SLOVENSKI STANDARD
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Guide for procurement of power station equipment - Part 2-4: Electrical equipment - High power static convertors

Guide for procurement of power station equipment - Part 2-4: Electrical equipment - High power static convertors

Leitfaden für die Beschaffung von Ausrüstungen für Kraftwerke - Teil 2-4: Elektrische Ausrüstung - Statische Hochleistungsumrichter

Guide pour l'acquisition d'équipements destinés aux centrales de production d'électricité - Partie 2-4: Equipements électriques - Convertisseurs de puissance

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27.100	Elektrarne na splošno	Power stations in general
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Guide for procurement of power station equipment
Part 2-4: Electrical equipment - High power static convertors

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This European Standard was approved by CEN and CENELEC on 2000-02-01.

CEN and 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 or 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 or CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN and 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 the British Standards Institution.

The text of the draft was submitted to the formal vote and was approved by CEN and CENELEC as EN 45510-2-3 on 2000-02-01.

The following dates were fixed:

- *latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement* (dop) 2001-01-01
- *latest date by which the national standards conflicting with the EN have to be withdrawn* (dow) 2003-01-01

Annexes designated "informative" are given for information only. In this standard, annex A is informative.

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
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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**.

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.

1 Scope

This standard gives guidance on writing the technical ***specification*** *for the procurement of* static a.c. and d.c. high power convertors *for use in electricity generating stations (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 each type of power convertor, i.e. rectifier, inverter, static excitation system, conversion of a.c. to a.c./d.c. to d.c. and switching, for the purpose of changing and/or controlling one or more characteristics.

This type of **equipment** is used for many applications such as motor drives and actuators, e.g. variable frequency starting equipment, a.c. and d.c. power supplies for computers and instrumentation, in chemical process plant, e.g. rectifiers for electrolysis in hydrogen production, in mechanical plant, e.g. electrostatic precipitators, etc.

For additional, or specific, requirements for batteries, battery chargers or uninterruptible power supplies (UPS) refer to the relevant guides in this series.

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.

European Standards

EN ISO 9001	*Quality systems - Model for quality assurance in design, development, production, installation and servicing*
EN ISO 9002	*Quality systems - Model for quality assurance in production, installation and servicing*
EN 50091	Specification for uninterruptible power systems (UPS) Part 1: General and safety requirements Part 2: EMC requirements
EN 60146 series	Semiconductor convertors - General requirements and line commutated convertors Part 1-1: Specification of basic requirements (IEC 60146-1-1) Part 1-3: Transformers and reactors (IEC 60146-1-3)
EN 60529	Degrees of protection provided by enclosures (IP Code) (IEC 60529)

International Standards

IEC 60050-191	*International electrotechnical vocabulary* *Chapter 191: Dependability and Quality of Services*
IEC 60050-551	International electrotechnical vocabulary Chapter 551: Power electronics
IEC 60146 series	Semiconductor convertors - General requirements and line commutated convertors Part 1-2: Application guide Part 3: Semiconductor d.c. convertors (d.c. chopper convertors)

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 are used in accordance with IEC 60050-551 and EN 60146.

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 convertor module/sub-assembly 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 60050-191.*

3.3.11 ***reliability****: As defined in IEC 60050-191.*

3.3.12 ***maintainability****: As defined in IEC 60050-191.*

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.*

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.*

4.4 Equipment to be purchased

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

For example, the **purchaser** may specify:

- the type of convertor,
- the number of convertors (for a particular application).

The **specification** may define any preferences with regard to the system configuration to be provided to achieve the required level of continuity and capacity of load output. Where appropriate, this should include a schematic diagram of the proposed system.