

**Testing and Certification Regulations
Revision 07 / 02-2022**

General Conditions and Procedural Directive
for the Certification of Wind Turbines

of the
Certification Body for Wind Turbines
of TÜV Rheinland Industrie Service GmbH

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0. Preliminary Remarks

These testing and certification regulations are applicable to the Certification Body for Wind Turbines of TÜV Rheinland Industrie Service GmbH.

The Certification Body for Wind Turbines (referred to hereinafter as Certification Body) offers the following services to interested manufacturers or operators of wind turbines (referred to hereinafter as applicant):

- Performance of conformity testing, conformity assessments and certification of on- and offshore wind turbines

In particular these product certifications comprise the following certification procedures:

- Type certification
- Project certification
- Component certification
- Prototype certification

The certification procedure is based on one or more of the below mentioned schemes resp. standards:

- IECRE OD-501 - series; Type and Component Certification Scheme
- IECRE OD-502 - series; Project Certification Scheme
- IEC 61400-22: Wind turbines - Part 22: Conformity testing and certification
(in conjunction with IEC 61400-series)
- IS / IEC 61400-22:2010; Conformity Testing and Certification (India)
- GL:2010 - Guideline for the Certification of Wind Turbines
- DNV GL-ST- series
- Deutschen Institut für Bautechnik (DIBt): Richtlinie für Windenergieanlagen
- Executive Order No. 73 from Danish Ministry for Climate, Energy and Buildings:2013-01 – executive order on a technical certification scheme for wind turbines
- Deutschen Institut für Bautechnik (DIBt): Richtlinie für Windenergieanlagen
- Bundesamtes für Seeschifffahrt und Hydrographie (BSH):
BSH-Standards 7004, 7005
- VdS 3523: Windenergieanlagen: Guideline for fire protection

Through the certification procedure it is confirmed that the product inspected was designed in accordance with specified design assumptions as well as with certain technical specifications and requirements, and that it has been manufactured, constructed, tested and documented in accordance with these design specifications.

With this certificate the applicant can provide evidence of and prove to his customers that his product complies with all stipulated requirements.

The Certification Body works as an independent third party and is accredited for these activities by the Deutschen Akkreditierungsstelle GmbH (*national accreditation body for the Federal Republic of Germany – DAkkS*) on the basis of the standard ISO / IEC 17065 under the number “ZE-11052-02”.

1. Scope

These testing and certification regulations regulate

- performance of the testing and certification procedure
- the obligations and responsibility of the Certification Body as well as
- the duties, obligations and rights of the applicant.

The corresponding specifications follow the requirements of ISO / IEC 17065 and the standards mentioned in clause 0 (Preliminary Remarks).

During the certification of wind turbines a distinction is made between the following certification procedures, the scope of certification and areas of application:

1.1 Type certification

The Certification Body assesses and confirms that a wind turbine type conforms to the specified requirements.

A wind turbine type is a design type for a series of turbines of the same construction, same materials and same main components that undergo the same manufacturing process and that can be clearly described with certain values and parameters.

A wind turbine type is a comprehensive installation that is ready for use and, as standard, comprises the following sections and components:

- rotor blades, rotor hub
- mechanical components such as nacelle frame, bearings, gear box, brakes, couplings, hydraulic systems etc.
- electrical components such as: generators, transformers, converters, medium and high voltage components, electrical drives, protection equipment, cables, electrical installation equipment, lightning protection, etc.
- control / safety system
- housing
- tower
- (here: optional) support structure, with foundation, sub-structure

During the certification procedure at least the following aspects (modules) are taken into consideration:

- design basis evaluation
- design evaluation
- type testing
- manufacturing evaluation

In addition further optional modules – selected by the customer– can be applied:

- foundation design evaluation
- foundation manufacturing evaluation
- type characteristic measurements

1.2 Project certification

The Certification Body assesses and confirms that a wind turbine project conforms to the stipulated requirements.

In a wind turbine project (type-certified) wind turbines are installed and operated at a certain location (e.g. in a wind-park). In particular the support structure (with foundation, sub-structure) and possibly other installations are also assessed in addition to the site-specific conditions for the wind turbine.

