



**SLOVENSKI STANDARD**  
**SIST EN 45510-4-8:2000**

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**Guide for procurement of power station equipment - Part 4-8: Boilers auxiliaries - Dust handling plant**

Guide for procurement of power station equipment -- Part 4-8: Boiler auxiliaries - Dust handling plant

Leitfaden für die Beschaffung von Ausrüstungen für Kraftwerke -- Teil 4-8: Nebenanlagen - Staubtransportanlage

Guide pour l'acquisition d'équipements destinés aux centrales de production d'électricité -- Partie 4-8: Auxiliaires de chaudières - Manutention des poussières

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## Guide for procurement of power station equipment - Part 4-8: Boiler auxiliaries - Dust handling plant

Guide pour l'acquisition d'équipements destinés aux  
centrales de production d'électricité - Partie 4-8: Auxiliaires  
de chaudières - Manutention des poussières

Leitfaden für die Beschaffung von Ausrüstungen für  
Kraftwerke - Teil 4-8: Nebenanlagen - Staubtransportanlage

This European Standard was approved by CEN/CENELEC on 1 October 1999.

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 European Standard has been prepared by Technical Committee CEN/CLC JTFPE "Joint Task Force Power Engineering", the secretariat of which 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 April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.*

*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.*

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

*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 converters*

*Part 2-5: Electrical equipment - Motors*

*Part 2-6: Electrical equipment - Generators*

*Part 2-7: Electrical equipment - Switchgear and control gear*

*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 desulphurisation (De-SO<sub>x</sub>) 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<sub>x</sub>) 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 plants. 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.

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## 1 Scope

This standard gives guidance on writing the technical **specification** for the procurement of **equipment** for dust handling associated with coal fired steam generating plant 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 the devices for pneumatic, mechanical and hydraulic conveying of different design.

Pneumatic conveying systems use compressed air or inert gas in different ways. Air activated gravity flow is used in the **air slide**. Other pneumatic systems use gas as conveying medium for the dust in pipelines; those are differentiated by the velocity of conveyance.

Dilute phase conveying systems also known as high-velocity conveying systems include:

- **ejectors**;
- **dust pumps**;
- elevators (**airlift**).

Dense phase conveying systems, using **pressure vessel conveyors** as transmitters include:

- **plug conveyors** (batch conveyors);
- turbulent flow conveyors.

Mechanical conveyors systems for dust handling include:

- **belt conveyors** (moistened **dust**);
- **drag link conveyors**;
- **bucket elevators**; <https://standards.iteh.ai/catalog/standards/sist/b3cd3de0-ee76-4433-ab2b-a0f23e89036f/sist-en-45510-4-8-2000>
- **silos vehicles**.

Hydraulic conveying systems use pressurised water as conveying medium in pipelines; These include::

- **slurry pumps**;
- **ejectors**.

A multitude of accessories can be necessary to form a complete dust removal plant.

If **fly ash** is to be utilised it mostly is to be kept in dry condition. In consequence the dust handling systems for this purpose are limited to pneumatic and mechanical devices or a combination of both.

Hydraulic conveyance of **fly ash** is preferably employed in combination with hydraulic ash handling if all combustion residues are to be dumped as waste.

*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 such as the boiler and gas treatment plant;
- 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 60050-191	International electrotechnical vocabulary – Chapter 191 : Dependability and quality of service.

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## 3 Definitions

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

### 3.1 Organisational terms

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**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 Bibliography).

### 3.2 Technical terms

#### 3.2.1 Operating conditions

**3.2.1.1 dust handling plant:** Equipment comprising devices for extraction, conveying, intermediate storage, treatment and loading for delivery by means of pneumatic, mechanical or hydraulic systems which together form a system to remove combustion residues entrained in the fluegas as **fly ash** for utilisation or dumping.

**3.2.1.2 fly ash:** Dust burden entrained in the flue gas flow leaving the furnace consisting of mineral matter and some unburnt combustibles.

