



SLOVENSKI STANDARD

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Vodilo za nabavo opreme elektrarn –5-4. del: Vodne turbine, akumulacijske črpalke in črpalne turbine

Guide for procurement of power station equipment - Part 5-4: Hydraulic turbines, storage pumps and pump-turbines

Leitfaden für die Beschaffung von Ausrüstungen für Kraftwerke - Teil 5-4: Wasserturbinen, Speicherpumpen und Pumpturbinen

Guide pour l'acquisition d'équipements destinés aux centrales de production d'électricité - Partie 5-4: Turbines hydrauliques, pompes d'accumulation, turbines-pompes

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EUROPEAN STANDARD

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Guide for procurement of power station equipment - Part 5-4: Hydraulic turbines, storage pumps and pump-turbines

Guide pour l'acquisition d'équipements destinés aux centrales de production d'électricité - Partie 5-4: Turbines hydrauliques, pompes d'accumulation, turbines-pompes

Leitfaden für die Beschaffung von Ausrüstungen für Kraftwerke - Teil 5-4: Wasserturbinen, Speicherpumpen und Pumpturbinen

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.

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In this Guide, words and sentences not in italics are specific to this Guide and refer to the particular equipment covered. (standards.iteh.ai)

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 Hydraulic Turbines, Storage Pumps and Pump-Turbines for use in electricity generating stations (hydraulic power stations). This Guide for procurement is not applicable to equipment for use in the nuclear reactor plant area of nuclear power stations. Other possible applications of such equipment have not been considered in the preparation of this Guide.

This Guide covers the following hydraulic machines:

- Francis Turbines,
- Pelton Turbines,
- Kaplan and Propeller Turbines,
- Tubular Turbines (bulb, pit, rim-generator and S-type units),
- Pump-Turbines and
- Storage Pumps.

This Guide for Procurement of hydraulic machines has been prepared to be used with the International Standard IEC 1366, 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 | <i>Quality systems - Model for quality assurance in design, development, production, installation and servicing (ISO 9001:1994)</i> |
| EN ISO 9002 | <i>Quality systems - Model for quality assurance in production, installation and servicing (ISO 9002:1994)</i> |
| IEC 50 (191) | <i>International electrotechnical vocabulary, Chapter 191: Dependability and quality of service</i> |
| IEC 41 | International code for the field acceptance tests to determine the hydraulic performance of hydraulic turbines, storage pumps and pump-turbines. |
| IEC 193: 1965 | International code for model acceptance tests of hydraulic turbines (see NOTE). |
| IEC 193A | First supplement to publication 193: 1965, (see NOTE). |
| IEC 193 No.1 | Amendment No.1 - Test conditions to be fulfilled, (see NOTE). |
| IEC 545 | Guide for commissioning, operation and maintenance of hydraulic turbines. |
| IEC 805 | Guide for commissioning, operation and maintenance of storage pumps and of pump-turbines operating as pumps. |
| IEC 1366 | Technical report for the preparation of tendering documents for hydraulic turbines, storage pumps and pump-turbines |

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NOTE :This standard is under revision by IEC/TC4 and currently has the status of draft amendment (Amd).

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).

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3.2 Technical terms

Technical terms applicable to hydraulic machines are defined in IEC 1364

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 buckets and needles of pelton turbines or runner blades and guide vanes of other types of hydraulic machines are significant components

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 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, icing, snow, wind velocity (normal and maximum), lightning;
- 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, range of water temperature, water quality analysis (chemical, corrosive, biological, suspended solids).