During the project certification at least the following aspects (modules) are taken into consideration:

- site conditions evaluation
- design basis evaluation
- integrated load analysis
- evaluation of the site-specific design of the wind turbine and the rotor/nacelle assembly
- evaluation of the site-specific design of the support structure
- manufacturing surveillance of wind turbine and the rotor/nacelle assembly
- manufacturing surveillance of the support structure
- transport and installation surveillance
- commissioning surveillance

In addition further optional modules – selected by the customer – can be applied:

- design evaluation of additional installations
- manufacturing surveillance of additional installations
- project characteristics measurements

Furthermore, and within the framework of maintaining the project certificate, the Certification Body can also optionally carry out a

- surveillance of operation and maintenance.

1.3 Component certification

Beside the certification of a wind turbine type it is also possible to simply certify individual sections or components of a wind turbine.

In this case the Certification Body assesses and confirms that one type of a component conforms to the stipulated requirements.

The procedure is in accordance with that of the type certification, however with reference to the particular individual components. The following aspects (modules) are taken into consideration:

- design basis evaluation
- design evaluation
- type testing
- manufacturing evaluation

1.4 Prototype certification

Beside the certification of a wind turbine type it is also possible to certify a wind turbine prototype. In this case the Certification Body assesses and confirms that the prototype conforms to the stipulated requirements.

A prototype is a wind turbine that is not yet ready for series manufacture.

In accordance with the type certification at least the following aspects (modules) are taken into consideration during this certification procedure:

- design basis evaluation
- design evaluation
- type testing
(with: evaluation of the test plan, safety and function test)

2. Testing and Certification Procedure

2.1 Application

The interested applicant submits an informal application to the Certification Body for the corresponding certification procedure (cf. Chap. 1.1 -1.4).

The following data and information must be included in this enquiry:

- name of the applicant, contact person
- description of the product to be certified: wind turbine, components, project
- scope and extent of certification: certification procedure, modules
- underlying specifications and technical regulations, according to which conformity is to be assessed

2.2 Offer and commissioning

The Certification Body draws up an offer in which the individual services, conditions and prices are set out in accordance with the scope of certification applied for and on the basis of the prices and calculations determined by the Certification Body

The applicant commissions the services offered in writing.

Changes or amendments to the offer or commissioning are only permissible if made in writing; any further questions or open issues must be clarified between the Certification Body and the applicant.

Any differences in the opinions of the Certification Body and the applicant must be resolved.

2.3 Documents to be submitted

The applicant has to provide the Certification Body with certain documentation on the individual modules which are then assessed by the experts of the Certification Body. Typically the records and documents are:

- specifications, descriptions
- technical data
- calculations
- drawings, circuit diagrams
- data sheets, test data

A list of the requisite documents to be submitted is attached in the Appendix (Annex 1).

2.4 Performance of conformity assessments

The various certification procedures are subdivided hierarchically in modules, which are then also subdivided into individual elements.

The Certification Body commissions authorised experts to process and perform the corresponding testing and conformity assessments of these modules and elements.

The conformity assessment comprises the evaluation of the documentation submitted as well as tests and inspections on site, during manufacture, of the test rig or of the turbine. The individual test steps are stipulated in process instructions and in checklists.

The test and evaluation results (as applicable incl. any non-conformities detected) are summarised in corresponding reports and certification such as:

- evaluation reports for the individual elements
 - certification of conformity for each module
 - final evaluation report for all modules
- and sent to the applicant.

Any detected non-conformities with the products requirements are to be corrected by the applicant within a suitable period of time through corresponding corrective action. Documented verification of the corrections performed is to be submitted to the experts of the Certification Body, corresponding re-audits may also be necessary.

2.5 Issuance of certificate

The Certification Body assesses the results reports.

If the assessment is positive then the corresponding certificate is issued and sent to the applicant.

A differentiation is made between the:

- type certificate
- project certificate
- components certificate
- prototype certificate

A certificate typically has the following contents:

- name of applicant
- designation of the certified product (wind turbine, components, project)
- underlying specifications and technical regulations
- scope and extent of certification: certification procedure, modules
- date of issue, possibly the period of validity
- specified characteristics and parameters

Beside the certificate itself the Certification Body can also award a certification symbol (symbol, logo).

2.6 Validity and surveillance

The certification is only valid as long as the conditions on which the certification is based remain unchanged.

The applicant is obliged to inform the Certification Body immediately of all changes or modifications to the certified product.

If required the Certification Body arranges for corresponding re-audits for renewal, maintaining, expansion or extension of certification.

2.6.1 Type certification

The period of validity for a type certificate is 5 years.

In order to maintain validity of a type certificate it is necessary that the following surveillance steps are undertaken by the Certification Body:

Annual report:

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 ab normal operating experience or failures known to the certificate holder and any minor modification-tions.

As template the proposal from the IEC Clarification Sheet” CBC 14C dated 2014-03-17 can be used (see annex 2).

Modifications:

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.

Examples for major modifications as:

- Major modifications in the design
- New/modified main components
- modifications in rotor diameter
- modifications in blade profile
- modifications in rotor speed
- modifications in power range
- etc.

In case the certificate holder intends to maintain and/or extend the validity of the certificate, up-date of all documents affected by such modifications shall be provided and assessed by certifica-tion body.

In case of successful completion of the assessment, an updated certificate will be issued and the replaced one will be withdrawn and respectively declared as invalid.

Periodic surveillance

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 ac-cording to ISO/IEC 17065. The period shall in general not exceed 2.5 years, if the serial produc-tion 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 man u-factured wind turbines continue to be in conformance with the certified design. This verification shall follow the applicable elements of IECRE OD-501 or IEC61400-22.

2.6.2 Project certification

A project certificate specifies the current state and therefore does not include a period of validity.

It is necessary that the following surveillance steps are undertaken by the Certification Body in or-der to maintain / re-issue a project certificate:

- review of the progress report drawn up each year by the applicant for the certified project
- evaluation of major modifications to the certified project
- periodic operation and maintenance surveillance of the certified project; the surveillance period is 2.5 years.

2.6.3 Component certification

The period of validity of a components certificate is 5 years.

In order to maintain validity of a certificate it is necessary that the same surveillance steps are undertaken by the Certification Body as with the type certification.

2.6.4 Prototype certification

The period of validity of a prototype certificate is 3 years at the most.

If modifications to a prototype have been carried out that affect the safety of the wind turbine, then re-certification of the prototype is necessary.

3. Obligations and Responsibility of the Certification Body

3.1 Assurance

The Certification Body affirm that they offer their services to all interested applicants under the same, suitable conditions and that they perform these services in a neutral, objective and non-discriminatory manner

The Certification Body ensures that basic principles, such as impartiality and independence, competence, responsibility, openness, transparency and confidentiality are safeguarded. They work free of any pressure, without influences and without any conflict of interests.

The authorised inspectors deployed are free of any conflict of interests. They are not involved in the construction and planning, in the manufacture, the sale, the installation, operation and the maintenance of the wind turbine to be certified.

3.2 Experts

The Certification Body deploys in particular internal experts in the certification procedure, i.e. experts who are employed at TÜV Rheinland. These experts are competent and qualified to work as auditors / inspectors, specialist certifiers and certifiers. In particular decisions regarding certification are only made by internal experts.

Certain activities may also be performed by external experts, i.e. by experts from external companies who are contractually bound to the Certification Body through an assignment contract / declaration of commitment. These experts are qualified and competent in the same manner as the internal experts. They only perform test and inspection activities; however they do not make any decisions regarding certification.

If the Certification Body intends to deploy external experts in a certification procedure then the agreement of the applicant is to be obtained accordingly.

3.3 Subcontractors

Certain test steps can be performed by subcontracted external subcontractors. These subcontractors are qualified and competent. External subcontractors are not involved in any evaluation steps or in decisions regarding certification.

If the Certification Body intends to deploy external subcontractors in a certification procedure then the agreement of the applicant is to be obtained accordingly.

3.4 Confidentiality

The Certification Body is obliged to treat all information made available to the Body about the product to be certified as strictly confidential. All information that is gained as a result of the certification activities will not be forwarded to any third parties without the express written consent of the applicant. This confidential handling of information applies to all members of staff of the Certification Body, also to associated bodies such as external experts, members of committees and sub-contractors.