**3.2.1.3 stabilised product:** Reaction by-product of spray dry, semi spray dry or absorption FGD process, stabilised with some **fly ash**. This product is normally transported in its dry state or with pre-dried transport air.

**3.2.1.4 continuous maximum operating condition:** Maximum condition at which the **equipment** may be operated for a period not exceeding the specified **design life**.

### 3.2.2 Pneumatic conveying

**3.2.2.1 air slide:** Device for air activated gravity conveying, consisting of a closed chute with a slight slope, split into a lower and an upper section separated by a porous membrane. Supply of air into the lower section causes the dust in the upper section to be fluidised and flow in the direction of the slope.

**3.2.2.2 ejector:** Device for pneumatic conveyance of dust. Comprising an inlet housing for accepting dust, a pressure nozzle and a diffuser connected to a pipeline.

**3.2.2.3 dust pump:** A pneumatic pump in which dust enters the mixing head through a high-speed screw. Further conveyance by compressed air via a pipeline.

**3.2.2.4 airlift:** Vertical transport of dust. Dust is stored in a container at the bottom and fluidized before conveyance by compressed air via a pipeline.

**3.2.2.5 pressure vessel conveying:** The dust is admitted intermittently into a vessel isolated from the conveying pipeline. After filling the vessel is pressurised and then discharged into the pipeline.

**3.2.2.6 plug and turbulence conveying:** Further developments of **pressure vessel conveying**, with additional air injection into the pipeline system.

### 3.2.3 Mechanical conveying (standards.iteh.ai)

**3.2.3.1 dust hopper:** Dust collecting chamber arranged below DeNO<sub>x</sub> reactor, air preheater, open pass and precipitator or filter from which the dust can be discharged under gravity into the conveying system.

**3.2.3.2 belt conveyor:** An endless rubber belt supported by idlers mounted on a structure in trough shape and stretched between a head drive pulley and a tail pulley. **Fly ash** should be moistened and **the belt conveyor** be covered for weather protection. A further development is an endless rubber belt constrained to form a tube by annular arrangement of the idlers.

**3.2.3.3 drag link conveyor:** One or two parallel endless chains with a series of scraper flights sliding in a dust tight casing. A further development uses a series of discs on an endless chain enclosed in a tube.

**3.2.3.4 bucket elevator:** An endless belt or pair of chains carrying a series of discrete buckets for vertical transport which on turning over at the top pulley discharge their contents. Particularly suitable for large elevations. Enclosed in a dust tight casing.

**3.2.3.5 silo vehicle:** mobile equipment with special facilities for ease of transport and discharge of dust.

### 3.2.4 Hydraulic conveying

**3.2.4.1 slurry pump:** Single-stage wear-resistant centrifugal pump for transportation of dust/water mixture through pipelines.

**3.2.4.2 ejector:** Device to propel dust by a pressurised water jet into a pipe. The ejector consists of an inlet housing, a nozzle fed with water and a diffuser.. Simple design permits easy replacement of components which may wear.

### 3.2.5 Accessories

**3.2.5.1 hopper shut-off devices:** Tightly closing devices below **dust hopper** to prevent air in-leakage when conveying device is not in operation and to allow access for repair of downstream equipment. Flatbody gate and rotary disc valves are commonly used.

**3.2.5.2 hopper discharging devices:** Equipment which controls discharge rate and prevents air in-leakage when conveying device is in operation. Weight loaded or actuated valves, rotary feeders or screw conveyors are commonly used.

**3.2.5.3 dry loading:** Long distance transport of **fly ash** in dry condition is performed by **silos** which are filled by gravity flow via double bellows adjustable in outlet height and provided with a connection cone. Displaced air from the **silos** is fed to a suction unit via the free space of the double bellows.

**3.2.5.4 wet loading:** For transport in open vehicles or by belt conveyors **fly ash** must be moistened in order to prevent dust nuisance; Moistening can be performed either by moistening screw devices, plough blade mixers or peletizing disks.

**3.2.5.5 fluidization aids:** Devices to promote the flow of dust from hoppers and silos.

### 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.

**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: