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Guide for procurement of power station equipment - Part 5-3: Wind turbines

Leitfaden für die Beschaffung von Ausrüstungen für Kraftwerke - Teil 5-3: Windturbinen

Guide pour l'acquisition d'équipements destinés aux centrales de production d'électricité
- Partie 5-3: Turbines éoliennes

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ICS:

27.180	Sistemi turbin na veter in drugi alternativni viri energije	Wind turbine systems and other alternative sources of energy
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Guide for procurement of power station equipment - Part 5-3: Wind turbines

Guide pour l'acquisition d'équipements destinés aux
centrales de production d'électricité - Partie 5-3: Turbines
éoliennes

Leitfaden für die Beschaffung von Ausrüstungen für
Kraftwerke - Teil 5-3: Windturbinen

This European Standard was approved by CEN/CENELEC on 11 December 1997.

CEN/CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN/CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN/CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN/CENELEC members are the national standards bodies and national electrotechnical committees, respectively, of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This standard takes the form of a recommendation and is therefore entitled a "Guide".

This Guide for procurement has been prepared by the CEN/CENELEC Joint Task Force Power Engineering (JTFPE) of which the secretariat is held by BSI.

*This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by **July 1998**, and conflicting national standards shall be withdrawn at the latest by **July 1998**.*

This Guide for procurement has been prepared under mandates given to CEN and CENELEC by the European Commission and the European Free Trade Association.

This Guide for procurement is a part of a series of Guides mandated to cover the procurement of power station plant and equipment in conformity with European Procurement Directives. The Guides are:

EN 45510: Guide for procurement of power station equipment

Part 1: Common clauses

Part 2-1: Electrical equipment - Power transformers

Part 2-2: Electrical equipment - Uninterruptible power supplies

Part 2-3: Electrical equipment - Stationary batteries and chargers

Part 2-4: Electrical equipment - High power static convertors

Part 2-5: Electrical equipment - Motors

Part 2-6: Electrical equipment - Generators

Part 2-7: Electrical equipment - Switchgear and controlgear

Part 2-8: Electrical equipment - Power cables

Part 2-9: Electrical equipment - Cabling systems

Part 3-1: Boilers - Water tube boilers

Part 3-2: Boilers - Shell boilers

Part 3-3: Boilers - Boilers with fluidized bed firing

Part 4-1: Boiler auxiliaries - Equipment for reduction of dust emissions

Part 4-2: Boiler auxiliaries - Gas-air, steam-air and gas-gas heaters

Part 4-3: Boiler auxiliaries - Draught plant

Part 4-4: Boiler auxiliaries - Fuel preparation equipment

Part 4-5: Boiler auxiliaries - Coal handling and bulk storage plant

Part 4-6: Boiler auxiliaries - Flue gas desulphurization (De-SO_x) plant

Part 4-7: Boiler auxiliaries - Ash handling plant

Part 4-8: Boiler auxiliaries - Dust handling plant

Part 4-9: Boiler auxiliaries - Sootblowers

Part 4-10: Boiler auxiliaries - Flue gas denitrification (De-NO_x) plant

Part 5-1: Turbines - Steam turbines

Part 5-2: Turbines - Gas turbines

Part 5-3: Turbines - Wind turbines

Part 5-4: Turbines - Hydraulic turbines, storage pumps and pump-turbines

Part 6-1: Turbine auxiliaries - Deaerators
Part 6-2: Turbine auxiliaries - Feedwater heaters
Part 6-3: Turbine auxiliaries - Condenser plant
Part 6-4: Turbine auxiliaries - Pumps
Part 6-5: Turbine auxiliaries - Dry cooling systems
Part 6-6: Turbine auxiliaries - Wet and wet/dry cooling towers
Part 6-7: Turbine auxiliaries - Moisture separator reheaters
Part 6-8: Turbine auxiliaries - Cranes
Part 6-9: Turbine auxiliaries - Cooling water systems

Part 7-1: Pipework and valves - High pressure piping systems
Part 7-2: Pipework and valves - Boiler and high pressure piping valves

Part 8-1: Control and instrumentation

EN 45510 Part 1 contains those clauses common to all the above Guides giving the provisions of a non **equipment** specific nature for use in the procurement of power station plant. EN 45510 is the responsibility of JTFPE. The so called "common clauses", as appropriate, also appear in italics in the documents specific to particular **equipment**.

Where paragraphs of "common clauses" are omitted, each paragraph omitted is indicated by the symbol *****.

In this Guide, words in **bold type** indicate that they have the meaning given in the definitions, clause 3.

In this Guide, words and sentences not in italics are specific to this Guide and refer to the particular **equipment** covered.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

*This standard gives guidance on writing the technical **specification** for the procurement of Wind Turbines for use in electricity generating stations (**Wind Power Stations**). * * * * * Other possible applications of such **equipment** have not been considered in the preparation of this Guide.*

This Guide covers **Wind turbine generator systems (WTGS)** with swept area equal to or larger than 40 m².

This Guide for Procurement of Wind Turbines has been prepared to be used with the existing International Standard IEC 1400-1, it should, therefore, be read in addition and complementary to the International Standard.

*The **equipment** covered by this Guide is defined by its function rather than design type. Therefore, the guidance to the **specification** is stated in performance terms rather than being specified by a detailed description of the **equipment** to be supplied.*

*This Guide indicates to potential **purchasers** how their **specification** should be prepared so that:*

- the **equipment** type and capacity interfaces correctly with other elements of the systems;
- predicted performance is achieved;
- ancillary **equipment** is properly sized;
- **reliability, availability** and safety requirements are achieved;
- proper consideration is given to the evaluation process and the quality measures to be applied.

*This Guide does not determine the type of **specification** (e.g. detailed, performance, functional) or the extent of supply for any given contract which is normally decided on the basis of the **purchaser's** project strategy. It does not cover:*

- any commercial, contractual or legal issues which are normally in separate parts of an **enquiry**;
- any allocation of responsibilities which are determined by the contract.

*This Guide does not prescribe the arrangement of the documents in the **enquiry**.*

*NOTE: As a comprehensive European environmental policy is still under preparation, this Guide does not address the environmental implications of the **equipment**.*

2 Normative references

This Guide for Procurement incorporates by dated or undated reference, provisions from other publications. These normative references are cited in the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Guide only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN ISO 9001	Quality systems - Model for quality assurance in design, development, production, installation and servicing (ISO 9001:1994)
EN ISO 9002	Quality systems - Model for quality assurance in production, installation and servicing (ISO 9002:1994)
IEC 50 (191)	International electrotechnical vocabulary - Chapter 191: Dependability and quality of service
IEC 1400-1	Wind turbine generator systems - Part 1: Safety requirements

3 Definitions

For the purposes of this Guide, the following definitions apply:

3.1 Organisational terms

- 3.1.1 **purchaser:** Recipient of a product and/or a service provided by a **supplier**.
- 3.1.2 **supplier:** Person or organisation that provides a product and/or a service to the **purchaser**.
- 3.1.3 **specification:** Document stating technical requirements of the **purchaser**. It may form part of an **enquiry** issued by a **purchaser**.
- 3.1.4 **enquiry:** Invitation to **tender** issued by a **purchaser**. It will normally include a **specification** together with the necessary contractual and commercial conditions.
- 3.1.5 **tender:** Offer made by a **tenderer** in response to an **enquiry**.
- 3.1.6 **tenderer:** Person or organisation submitting a **tender** for the **equipment** in response to the **enquiry**.
- 3.1.7 **site:** Place to which the **equipment** is to be delivered or where work is to be done by the **supplier**, together with so much of the area surrounding as the **supplier** may, with the consent of the **purchaser**, use for the purposes of the contract.

NOTE: Further definitions of useful organisational terms may be found in EN ISO 8402 (see Annex A).

3.2 Technical terms

Technical terms applicable to wind turbines are defined in IEC 1400-1. The following definitions are specific for this guide:

- 3.2.1 **wind turbine generator system (WTGS):** System which converts kinetic energy in the wind into electric energy.
- 3.2.2 **wind power station:** Group or groups of wind turbine generators.
- 3.2.3 **external conditions:** Factors affecting the operation of wind turbine including the wind regime and other climatic factors, i.e. snow, ice, etc.
- 3.2.4 **power curve:** A table which depicts the net power of a **WTGS** as a function of wind speed.