If legislation demands that information be passed on to third parties, then the applicant shall be informed about this matter and also about the extent of the information disclosed.

The applicant may for specific reasons release the Certification Body from their obligation to maintain confidentiality.

3.5 List of certified products

The Certification Body keeps a list of all valid certification (with: name of the applicant, product, underlying regulations, scope of certification).

This list is available for any interested parties on request.

3.6 Change in the requirements for certification

If the certification requirements change (e.g. through revision of the underlying regulations), then the Certification Body informs the applicant in due time about these changes as well as about the requisite adjustment or modification measures.

Once the certification requirements have been changed the Certification Body checks any consequently necessary modifications to the product to be certified within a stipulated period of time.

3.7 Suspension, withdrawal of certification

If any infringement of the testing and certification regulations is detected, in particular unlawful utilisation of the certificate, then the Certification Body can demand that the applicant carry out corresponding corrective action.

In extreme cases the validity of a certification can expire, or the validity is suspended, limited or withdrawn.

A certificate expires when:

- the period of validity stated on the certificate expires and there is no extension thereof
- the applicant waives the right to the certificate
- the applicant company is declared bankrupt
- the conditions on which the certificate is based change

A certificate can be suspended, limited or withdrawn by the Certification Body when:

- non-conformities to the requirements for the product to be certified subsequently emerge
- the applicant refuses or does not enable the inspection and despite a request in writing from the Certification Body does not allow performance thereof
- the certificate (or the symbol) is used in a misleading manner or used to make unlawful advertising
- as a result of facts that could not be detected at the point in time when the certificate was issued

- requisite corrective action on non-conformities has not been implemented within a suitable or a stipulated period of time
- outstanding remuneration has not been paid to the Certification Body within the stipulated period of time following a payment reminder

The Certification Body gives the applicant the opportunity to present their views before declaration of the limitation, suspension or invalidity of a certificate, unless such a hearing is not justifiable due to the urgency of the measures to be undertaken.

If the certification is withdrawn then the Certification Body can demand that the certificate be returned.

The Certification Body can correspondingly publish the expiry or withdrawal of the certification. The Certification Body is entitled to inform certain bodies, such as accreditation bodies or regulatory bodies, about the issue, expiry or the withdrawal of certificates.

The Certification Body is not to be held liable for disadvantages, which the applicant suffers because of the certificate not being issued or because of the expiry or the withdrawal of a certificate.

3.8 Handling complaints, objections and disputes

Objections to test results or certification decisions, or complaints about the Certification Body can be submitted to the Certification Body by the applicant him/herself or by other interested parties.

The contact person is the head of the Certification Body.

The head of the Certification Body is responsible for ensuring that such persons or committees of the Certification Body who were not involved in the certification procedure in question only make any decisions regarding objections and complaints.

The claimant or the person submitting an objection is informed about the receipt, the progress and about the decisions and results. The Certification Body must give the claimant or the person submitting an objection detailed reasons for their decision.

If the decision given by the Certification Body is not acceptable for the claimant or the person submitting an objection, then he/she may take this matter to the steering committee of the Certification Body. The steering committee has to make a definitive decision.

It is assured that the person submitting an objection shall not be disadvantaged or discriminated against.

3.9 Liability of the Certification Body

The Certification Body is only liable towards the applicant or third parties to such an extent as is prescribed by legislation in cases of wilful intent or gross negligence. Any further claims are excluded.

In particular the Certification Body is not to be held liable for disadvantages which the applicant suffers when no certificate can be issued due to the negative test results.

4. Rights and Obligations of the Applicant

4.1 Assurance

The applicant must make sure and assure that all requirements, on which the certification is based, have been implemented and will also continue to be complied with in future.

4.2 Access to applicant's premises

The applicant grants the experts of the Certification Body access to all relevant areas and products (such as: documentation, records, personnel, industrial premises, production sites, testing sites, complaints) for the purpose of performance of the designated testing and conformity assessment.

The applicant must provide the Certification Body with all information, data and documents required for the application or for testing.

The applicant must also allow auditors from the accreditation body - e.g. in the case of a witness audit by the accreditation body – to access his/her industrial premises and to access data and information.

4.3 Information about changes

The applicant must inform the Certification Body immediately about all changes and modifications to the certified product, the organisation, the procedures and processes.

4.4 Utilisation of certificates

When the product conforms to the specified requirements a certificate is issued in connection with the certificate symbol.

The applicant can prove and provide evidence of the conformity of his product through presentation of the certificate.

The applicant can affix the certification symbol as a sign of conformity on the certified product, on the product packaging as well as on the accompanying documents.

During the period of validity of the certificate the applicant is entitled:

- to advertise with the certification in printed matter (such as brochures, leaflets, business documents)
- to present the certificate in an unchanged and unabridged form for advertising or promotional activities

The applicant may not use the certificate in a misleading manner, but only for the designated scope. The certificate may not be used in any way that could discredit the Certification Body.

The applicant may only pass on or publish test reports and certificates in their full and unabridged form. The publication of any extract requires the prior approval and consent of the Certification Body.

After suspension or withdrawal of the certification the applicant must suspend all advertising that in any way whatsoever refers to the certification.

After withdrawal of certification the applicant must return all certification documents as demanded by the Certification Body.

4.5 Objections and complaints

The applicant must record and archive all objections, complaints and incidents that pertain to the scope of certification. On request from the Certification Body the applicant must make these documents available and provide information about the measures he has taken to rectify such objections or complaints.

4.6 Liability of the applicant

The performance of testing and certification by the Certification Body does not exempt the applicant from his statutory product liability.

5. Effective date and amendments

The testing and certification regulations come into effect on 01.02.2022.

They apply in principle to all certificates that have been issued within the period of validity.

Future changes or amendments to the testing and certification regulations may have an effect on existing certification. In these cases the applicant will be informed accordingly in writing by the Certification Body.

Annex 1: List of Design Documentation

	Item	Drawings geometrical data	Analysis Calculations	Description	Specifications	Data sheet	Schematics	Test data
1	General turbine description			X			X	
	General turbine characteristics, configurations and layout	X		X	X			
	Turbine description and general specifications				X			
	Major component weights and centres of gravity				X			
	Operational limits			X			X	
	Electrical power system			X				
	External conditions and design class			X				
	Codes and standards	X		X				
	Co-ordinate Systems	Verfahren für die Entwurfslenkung						
2	Design control procedure			X				
	Document description and Organisation in compliance with ISO 9001	Betriebsführungs- und Sicherheitssystem						
3	Control and protection system						X	
	Detailed control logic flow chart			X				
	Control and protection philosophy			X				
	Modes of operation			X	X		X	
	Control system software			X				
	Software release and version control				X			
	Set point list			X	X		X	
	Remote control/monitoring			X				
	Protection system logic			X			X	
	Electrical control system (structure, starting and stopping procedures,...)		X	X				
	Fault analysis	X		X			X	
	Structure of protection system			X	X			
	Description of safety concept and component specifications including transducers and sensors (settings, time constants,...)	X	X	X	X		X	
	Braking system (structure, time constants, characteristics, braking torque curve,...)			X			X	
	Electrical and hydraulic circuit diagrams			X	X	X	X	
	Condition monitoring			X				
	Safety instructions				X		X	
	Overspeed sensing				X		X	
	Overpower/current sensing				X		X	
	Vibration sensing			X			X	
	Emergency switching off button			X				
	Supervisory wind farm control system (remote control of power output, pitch/yaw control parameters,...)			X			X	
	Test plan	X		X	X			

	Item	Drawings geometrical data	Analysis Calculations	Description	Specifications	Data sheet	Schematics	Test data
4	Loads and load cases							
	General:	X					X	
	Wind farm configuration chart							
	Site data (e.g. environmental and marine conditions, dynamic viscosity, air density, salinity, soil,...)		X	X				
	Mass distribution, stiffness, natural frequencies and damping factors for all structural components (rotor, blade, drive train, support structure,...)		X		X			
	Cut in/cut off/rated wind speed				X			
	Rotor-/generator speeds				X			
	Mechanical/electrical losses				X			
	Generator data (rated power, synchronous speed, nominal/ maximum slip, relevant time constants)					X		
	Nacelle/rotor data (mass, dimensions, centre of gravity, etc.)	X	X		X			
	Nacelle/rotor data (mass, dimensions, centre of gravity, etc.)	X	X	X				
	General analysis approach (e.g. coordinate system used)							
	System dynamics model description:			X			X	
	Degrees of freedom				X			
	Mass and stiffness distributions		X		X		X	
	Aerodynamic inputs (airfoil tables, blade geometry, lift and drag coefficients,...)		X		X			
	Partial safety factors							
	Validation of calculation models:		X					
	Analytical		X					X
	Comparison with test data							
	Dynamic behaviour of the system and of individual major components:		X				X	
	Campbell diagrams		X					X
	Spectral/frequency plots		X					
	Mode shapes and frequencies		X					X
	Comparisons between predictions and measurements							
	Load cases (from IEC 61400-1/2/3 plus other identified cases):		X					
	Fatigue loads for several turbine sections (tower sections, main shaft/hub, blade root, blade sections)		X					
	Ultimate loads for several turbine sections (tower sections, main shaft/hub, blade root, blade sections)		X					
	Markov matrices for drive train and blade section loads	X					X	
	Load duration distribution spectra (LDD) for drive train and pitch bearing		X					

	loads							
	Tower bottom loads		X					
	Maximum blade deflection analysis		X					

	Item	Drawings geometrical data	Analysis Calculations	Description	Specifications	Data sheet	Schematics	Test data
	Critical deflection (blade/tower)		X					
	Failure modes		X					
	Turbine controller (e.g. block circuit diagram, input and output signals, etc.)			X			X	
5	Rotor blades							
	Structure	X		X	X			
	Blade connection		X		X			
	Data of materials used (fibres, resins, foam, etc.)				X			
	Geometrical data	X			X			X
	Extreme stress analysis		X					
	Fatigue stress analysis		X					
	Modal analysis		X					
	Stability stress analysis		X					
	Production sequence	X			X			
	Root	X	X					
	Blade/hub connection	X	X					
	Aerodynamic brake mechanism	X	X		X			
	Material and blade tests		X					X
6	Machine and structural components							
	<i>General:</i>							
	Assembly drawings	X		X				
	Material data		X		X			X
	Gearing and drive train (including generator, brake and couplings, ratio, inertia)		X		X			
	Drive train dynamics	X	X	X	X	X		
	Hydraulic system		X	X	X	X	X	
	<i>Pitch system:</i>							
	Drive	X	X		X	X	X	
	Power supply	X	X		X			
	Bearings	X	X		X			
	Pitch lock	X	X		X			
	Connections	X	X		X			
	<i>Hub:</i>							
	Structure	X	X		X			
	Teeter system	X	X		X			
	Pitch system (including power supply)	X	X		X	X		
	Hub/low speed shaft connection	X	X		X			
	<i>Low speed shaft:</i>							
	Main shaft	X	X		X			
	Main bearing	X	X		X			
	Bearing housing	X	X		X			
	Rotor lock	X	X		X			

	Coupling		X		X			
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	Item	Drawings geometrical data	Analysis Calculations	Description	Specifications	Data sheet	Schematics	Test data
	Bearing lubricants				X	X		
	<i>Gear box:</i>							
	Gear box	X	X		X			X
	Torsion support	X	X		X			
	Connections to main frame, bearings	X	X		X	X		
	Cooling and heating systems	X	X		X	X		X
	<i>High speed shaft:</i>							
	Mechanical brake	X	X		X			
	Coupling	X	X		X			
	<i>Frame:</i>							
	Main frame	X	X		X			
	Generator frame	X	X		X			
	Connections main frame and main frame to generator frame	X	X		X			
	<i>Yaw system:</i>							
	Drive	X	X		X	X	X	
	Bearings	X	X		X			
	Yaw lock	X	X		X			
	Connections	X	X		X			
	<i>Tower:</i>							
	Structure	X			X			
	Connections	X	X					
	Dynamic analysis of the tower (with turbine)		X					
	Earthquake analysis		X					
	Extreme and fatigue analysis for welded and bolted connections of the tower		X					
	Finite-element-analysis of door frame and other openings	X	X					
	Corrosion protection system				X			
	Cable twist			X	X		X	
	Cable suspension	X			X			
	Ladders, platforms, elevators	X	X		X			
7	Electrical components							
	Single line diagram (basic power circuit with safety devices)						X	
	Characteristic parameters of electrical components (positioning drives, generator,...)			X	X			
	Functional descriptions and maintenance instructions			X				
	Power circuit schematic	X					X	
	Data of short-circuit and overcurrent protection gear						X	

