluation 制造评估

9.1 General 概述

The purpose of manufacturing evaluation is to assess if a specific wind turbine type is manufactured in conformity with the documentation design verified during the design evaluation. This evaluation shall include the following elements:

制造评估的目的是评估特定型号的风力发电机组的制造是否符合设计评估期间验证的文件设计。该评估应包括以下要素：

- quality system evaluation 质量体系评估
- manufacturing inspection 制造检查

The manufacturing evaluation presupposes that the manufacturer of the wind turbine and the main components operates a quality system. It requires manufacturing of at least one representative specimen of the type under certification.

制造能力评估假定风力发电机组及关键零部件制造商已经运行了相应的质量体系，认证时要求至少制造一个相应的样本。

9.2 Quality system evaluation 质量体系评估

The requirement for evaluation of the quality system is satisfied if the quality system is certified to be in conformance with ISO 9001. This system certification shall be carried out by an accredited body that operates according to ISO/IEC 17021.

如果厂家的质量体系已被验证其符合 ISO 9001，则符合本节质量体系评估要求。质量体系的认证须由获得认可的机构（依据 ISO/IEC 17021）执行。

If the quality system is not certified, the certification body shall evaluate the system of the applicant. The following aspects shall be evaluated:

如果申请人的质量体系未获得认证，认证机构应对其进行评估。须评估以下方面：

- responsibilities 职责分工
- control of documents 文件控制
- sub-contracting 分包
- purchasing 采购
- process control 过程控制
- inspection and testing 检验和测试
- corrective measures 整改措施
- quality recordings 质量记录
- training 培训
- product identification and traceability 产品的标识和可追溯性

9.3 Manufacturing inspection 制造检查

It shall be ensured that the requirements identified during the design evaluation with regard to critical components and critical manufacturing processes are observed and implemented in production and assembly. The certification body shall verify by inspection that at least one representative specimen is manufactured according to the design under certification.

制造检查应确认设计评估中关键部件和关键生产工艺的要求在制造和装配过程中得到了遵守与实施。认证机构应通过检查以确认至少一个对应的样本是跟据认证过的设计要求进行制造的。检查内容包括：

The inspection shall comprise:

检查内容包括：

- verification that design specifications are properly implemented in workshop 确认在车间正确地执行了设计规范要求
- workshop instructions, purchase specifications and installation instructions 车间作业指导书，采购规范，安装说明书
- evaluation of manufacturer's workshop, if relevant 对相关制造车间进行评估
- verification of fabrication methods, procedures and qualifications of personnel 确认制造方法、工艺及人员资质
- review of material certificates 审核材料合格证
- random checks on effectiveness of procedures for acceptance of purchased components 随机检查外购件验收流程的有效性
- random checks of fabrication processes 随机检查制造工艺

Inspection of critical components shall take place at the wind turbine manufacturer unless the manufacturer's incoming goods inspection is insufficient to ensure that the requirements identified during the design evaluation are met.

关键零部件的检查应在风力发电机组制造厂进行，除非入厂检验不足以确保关键零部件满足设计评估中确认的要求，则对该零部件补充进行制造能力评估。

In general, the following components shall be considered for inspection:

一般来说，应检查以下关键部件：

- rotor blades 叶片
- rotor hub 轮毂
- rotor shaft 主轴
- main, pitch and yaw bearings (pitch and yaw drives) 主轴承，变桨和偏航轴承（变桨和偏航驱动器）
- main bearing housings 主轴承座
- gear box 齿轮箱
- locking devices and mechanical brake 锁定装置和机械刹车
- generator, transformer 发电机，变压器
- main frame, generator frame 机舱底座，发电机底座
- tower 塔架
- sub-structure (optional) 下部支撑结构（可选）
- foundation (optional) 基础（可选）
- bolted connections 螺栓连接
- hub and nacelle assembly (in workshop) 轮毂和机舱装配（车间中）

If a critical component is produced by more than one component manufacturer and the components differ significantly in specifications and/or manufacturing processes, all differing components shall be considered for inspection.

如果关键部件有多个制造商，而且部件说明或制造工艺有显著差别，那么应对这些部件分别做检查。

Changes in manufacturing processes that influence the component quality or component properties shall be reported to the certification body. In the event of major process changes documentation shall be submitted for renewed evaluation and, if necessary, the inspection shall be repeated.

如果制造工艺变更影响到了部件的质量或性能，应向认证机构汇报。如果关键工艺变更，认证机构应对修改后的文件重新进行评估，必要时需重新进行制造检查。

The manufacturing inspections shall be repeated as part of the renewal of the certificate.

重新进行制造检查应作为证书更新的一部分。

9.4 Period of manufacturing evaluation 制造评估时间

The man-day of manufacturing evaluation is 2 man-days.

