TECHNICAL SPECIFICATION

ISO/TS 16952-10

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Technical product documentation — Reference designation system —

Part 10:
Power plants

Documentation technique de produits — Système de désignation de référence —

Partie 10: Centrales électriques

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Contents

Page

ISO/TS 16952-10:2008
https://standards.iteh.ai/catalog/standards/sist/be6cf4fa-1158-4c53-97f2-
fa36281fad5f/iso-ts-16952-10-2008

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

⎯ an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 16952-10 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation and tpd-symbols*.

ISO 16952 consists of the following parts, under the general title *Technical product documentation — Reference designation system*:

⎯ *Part 1: General application rules* [Technical Specification]

⎯ *Part 10: Power plants* [Technical Specification]

Further parts on sector-specific rules are under consideration.

Introduction

Based on ISO/TS 16952-1, this part of ISO 16952 serves to designate plants, sections of plants and items of equipment in any type of installation for industrial production of electrical and thermal energy according to task, type and location. This sector-specific Reference Designation System (RDS) is intended for application by all engineering disciplines for the entire life cycle of a plant, from planning, licensing, construction, operation and maintenance, re-powering, extension and recreation, to dismantling and demolition. Based on the structuring principles and reference designation rules of IEC 61346 and other documents, ISO 16952 breaks down these rules into interdisciplinary guidelines for practical application.

The relationships of input documents with this part of ISO 16952 are shown in Figure 1.
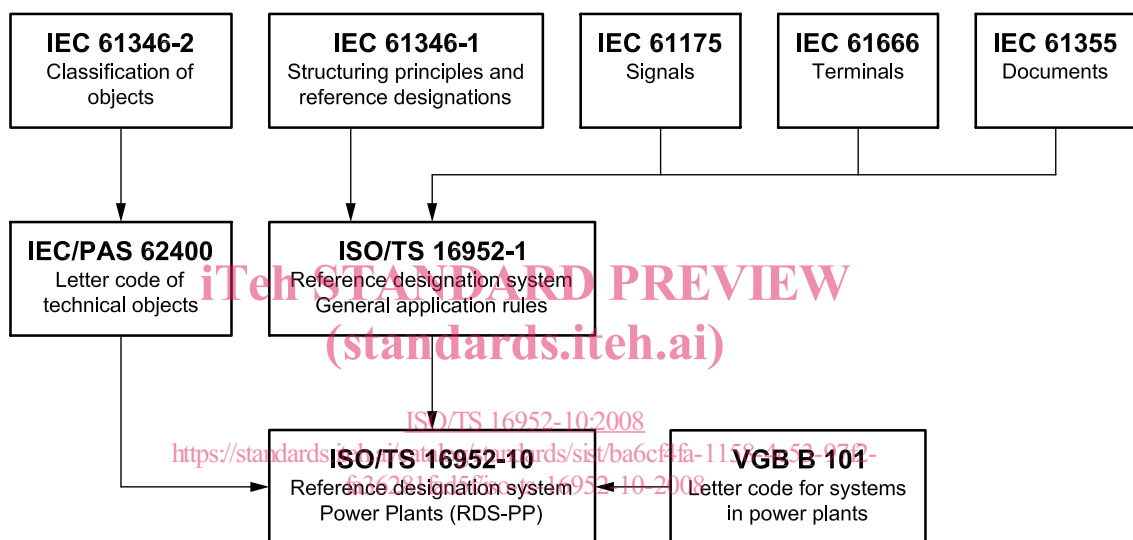
Figure 1 — Structuring and designation standards

This part of ISO 16952 establishes the prerequisites for

— uniform designation of all power plant processes (see Figure 2 for a summary of the energy conversion cycle),

— uniform designation of all power plant types,

— language-independent codes to ensure international applicability,

— adequate capacity and possible detail for designation of all systems, equipment and structures,

— adequate extension possibilities for new technologies,

— consistent designation for planning, licensing, construction, operation, maintenance and decommissioning,

— common applicability in mechanical, electrical, instrumentation and control (I&C) and civil engineering, with the simultaneous possibility to designate according to function, product and location aspects,

— fulfilment of quality management requirements,

— fulfilment of the technical documents management system requirements,

— fulfilment of the requirements for occupational safety and ergonomics.