3.3 General terms

3.3.1 **equipment**: Plant, component, system and/or associated service to be provided in response to the enquiry.

3.3.2 **conformity**: Fulfilment of specified requirements by a product, process or service.

3.3.3 **performance**: Obligations verified by specified tests.

3.3.4 **operating period**: Time between planned outages or maintenance periods during which the equipment is in operation and/or does not restrict operational requirements of the power station.

3.3.5 **life expectancy**: Time period over which the equipment might be expected to operate with planned maintenance but without replacement of a significant component. For example a wind turbine blade is a significant component.

3.3.6 **design life**: Operating hours of the equipment on which design calculations are based.

3.3.7 **acceptability**: Compliance with criteria defined by the purchaser for assessing the suitability of equipment.

3.3.8 **equipment margins**: Allowance for design, fabrication or operating contingency defined in the specification. These are separate to those normally included by the supplier for his own purposes.

3.3.9 **proven equipment**: Equipment which may be demonstrated to be similar to that offered and has operated for a sufficient time to have demonstrated performance and availability.

3.3.10 **availability**: As defined in IEC 50 (191).

3.3.11 **reliability**: As defined in IEC 50 (191).

3.3.12 **maintainability**: As defined in IEC 50 (191).

4 Brief overall project description

4.1 Role and organisation of purchaser

The enquiry should define the purchaser's role in the project, including whether the purchaser will assume responsibility for the planning and technical coordination of the project, or whether other organisations will be appointed to carry out all or part of this function. The enquiry should define all organisational interfaces and the procedures to be employed for managing the contract and the site.

4.2 Site location

The specification should describe the geographical location of the site which may include surveying points, the previous use of the site and any local features such as use of adjoining sites and proximity of habitation or other public use, impact of industrial or military activities and planning restrictions.

Where applicable, the specification should indicate site datum on specification drawings and specify site and drawing orientation and define co-ordinate axes (x,y,z) and numbering order to ensure consistency between suppliers of connected equipment.

Where appropriate, the **specification** should define the permitted ground loading, dimensional and time restrictions on access routes up to but not including public roads or railways.

The **specification** should identify, where appropriate, the environment of the **site** in which the **equipment** will operate. The following factors may normally be included if appropriate:

- climatic e.g. atmospheric pressure, annual variation of air and cooling water temperature, relative humidity, rain fall, hail, icing, snow, wind velocity (normal and maximum), lightning, chemically active substances, mechanically abrasive particles, salinity, solar radiation;
- geological e.g. seismic conditions and characteristics of subsoil (e.g. caverns, gliding stratifications, load bearing capability of subsoils);
- geographic e.g. elevation, influence of local topography and structures;
- hydrological e.g. flooding and tides.

4.3 Equipment task

The **specification** should describe in general terms the function, task or role of the **equipment** to be purchased. e.g. whether it is part of a new power generating plant, a modification to an existing power generating plant or replacement **equipment**.

Where appropriate, the **specification** should define the function and the known limitations, if any, in the **equipment** connected to that which is being supplied so that the **equipment** may avoid imposing adverse conditions or the **supplier** may suggest modifications to connected equipment which would ensure satisfactory operation.

The **specification** should define the electrical conditions of the utility interconnections with the electrical transmission line.

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4.4 Equipment to be purchased

The **specification** may define the **equipment** type or arrangement to be purchased.

For example the **specification** may state requirements in aspects such as:

- safety
- vibrations
- noise
- direction of rotation
- performance**
- power quality issues such as harmonic distortion, reactive power **performance** and transient current requirements

The **specification** may also define preferences for **equipment** types (or give information) regarding compatibility with existing equipment, if required.

The **specification** should define the intended methods or local practice for maintenance, inspection and operation.

The **specification** should define requirements with regard to the general appearance of the **equipment** (e.g. dimensions, shape or colour) to meet local planning requirements or specific criteria, where such requirements exist.

NOTE: Attention is drawn to European, national and/or local legislation which may place restrictions in this area.