制造评估人日数为2人日。

9.5 Manufacturing conformity statement

A satisfactory manufacturing conformity evaluation is concluded with a manufacturing conformity statement.

制造能力评估合格后，可签发制造能力评估符合性声明。

10 Foundation design evaluation 基础设计评估

The purpose of the optional foundation design evaluation is to enable the inclusion of one or more foundation designs in the type certificate, as selected by the applicant. The certification body shall evaluate whether any turbine foundation included in type certification is designed in accordance with the foundation specifications detailed in the design documentation used in the turbine design evaluation (see 7.10) and is in accordance with the agreed applicable standards and codes.

可选基础设计评估的目的是使申请人选择的一个或多个基础设计能够包含在型式证书中。认证机构应评估型式认证中包含的任何风力发电机组基础是否根据风力发电机组设计评估中使用的设计文件中详细说明的基础规范（见 7.10）进行设计，以及是否符合商定的适用标准和规范。

For an offshore wind turbine the scope of foundation design evaluation shall include the substructure connecting the foundation to the tower.

海上机组基础设计评估还应包括连接塔架与基础的下部结构。

The certification body shall, if applicable, require that reinforcement, concrete layout and construction sequence plans be included in the foundation design documentation. These plans shall be in sufficient detail to allow the certification body to verify the adequacy of the foundation design, taking into account the specified construction processes.

认证机构要求提交的基础设计文件应包含基础钢筋混凝土结构的设计及其施工方案。施工方案应尽量详细，以使认证机构能确认基础设计已经考虑了特殊过程。

The certification body shall issue a conformity statement based on satisfactory evaluation of the foundation design evaluation report. The conformity statement shall include:

基础设计评估报告完成以后，认证机构可签发基础符合性声明，应包含以下内容：

- identification of the wind turbine type 风力发电机组机型
- description of assumed soil and other external conditions 土壤及其他外界条件
- identification of tower configuration 塔架结构型式
- identification of the sub-structure configuration 基础结构连接型式
- identification of the foundation type 基础类型

11 Foundation manufacturing evaluation 基础制造评估

11.1 General 概述

The purpose of manufacturing evaluation is to assess if a specific wind turbine foundation type is manufactured in conformity with the documentation design verified during the design evaluation. This evaluation shall include the following elements:

基础制造能力评估的目的是评估特定的风力发电机组基础是否按照设计评估时验证过的设计进行制造。应包含以下内容：

- quality system evaluation 质量体系评估
- manufacturing inspection 制造检验

The manufacturing evaluation presupposes that the manufacturer of the foundation operates a quality system. It requires manufacturing of at least one representative specimen of the type under certification.

制造能力评估假定基础的制造方有质量体系。认证时要求至少有一个相应的样机基础在进行制造施工。

For an offshore wind turbine, the foundation manufacturing evaluation shall include manufacturing evaluation of the sub-structure connecting the foundation to the tower.

对于海上机组，基础制造能力评估应包含对连接基础与塔架的连接结构的制造施工评估。

11.2 Quality system evaluation 质量体系评估

The requirement for evaluation of the quality system is satisfied if the quality system is certified to be in conformance with ISO 9001. This system certification shall be carried out by an accredited body that operates according to ISO/IEC 17021.

如果厂家的质量体系已被验证其符合ISO 9001，则符合本节质量体系评估要求。质量体系的认证须由获得认可的机构（依据ISO/IEC 17021）执行。

If the quality system is not certified, the certification body shall evaluate the quality system of the applicant. The following aspects shall be evaluated:

如果申请人的质量体系未获得认证，认证机构应对其进行评估。需评估以下方面：

- responsibilities 职能分工
- control of documents 文件的控制

- sub-contracting 分包
- purchasing 采购
- process control 过程控制
- inspection and testing 检验与测试
- corrective measures 整改措施
- quality recordings 质量记录
- training 培训
- product identification and traceability 产品的标识与可追溯性

11.3 Foundation manufacturing inspection 基础制造检查

It shall be ensured that the requirements identified during the design evaluation with regard to critical manufacturing processes are observed and implemented in production. The certification body shall verify by inspection that at least one representative specimen is manufactured according to the design under certification. 应保证在制造过程中遵守和执行设计评估中被认可的与关键制造过程相关的要求。认证机构应通过检查验证至少一个对应的样本是根据认证过的设计要求进行制造的。

The inspection shall comprise:

检查包括：

- verification that design specifications (e.g. reinforcement, concrete layout and construction sequence plans) are properly implemented on site 验证在现场严格地执行了设计技术要求（如：基础钢筋混凝土结构的设计和施工方案）
- manufacturing instructions, purchase specifications and installation instructions 制造手册，采购技术要求，安装手册
- verification of fabrication methods, procedures and qualifications of personnel 验证制造方法和过程，人员资质
- review of material certificates 审核材料合格证书
- random checks on effectiveness of procedures for acceptance of purchased components 随机检查对外购件的接受过程的有效性
- random checks of fabrication processes 随机检查制造工艺

If a foundation is produced by more than one manufacturer and the foundations differ significantly in specifications and/or manufacturing processes, all differing foundations shall be considered for inspection.

如果基础有多个制造商且基础的技术要求和/或制造工艺有明显的差异，应考虑检查所有不同的基础。

Changes in manufacturing processes, which influence the foundation quality or properties, shall be reported to the certification body. In the event of major process changes, documentation shall be submitted for renewed evaluation and, if necessary, the inspection shall be repeated.

对于影响基础质量或性能的制造工艺的变更，应向认证机构汇报。如果关键工艺变更，应提交相关文件以便进行重新评估，如有必要，还需重新检查。

The manufacturing inspections shall be repeated as part of the renewal of the certificate.

重新进行制造能力检查应作为证书更新的一部分。

11.4 Foundation manufacturing conformity statement 基础制造符合性声明

A satisfactory manufacturing conformity evaluation is concluded with a manufacturing conformity statement.

基础制造评估合格后，可出具基础制造评估符合性声明。

12 Type characteristics measurements 型式测试测量

12.1 General 概述

The purpose of type characteristic measurements is to establish performance-related characteristics of the wind turbine type, other than measurement of power performance, which is a mandatory element of type testing. These optional measurements may be selected by the applicant and shall conform with the relevant IEC 61400

standards listed in the following subclauses. The type characteristics measurements comprise one or more of the elements:

不同于型式测试强制要求的模块，如功率特性测量，型式特性测量的目的是为了获得风力发电机组型号性能相关的特性参数。此类选做测试可以由申请人选择并且符合以下章节中所列的相关的IEC 61400标准。型式特性测量包含一项或多项测试。

- power quality tests 电能质量测试
- low voltage ride through tests 低电压穿越测试
- acoustic noise measurements 噪声测量

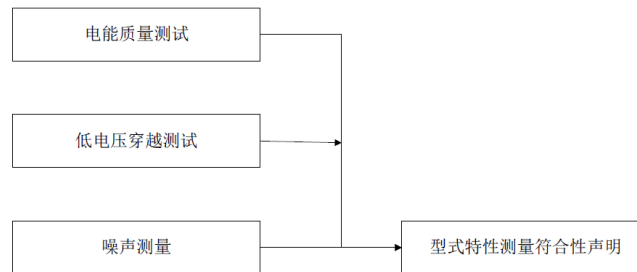


图3 型式特性测试模块

In cases where applicable IEC standards are not available, the measurement procedure shall be agreed between the applicant and the certification body.

如果没有适用的标准，测量步骤应由申请人和认证机构协商确定。

The certification body shall evaluate that measurement of characteristics has been carried out on a turbine representative of the type to be certified. Inspection records shall be completed prior to measurement in order to demonstrate satisfactory conformity of the turbine with design documentation.

认证机构应确认测量用风力发电机组可代表拟认证的风力发电机组型号。为了证明风力发电机组与设计文档相符，检查记录应在测试之前完成。

The measurements shall be carried out by an accredited test laboratory or the certification body shall verify that the party conducting the testing complies with at least the criteria of ISO/IEC 17025 or ISO/IEC 17020, as applicable.

测量应由经认可的测试实验室完成，或者认证机构确认测量的执行机构至少应符合ISO/IEC 17025或ISO/IEC 17020中的相关要求。

Measurements and test results shall be documented in a test report evaluated by the certification body. The certification body shall evaluate that the measurements have been carried out in accordance with an approved detailed program and that the report properly documents the characteristics required for certification.

认证机构应评估记录了测量和测试结果的测试报告。认证机构应评估测量是按照认可的测量大纲进行的，以及报告恰当地记录了认证所需的特性参数。

A satisfactory evaluation is concluded with a conformity statement issued by the certification body, attesting that the measurements have been carried out in accordance with the appropriate test procedures and relevant IEC 61400 standards.

评估合格后，认证机构基于测试报告的合格评估颁发型式特性测量符合性声明，以证明该测量符合恰当的试验程序以及相关IEC 61400系列标准。

12.2 Power quality measurements 电能质量测试

For type certification in which power quality measurements are included, the certification body shall verify that the measurement procedures conform with IEC 61400-21 and that the measurement conditions, instrumentation, calibrations and analyses are described in a test report, also in accordance with IEC 61400-21. The purpose of these measurements is to document the characteristic quality of the power generated by the wind turbine type.

若型式认证中包含了电能质量测试，认证机构应确认测试过程符合IEC 61400-21，而且测试条件、仪器、校准及分析方法应在试验报告中说明，并应符合IEC 61400-21。该项测试的目的是记录风力发电机组型号的电能质量特性参数。

12.3 Low voltage ride through measurement 低电压穿越测试

For type certification in which low voltage ride through (LVRT) measurements are included, the certification body shall verify that the measurement procedures conform with the relevant standards and that the measurement conditions, instrumentation and equipment, calibrations and analyses are described in a test report, also in accordance with the relevant standards.

对于包含低电压穿越 (LVRT) 测试的型式认证, 认证机构应确认测试过程符合相关的标准要求, 并且测试条件、仪器设备、校准和分析在报告中说明, 并应符合相关标准。

The relevant standards shall comprise:

相关标准应包括:

- IEC 61400-21
- other standards agreed between the certification body and the applicant 认证机构和申请人双方均认可的其他标准

The purpose of these measurements is to document the low voltage ride through capabilities of the wind turbine type.

这些测试的目的是为了记录风力发电机组低电压穿越能力的特性。

12.4 Acoustic noise measurements 噪声测量

For type certification in which acoustic emission measurements are included, the certification body shall verify that the measurements conform with IEC 61400-11. The purpose of these measurements is to document the acoustic emission characteristics of the wind turbine type. If acoustic emission measurements are included, the certification body shall verify as defined in IEC 61400-11:

对于包含噪声测量的型式认证, 认证机构应确认测量符合IEC 61400-11要求, 此项测量是为了记录风力发电机组型号噪声排放特性。如果进行噪声测量, 认证机构应确认测量至少包括IEC 61400-11中所定义的:

- apparent sound power level at a wind speed of 8 m/s 8 m/s风速的视在声功率级
- sound directivity index at the three required positions 在三个指定位置的声源指向性指数
- tonality of any tones above the minimum threshold 最小阈值以上所有音调的音值

The certification body shall also verify that the measurement conditions, instrumentation, calibrations and analyses are described in a test report in accordance with IEC 61400-11.

认证机构应确认在测试报告中描述的测试条件、仪器、校准和分析符合IEC 61400-11的要求。

12.5 Test reports 测试报告

The certification body shall require that type characteristics measurements reports conform with the requirements of ISO/IEC 17025 and relevant standards used to define the test requirements. In addition, descriptions of:

认证机构应要求型式特性测量报告符合ISO/IEC 17025及试验所引用的其它相关标准的要求。另外报告还应包含以下内容:

- the test turbine, including serial number and control system software revision number(s) 测量用风力发电机组说明, 包括序列号和控制系統软件版本号
- any differences between the test turbine and the wind turbine type under certification 测量用风力发电机组和认证风力发电机组的差异说明
- any significant unexpected behaviour shall be required 任何重要的非预期行为

Attestation by the certification body shall be clearly marked on the final type characteristics measurements report(s).

认证机构的证明应明确标注在最终的型式特性试验报告上。

12.6 Type characteristics measurements conformity statement 型式特性测试符合性声明

The certification body shall issue a conformity statement based on satisfactory evaluation of the test reports. The conformity statement shall specify:

认证机构基于型式特性测量报告的合格评估颁发型式特性测量符合性声明。符合性声明应注明:

- the measurements carried out 进行的测量
- the measurement standards applied 测量采用的标准
- identification of the test report(s) 测量报告的标识性

12.7 Final evaluation 最终评估

The purpose of final evaluation is to provide documentation of the findings of all operating bodies involved in the evaluation of the elements of the type certificate.

最终评估的目的是提供参与型式认证各模块评估的所有执行机构结论的文档。

The final evaluation report shall consist of:

最终评估报告应包含下列内容：

- a reference list of all supporting product documentation for the type certificate 型式证书所有支持产品文档的参考列表
- report of whether the detailed documentation is complete and whether the type test results confirm all relevant requirements set out in the design documentation 所有文件内容是否完整以及型式试验结果是否符合相应设计文件要求的报告
- review of the final product documentation, including drawings, component lists procurement specifications and manuals (see following paragraph), to confirm that this is consistent with the manufacturing evaluation report and with the supporting design calculations and relevant design assumptions 复查最终产品文档，包括图纸、零部件清单、采购规范与手册等（见以下段落文档），以确认这些文档与制造能力评估报告、设计计算及相关设计假设相一致

The certification body shall attest that the installation, operator's instructions and maintenance manuals are based on the relevant requirements in IEC 61400-1, IEC 61400-2 and IEC 61400-3, for an offshore wind turbine. The manuals shall be reviewed against the corresponding approved processes. The certification body shall establish that

认证机构应验证安装操作指南及维护手册是基于IEC 61400-1, IEC 61400-2和IEC 61400-3中的相关要求。根据认证过的流程对这些手册进行复核。认证机构应确定：

- format and detail are such that a skilled worker with technical training can understand the documentation 经过技术培训的工作人员能理解的文件格式及内容
- notes regarding safety and regulations for the prevention of accidents are arranged in the text such that they appear before the operation in question 在相关文件中注明关于安全和事故预防的规定，如操作前应当注意的问题
- these notes shall be clearly identified as safety-related items 上述注意事项应清楚地标识为安全相关条款

The final evaluation report shall be delivered to the applicant and a copy retained in the confidential files of the certification body.

最终评估报告应递交给申请人，副本作为保密文件保留在认证机构。

12.8 Type certificate 型式认证证书

The certification body shall issue a type certificate based on satisfactory evaluation for completeness and correctness of the final evaluation report. The type certificate shall include the results of the mandatory modules and, when applicable, document the optional foundation design and manufacturing evaluation and type characteristic measurements.

认证机构基于最终评估报告的完整性及准确性的合格评估签发型式认证证书。该证书应包含必选模块的评估结果，必要的话，还应包含可选的基础设计评估、制造能力评估及型式特性测量的结果。

The type certificate is valid for the wind turbine type specified in the certificate. The specifications may include alternative components and configurations. The allowable combinations of alternatives shall be clearly identified. The type certificate shall reference in an appropriate way the standards and normative documents used.

型式认证证书仅适用于证书中指定的风力发电机组型号。证书中应注明可替换的零部件和配置，并对可选组合予以清晰注明。型式认证证书应以适当的方式列出评估所依据的实施规则及相应的标准和规范文件，并明确其版本信息。

The certification body shall include requirements in the agreement governing the validity of the certificate.

认证机构应在认证协议中注明证书有效性的要求。

If the applicant does not operate a quality system that is certified according to ISO 9001, the certification body shall verify at least once a year that manufactured wind turbines continue to be in conformance with the certified design. This verification shall follow the elements of 9.

如果申请人未运行根据ISO 9001认证的质量体系，认证机构应至少每年验证一次制造的风力发电机组是否继续符合认证设计。该验证应遵循第9节的要素。

13 Evaluation and approval of the certification 认证结果评价与批准

13.1 Evaluation and approval of the certification 认证结果评价与批准

TRCHN organize the evaluation for the result of the design evaluation and manufacturing evaluation. After evaluation, issue the certificate to the applicant, every application unit with one certificate.

TRCHN 组织对设计评估结论和制造评估结论进行综合评价。评价合格后，向申请人颁发产品认证证书。每一个申请认证单元颁发一份认证证书。

The same products, accept the result of the design evaluation and manufacturing evaluation report for the other TÜV's voluntary product certification, should be approved by the certifier and indicate the reason. The manufacturing evaluation report must be within 12 months and cannot be used beyond the time limit.

同样产品，采信已经获得 TÜV 莱茵颁发的自愿性产品认证证书的设计评估报告和制造评估报告结论。制造评估报告必须在 12 个月内，超期不能采用。

13.2 Lead-time 交付周期

After finishing the design evaluation and manufacturing evaluation n, and compliance with the certification requirements, TRCHN will issue the type certificate within two weeks when all the documents are provided.

完成设计评估和制造评估后，对符合认证要求的，将在提供所有文件之后 2 周颁发型式认证证书。

If only the design evaluation is completed without manufacturing evaluation, TRCHN will issue the design certificate within two weeks when all the documents are provided.

如果只完成了设计评估，不做工厂检查，对符合认证要求的，将在提供所有文件之后 2 周颁发设计认证证书。

13.3 Termination the certification 认证终止

When the design evaluation is disqualification or manufacturing evaluation is no-pass, TRCHN make the unqualified decision, and terminate the certification. If continue the certification after the termination, should start from the new application.

当设计评估或制造评估不通过，TRCHN 做出不合格决定，终止认证。终止认证后，如要继续申请，按新申请进行。

14 Follow-up surveillance 获证后监督

After the certificate issued, for the same category and specifications of the products covered by the certificate, the certification body should supervise and verify that the factory quality assurance ability of the production enterprise continues to meet the certification requirements, ensuring the certified products continue to meet the standard requirements and maintain the consistency with the type test samples. The supervision period generally does not exceed 2.5 years. After obtaining the certificate, the application enterprise should submit an annual report every year. The annual report includes: operation management and production of the application enterprise, abnormal operation experience of the product, information of the produced products (quantity and consistency of the produced products), and faults known to the certificate holder. When the certification body apply annual factory supervision inspection to the enterprise after obtaining the certificate, the application enterprise may not provide an annual report.