Figure 2 — Principle of energy conversion including supply and disposal processes

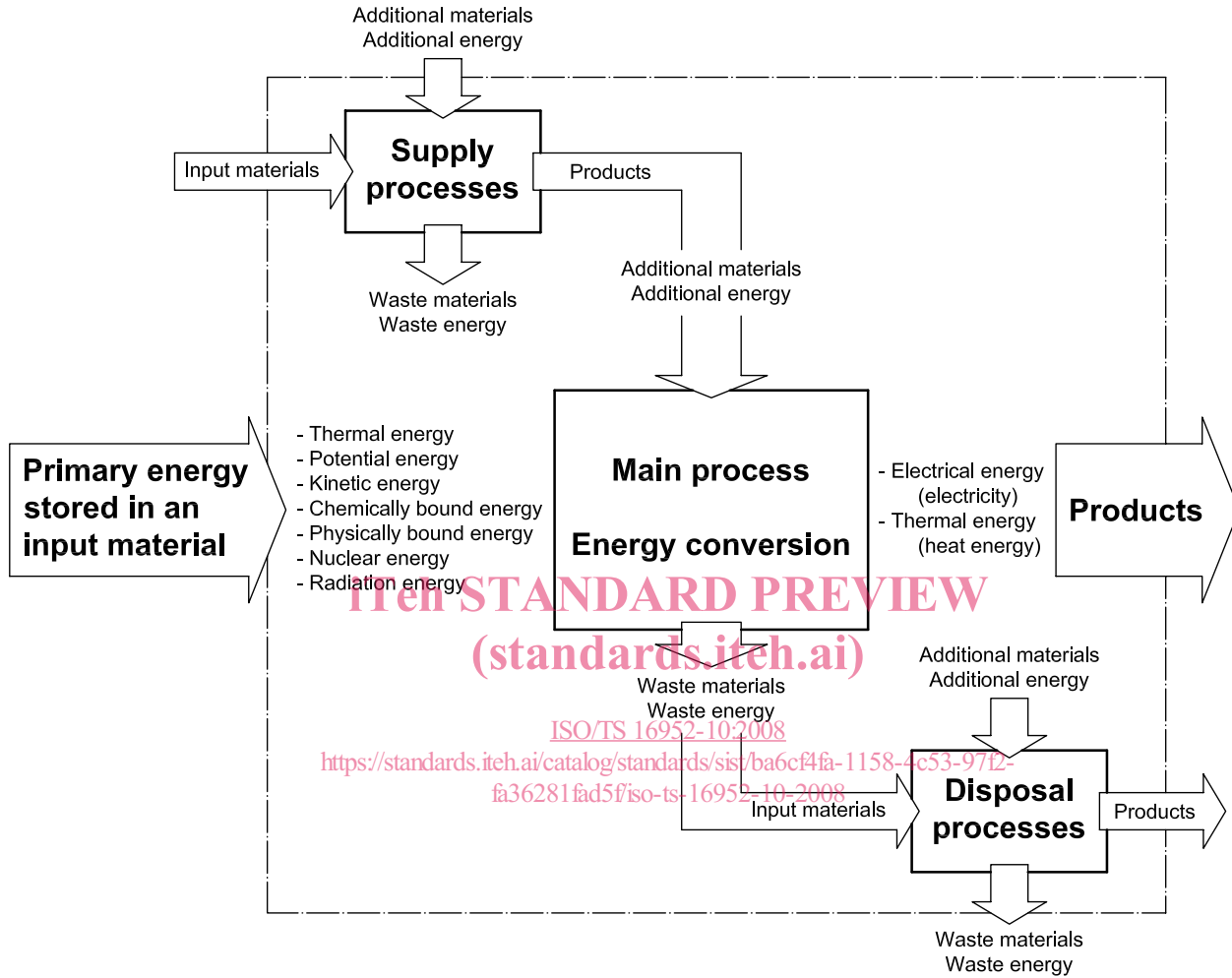# Technical product documentation — Reference designation system —

Part 10:
Power plants

1 Scope

This part of ISO 16952 contains sector-specific stipulations for structuring principles and reference designation rules on technical products and technical product documentation of power plants.