	Electrical systems diagrams (incl. auxiliary circuits like cranes, lifts, etc.)	X		X	X		X	
	Part lists (incl. sensors, switches and all important electrical appliances)						X	

	Item	Drawings geometrical data	Analysis Calculations	Description	Specifications	Data sheet	Schematics	Test data
	Emergency power system and fire alarm system	X		X			X	
	Charging equipment and storage batteries			X	X	X	X	
	Summary of electrical measuring equipment	X		X			X	
	Records of routine test according to IEC 60034-1			X	X			X
	Power converter	X			X		X	
	High voltage cable	X		X		X		
	Generator			X	X		X	X
	Connections to generator frame	X	X		X			
	Generator bearings	X	X		X			
	Airflow concept, cooling system			X				
	Capacitors			X		X		
	High voltage disconnection device	X		X		X	X	
	Low voltage disconnection device	X		X		X	X	
	Medium voltage transformer	X		X	X		X	
	Type test records of the transformer as per IEC 60076-1			X				X
	Earthing and lightning protection (incl. lightning protection zones, lightning rods and conductors, earth electrodes, location of bonding bars, connection to separate buildings)	X		X	X		X	
8	Housings							
	Spinner and nacelle cover	X	X		X			
	Enclosure (materials, design details, general view, etc.)	X	X		X			X
	Extreme analysis (for steel parts, bolts and fibre reinforced plastics, etc.)		X					
9	Component design evaluation tests							
	Test report							X
10	Foundation							
	Structure	X			X			
	Design parameters			X	X			
	Materials			X	X			
	Detailed presentation of the reinforcement plan	X		X			X	
	Reinforcement (type of steel; diameter, shape, number and position of bars)	X	X	X	X			
	Analysis of tower to foundation joint (embedded steel or anchor bolts)	X	X					
	Extreme and fatigue analysis for all load bearing concrete parts		X					
	Determination of pile forces in case of		X					

	pile foundations(onopole, tripod, jacket)							
	Geotechnical verifications(sliding, settlement, bearing capacity)		X					
	Construction, transport and installation			X				

	Item	Drawings geometrical data	Analysis Calculations	Description	Specifications	Data sheet	Schematics	Test data
11	Manufacturing process							
	Purchase specifications				X			
	Manufacturing specifications				X			
	Work instructions	X		X			X	
	Quality control procedures				X	X		
	Manufacturing manual	X		X	X	X	X	
12	Transportation process							
	Technical specifications				X			
	Limited environmental conditions			X	X			
	Work instructions	X		X			X	
	Quality control procedures				X	X		
	Transportation manual	X		X	X	X	X	
13	Installation process							
	Installation specifications				X			
	Work instructions	X		X			X	
	Quality control procedures				X	X		
	Installation manual	X		X	X	X	X	
14	Maintenance process							
	Work instructions	X		X			X	
	Quality control procedures				X	X		
	Maintenance manual	X		X	X	X	X	
15	Personnel safety							
	Safety instructions			X	X		X	
	Climbing facilities, access ways, passages, platforms, floors, hand rails, fixing points	X	X	X	X			
	Lighting			X	X	X		
	Fire resistance			X	X	X		
	Alternative escape routes			X	X		X	

NOTE 1 Drawings are typically engineering drawings that clearly define dimensions of components or electrical schematics. They can also include material specifications, fabrication instructions or finish specifications when referring to a specific component contained within the drawing.

NOTE 2 Analysis usually refers to engineering calculations such as stress analysis or calculations of structural loads or of electrical loads as well as statistical analysis. Analysis is the basis of specifications for structural, material, electrical and mechanical component requirements. This also includes plots of results and comparisons with test results.

NOTE 3 Descriptions consist of text describing relevant tasks, functions, components etc.