颁发认证证书后，对于该证书覆盖的同一类别、规格的产品，认证机构应进行监督，以验证生产企业的工厂质量保证能力持续符合认证要求、确保获证产品持续符合标准要求并保持与型式试验样品的一致性。监督周期一般不超过 2.5 年。申请企业获得证书后每年应提交年度报告，年度报告内容包括：申请企业运营管理和生产情况、产品非正常运行经历、已生产产品的信息（生产产品数量及一致性）、证书持有人所知的故障。当认证机构对申请企业获得证书后每年进行工厂监督检查时，申请企业可不提供年度报告。

Supervision inspection in factory conducted by certification body appointing inspector in accordance with “factory quality assurance of TÜV China mark”. Inspection of purchasing and incoming, production process control and process, production testing and type testing, consistency of certified product, certificates and certification mark logo usage shall be checked during supervision inspection, the remaining provisions on the basis of spot check. During supervision inspection, the applicant enterprise shall produce according to the same process as certified products.

监督检查由认证机构指定检查员对生产厂按照《TÜV 莱茵中国标志认证工厂质量保证能力要求》进行监督检查，其中采购和进货检验、生产过程控制和过程检验、出厂试验和型式试验、认证产品的一致性、证书及认证标志的使用情况为必查条款，其余条款依据情况进行抽查。监督检查时，申请企业应有认证产品或相同工艺流程的产品生产。

14.1 Surveillance inspection 监督检查时间

14.1.1 Surveillance frequency 监督检查频次

In general, after finishing the initial factory/construction site inspection, follow-up surveillance should be arranged within 12 months, and the timespan of every follow-up surveillance is no more than 12 months. Basis on the production situation, TRCHN can adjust the time of follow-up surveillance. If one of the following occurs, TRCHN would increase the frequency:

一般情况下，初始工厂/施工现场检查结束后，12个月内应安排监督检查，每次监督检查间隔不超过12个月。依据产品生产的实际情况，TRCHN可以按年度调整监督检查时间。若发生下述情况之一可增加频次：

A、The certified products have the serious quality problem or user make the serious complaint and it was found to be a product problem.

获证产品出现严重质量问题或用户提出严重投诉并经查实为产品问题的；

B、TRCHN has enough reason query the certified products are not compliance with the certification standards TRCHN.

有足够理由对获证产品与认证依据标准的符合性提出质疑时；

C、Has enough reason show the manufacturer or constructor change the organization chart, production condition, quality management system and other which can affect the products compliance.

有足够信息表明制造商或建设主体由于变更组织机构、生产条件、质量管理体系等而可能影响产品符合性或一致性时；

14.1.2 The man-day of follow-up inspection 监督检查人天数

The man-day of supervising manufacturing evaluation inspection is 2 man-days.

监督制造评估检查人日数为2人日。

14.2 Follow-up surveillance content 监督检查的内容

The content of the follow-up surveillance includes the inspection of the factory/construction site quality assurance and the products compliance. Conduct the surveillance inspection according to the <the factory quality assurance of TÜV China mark>.

监督检查的内容为工厂/施工现场质量保证能力和产品一致性检查。依据《TÜV 莱茵中国标志认证工厂质量保证能力要求》对制造现场进行监督检查。

The rectification of non-conforming items in the previous manufacturing evaluation is the necessary content of each supervision and inspection.

前次制造评估不符合项的整改情况是每次监督检查的必查内容。

14.3 Result evaluation 结果评价

TRCHN organize the evaluation for the result of the follow-up surveillance. After evaluation, issue the certificate of the manufacturing evaluation to the applicant, and the certification certificate maintain valid. If the follow-up surveillance is no-pass, follow the rules of item 13.3.

TRCHN 组织对监督检查结论进行评价，评价合格的，颁发制造评估通过证书，认证证书保持有效。当监督检查不通过时，按照 13.3 规定执行。

15 Validity, maintenance and expiration of certificates 证书的有效、保持和过期

15.1 General 概述

The period of validity and/or the period of review or monitoring shall be clearly stated in the certificate. The period of validity for type and component certificates and associated conformity statements shall not exceed 5 years. 证书有效性和（/或）复评或监督的周期应在证书上有明确的标识。型式认证证书以及相关的符合性声明的有效期不应超过5年，且过期后自动失效。

The period of validity of a provisional certificate or conformity statement during which all outstanding issues shall be documented by the applicant and evaluated by the certification body shall not exceed 1 year.

对于存在遗留问题的临时性证书或符合性声明的有效期不应超过1年，在此期间所有遗留问题应被记录并被评估。

15.2 Maintenance of type certificate 型式认证证书的维持

In order to maintain validity of the type certificate, the following requirements shall be met by the applicant and the certification body:

为了维持证书的有效性，申请人和认证机构应满足以下要求：

- the applicant shall prepare an annual report for the certified wind turbine to be sent to the certification body for review. The report shall include information on installed turbines and abnormal operating experience or failures known to the certificate holder and any minor modifications 认证申请人应提供一个关于被认证风力发电机组的年度报告给认证机构进行复审，报告应包括安装风力发电机组的信息、非正常运行经历、证书持有人所知的故障和任何细小的修改
- the applicant shall report major modifications to the certified product to the certification body without delay and provide corresponding design documentation, procedures, specifications or processes. In case the certificate holder intends to maintain and/or extend the validity of the certificate, update of all documents affected by such modifications shall be provided. See 15.5 for detailed requirements. 认证申请人应及时向认证机构报告认证产品的主要修改并提供相应的设计文档、程序、说明或进程。如果证书持有者想要维护或延长证书有效期，那么受这种修改所影响的更新文档应被提供。具体要求详见15.5。
- the certification body shall perform periodic surveillance with the purpose to check that the wind turbines produced correspond to the type-certified turbines and meet the required surveillance according to ISO/IEC Guide 65. The period shall in general not exceed 2,5 years, if the serial production has started. Such surveillance shall be on a recently installed wind turbine or in the workshop. The scope of the surveillance has to be significantly lower than for the inspections as they were performed as a part of the type certificate. If the applicant does not operate a quality system that is certified according to ISO 9001, the certification body shall verify at least once a year that manufactured wind turbines continue to be in conformance with the certified design. This verification shall follow the elements of 9.2 and 9.3 认证机构应进行周期性监督以检查生产的风力发电机组和认证的风力发电机组的一致性，监督要求应符合ISO/IEC Guide 65。如果产品进入系列化生产，监督周期一般不超过2.5年。这种监督在最近安装的风机风力发电机组上或制造厂中进行，2.5年监督时现场可以不生产样机。监督的范围要明显小于型式认证中检查的范围。如果申请人没有基于ISO 19001的质量体系，认证机构应对被制造的风力发电机组进行每年一次的验证，确保与认证的风力发电机组一致。这种验证必须遵照9.2质量体系评估和9.3制造检查的要求。

15.3 Dealing with outstanding matters 有遗留问题处理

A provisional certificate or associated conformity statement can be issued to allow for 0-series manufacture as well as to allow for outstanding matters with no safety implication.

对没有安全方面影响的遗留问题和未批量生产的制造商，可以签发临时性证书或相关的符合性声明。

The outstanding matters should be limited to:

遗留问题应限于：

- matters with no safety implication within the period of validity (maximum 1 year) 在有效期（最大1年）中，事件不会导致安全方面影响
- matters related to the finalization of manuals and quality control procedures 与最终手册和质量控制程序相关的项目

15.4 Corrective actions 纠正措施

The certification body shall be informed if, from log-book data or other information brought to the attention of the certificate holder, a wind turbine or project in question is shown not to function according to the design specifications and/or other criteria relevant to the certificate.

如果日志数据或其他带给证书持有者关注的信息显示风力发电机组不能按照设计参数与认证证书有关的其他准则要求工作时，应及时通知认证机构。

Incidents known to the certificate holder where the safety of a wind turbine, project or the surroundings is involved shall be reported to the certification body without delay.

证书持有人得知涉及到风力发电机组或周围环境的安全事故应及时告知认证机构。

If after preliminary evaluation the certification body determines a serious defect affecting the safety of a wind turbine in question, the certificate shall be immediately suspended. The certification body shall subsequently carry out a thorough evaluation of the defect. This evaluation shall result in either reaffirmation or withdrawal of the certificate. See 15.7 for detailed requirements.

初步评估后，如果认证机构确定有影响风力发电机组安全运行的严重缺陷存在，证书应立即暂停。待认证机构对缺陷进行充分评估后决定是否重新确认证书有效或取消证书。具体要求详见 15.7。

15.5 Certified products changing 认证产品的变更

15.5.1 Application for Changing 变更的申请

When the content in the certificate is changed, or when the design, mechanism parameters, façade or critical component/materials involved in the safety and/or performance of the products are changed, license holder should make a change request to TRCHN.

证书上的内容发生变化时，或产品中涉及安全和/或性能的设计、机构参数、外观、关键零部件/材料发生变更时，证书持有者应向 TRCHN 提出变更申请。

15.5.2 Evaluate and approve the changing 变更的评价和批准

According to the evaluation of the changed content and the provided materials, TRCHN decide to make the change or not. If need the design evaluation and/or manufacturing evaluation, make the change after passing the design evaluation and manufacturing evaluation. In principle, the change evaluation should be based on the certified product that has been conducted the initial design evaluation. The design evaluation and/or manufacturing evaluation follow the rules of TRCHN.

TRCHN 根据变更的内容和提供的资料进行评价，确定是否可以变更。如需安排设计评估和/或制造评估，则设计评估合格和/或制造评估通过后方能进行变更。原则上，应以最初进行设计评估的认证产品为变更评价的基础。设计评估和制造评估按照 TRCHN 的规定执行。

Conformance to the requirements, approve the change and issue the new certificate.

对符合要求的，批准变更，并换发新的认证证书。

15.6 Extending scope of certification 扩大认证范围

15.2.1 Extending process 扩大的流程

The license holder wants to extend the certification scope that is the same certification unit with the certified products, should start from the certification application and explain the extending request. TRCHEN review the compliance between the extending scope with the certified products, verify the validity of the original certification results for the extending scope, conduct products testing and/or factory inspection for discrepancies and/or extending scope, conformance to the requirements, issue the new certificate according to the requirements of the license holder.

认证证书持有者需要增加与已获得认证的产品为同一认证单元的产品认证范围时，应从认证申请开始办理手续，并说明扩大要求。TRCHN 核查扩大范围产品与原认证产品的一致性，确认原认证结果对扩大范围产品的有效性，针对差异和/或扩大的范围做补充试验和/或工厂检查，对符合要求的，依据认证证书持有者的要求换发证书。

In principle, the extending evaluation should be based on the certified product that has been conducted the initial design evaluation.

原则上，应以最初进行设计认证的认证产品为扩展评价的基础。

15.7 Suspension, Cancellation, Withdrawn and Restoring of certification 认证暂停、注销、撤销和恢复

In any circumstance, finds that a certified product is not in conformity with the essential requirements set out in the China Mark Scheme and / or Testing and Certification Regulation, TRCHN's certifier will suspend, cancel or withdraw related certificates.

无论通过何种方式发现认证产品不符合中国标志认证方案和/或检测认证条例规定的基本要求，TRCHN 签证官将暂停、注销和撤销相应证书。

The corrective action has to be reported and completed by the certificate holder, prior to the permission by China Mark certifier to claim the certified status again and to use the certification mark. The certifier will restore the certificate in valid according to the certification process of China Mark scheme. When certificate was suspended more than 6 months, the certificate shall be cancelled or withdrawn, or the corrective action has not completed as a waiver application, the certificate shall be withdrawn. In case of cancellation and withdrawn, the original certificate is requested to be returned to TRCHN in timely manner.

在 TRCHN 签证官允许恢复认证状态和使用认证标志前，证书持有者必须报告并完成纠正行动。签证官依照中国标志认证流程规定，将证书恢复为有效状态。对于暂停超过 6 个月，将注销或撤销相应证书；未完成纠正的，视为自愿放弃，对相应证书予以撤销。如果注销和撤销，需要及时将原证书退回给 TRCHN。

In case of suspension, cancellation or withdrawn, the license holder shall be informed accordingly by written stating the reasons for suspension, cancellation and withdrawn, and remark the certificate in its register as invalid. The license holder stops to use the certification mark on the products manufactured since the date of suspension, cancellation or withdrawn and will not place certified products on the market during the stated period. Potentially defective certified products are subject to corrective action including recall where appropriate.

当证书暂停，注销和撤销时，相关证书持有者将得到书面通知，说明暂停，注销和撤销的原因，并在记录中标记该证书无效。自暂停，注销和撤销日期起，不得将认证标志用于所制造的产品上，且在所述期限内，不得继续销售认证产品。对可能存在缺陷的认证产品应立即采取纠正行为，包括召回（如果适用）。

16 Certification mark 认证标志

The China Mark is the exclusively used by TÜV Rheinland (China) Ltd. such as:

TÜV莱茵中国标志由是莱茵检测认证服务（中国）有限公司获证客户独家所有，例如：



- A. Generic Certipedia ID can be assigned for each Chin mark license holder.
可以为每个中国标志认证证书持有人编制Certipedia唯一性号码。
The China Mark can be displayed on the rating label, package or user manual.
- B. 中国标志可以显示在等级标签、包装或用户手册上。
There is no specific dimensional requirement of the mark, it should be visible and identified the information of test mark by naked eye as long as the proportions are kept.
- C. 只要保持一定比例，没有具体的标志尺寸要求，标志可以由肉眼看见并识别试验标志信息。
There is no color scheme requirement for mark as long as the outline and artwork of the test mark is kept.
- D. 只要保持试验标志的轮廓和原图，没有标志配色方案要求。
The mark shall be used as stipulated in Testing and Certification regulations as well as the attachment to this document TR China Mark Certification Scheme.

E. 标志应与测试和认证规则以及本文件附件德国莱茵中国标志认证方案中规定的标志相同。

17 Cost 收费

The certification cost follows the relevant rules of TRCHN. 认证费用按TRCHN有关规定收取。

18 Reference 参考文件

The implementation of scheme refers to the instruction for components certification:

本方案的执行参考各专业的作业指导书:

WEWI_EC_Work Instruction for Control and Protection System Certification_V01

WEWI_EC_Work Instruction for Electrical Components Certification_V01

WEWI_MC_Work Instruction for Gearbox_V01

WEWI_MC_Work Instruction for Mechanical Components Certification_V01

WEWI_BC_Work Instruction for Rotor Blade Certification_V01

WEWI_MC_Work Instruction for Tower Certification_V01

WEWI_LE_Work Instruction for Loads Evaluation_V01