NOTE 4 Specifications are written requirements for certain components of the wind turbine. These could include performance and dimensional specifications for a gear-box, finish requirements for gearing, bearing descriptions, electrical demands for electrical components, dimensional requirements for mechanical components, performance specifications for a hydraulic auxiliary power supply or quality documentation.

NOTE 5 Data sheets are listings of data relevant for the corresponding component, part, detail etc.

NOTE 6 Schematics are data plots, flow charts, diagrams and other illustrations (electric, pneumatics, and hydraulics).

NOTE 7 Test data usually refers to reports of tests and measurements.

NOTE 8 A check mark (x) indicates that corresponding documentation is expected for certification purposes.

Annex 2: IECRE Clarification Sheet CBC 14C, dated 2014-03-17
 (Annual Report for Maintenance of Type Certification)

CBC DECISION/CLARIFICATION SHEET

Subject: Standard format maintenance report		Standard and clause: IEC 61400-22:2010 §6.5	Sheet No. CBC 14C
Status of document: Approved		Proposal date: 2013-10-28	Originator of proposal: CAC/OEM & EU
Related document:			
Revision:	Approval Date:	Description:	
A	-	Original proposal	
B	-	CBC revised proposal	
C	2014-03-17	CBC revised proposal including the EU comments	

The following standard format for annual report should be used by the OEM for the annual reporting in connection with maintenance of the Type Certificate.

As an option, an annual maintenance conformity statement could be issued by the certification body after successful evaluation of the OEM annual report. Such an Annual Maintenance Conformity Statement (AMCS) can be used as conformation towards the market that the evaluation of the OEM annual reporting has taken place and has been accepted by the Certification Body.

Annual Report for Maintenance of Type Certification

Content

- 1.0 Introduction
- 2.0 Certification summary
- 3.0 Installation summary
- 4.0 Abnormal Operating Experience/Failures
- 5.0 Minor modifications
- 6.0 Change in the manufacturing process
- 7.0 Significant events
- Appendix

1.0 Introduction

This report is to satisfy the annual reporting requirement for the Wind Turbine Type XXX Certification provided by YYY per IEC 61400-22. This report covers the period from xx-xx-20xx until xx-xx-20xx. Major Modifications or Serious Incidents are not addressed in this report as they are dealt with immediately and/or before implementation.

2.0 Certification Summary

The Wind Turbine Type XXX is certified by YYY as described in Type Certificate number TC-123456-0 issued on 20xx-xx-xx. This certificate is valid until 20xx-xx-xx.

CBC DECISION/CLARIFICATION SHEET

3.0 Installation summary

Below are the Wind Turbine Type XXX sites that have been installed in the reporting period:

Country	Wind turbine Type XXXX Number of WTGs
Total number of WTGs installed	

4.0 Abnormal Operating Experience/Failures

Abnormal Operating Experience for Wind Turbine Type XXX

	Warning Code	Controller Fault Code	# of faults	OEM Evaluation and if applicable Root Cause Analysis and Corrective Action
1	100	251	25	Overheating due to insufficient cooling capacity. See Appendix for RCA and Corrective Action.
2				
3				
4				
5				
6				
7				
8				
..				
XX				

Failures/damages/incidents for Wind Turbine Type XXX

	Component/ System	Description	# of faults	OEM Evaluation and if applicable Root Cause Analysis and Corrective Action
1	Generator	Damaged bearing	10	See Appendix
2				
3				
4				
5				
6				
7				
8				
9				
10				

CBC DECISION/CLARIFICATION SHEET

5.0 Minor Modifications

Minor Modifications - changes to existing components and systems

Component	Document (Latest version)	Engineering Change Description	Date

Appendix

CBC DECISION/CLARIFICATION SHEET

Example for AMCS:

Annual Maintenance Conformity Statement

This statement is issued to

XXXX
Street
City
Country

for the wind turbine

XXXX
Address
Country

This statement attests compliance with IEC 61400-22:2010 chapter 6.5.2, concerning validity of the type certification. It is based on the following reference documents:

TC – (Number)

OEM Annual report

This Statement is issued
(Location), dd.mm.yy.

Certification Body

Signature(s)