It applies in combination with ISO/TS 16952-1, IEC/PAS 62400 and VGB B 101 for the classification of systems and objects, and for function-, product- and location-specific designation of technical products and their documentation for power plants.

It specifies the designation blocks for the clear identification and localization of the technical products, which are used for their labelling in the plant, for their designation in technical documents and for the designation of the technical documents as well.

This part of ISO 16952 encompasses the process of energy conversion. The specifications in this part of ISO 16952 apply for the power plant process, for the primary energy supply and final products distribution, as well as for auxiliary media and auxiliary energy supply, waste materials and waste energy disposal.

This part of ISO 16952 is not applicable to recovery of the primary energy and the media for supplying the process, nor to the processing of residues from process disposal (e.g. gypsum, slag products, waste water, etc.).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TS 16952-1:2006, *Technical product documentation — Reference designation system — Part 1: General application rules*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification — Identification of equipment terminals and of terminations of certain designated conductors, including general rules of an alphanumeric system*

IEC 61082-1, *Preparation of documents used in electrotechnology — Part 1: Rules*

IEC 61175, *Industrial systems, installations and equipment and industrial products — Designations of signals*

IEC 61346-1, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 1: Basic rules*

IEC 61355, *Classification and designation of documents for plants, systems and equipment*

IEC 61666, *Industrial systems, installations and equipment and industrial products — Identification of terminals within a system*

IEC/PAS 62400, *Structuring principles for technical products and technical product documentation — Letter codes — Main classes and subclasses of objects according to their purpose or task*

EN 50005, *Low Voltage Switchgear and Controlgear for Industrial Use — Terminal Marking and Distinctive Number — General Rules*

VBG B 101, *Letter code for systems in power plants* [1]

3   Terms and definitions

For the purpose of this document, the terms and definitions given in ISO/TS 16952-1 and the following apply.

3.1
ancillary system
system which is not directly required for the power plant process

NOTE   This includes heating, ventilation, air-conditioning systems, space-heating systems, stationary compressed air supplies, fire protection systems, cranes, elevators, workshops, staff amenities, etc.

3.2
aspect
specific way of selecting information on or describing a system, or an object of a system

NOTE   Such ways may be:

—   what the system or object is doing (function viewpoint);

—   how the system or object is constructed (product viewpoint);

—   where the system or object is located (location viewpoint).

[IEC 61346-1]

3.3
auxiliary system
system which is required for the support of a power plant process

NOTE   This includes auxiliary steam system, compressed air, carrier air, control air, central chemicals supply, sampling systems, etc.

3.4
control
purposeful action on or in a process to meet specified objectives

[IEC 60050-351]

NOTE   This includes measure, count, monitor, indicate, alert, record, log, manipulate, evaluate, optimize, intervene, manipulate by hand, safeguard, structure, configure, parameter, automate.

3.5
designation block
structured compilation of related information units, consisting of a prefix, letters and numbers, and optionally a breakdown mark

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[1]   Source: www.vgb.org

3.6
document kind class
group of document kinds having similar characteristics concerning the content of information independent of the form of presentation

[IEC 61355]

3.7
documentation
collection of documents related to a given subject

NOTE   This may include technical, commercial and/or other documents.

[IEC 61082-1]

3.8
functional area
combination of groups and/or elements in a unit that can be used independently

3.9
functional group
combination of elements in a unit that can be used independently

3.10
functional unit
item under consideration defined according to function or effect

NOTE 1   A functional unit produces the interactive effect between input variables and output variables.

NOTE 2   A functional unit may be implemented by one or several physical units or program modules.

NOTE 3   If compound terms are used to designate functional units, the following should be used as the last word (in ascending order of rank):

— element;

— equipment;

— system.

For the subject under consideration, it is understood that "element" should designate the smallest functional unit in each case.

[IEC 60050-351]

3.11
multi-level reference designation
reference designation derived from a structural path through an overall system

[IEC 61346-1]

3.12
object
entity treated in the process of design, engineering, realization, operation, maintenance and demolition

NOTE 1   The entity may refer to a physical or non-physical "thing", or to a set of information associated with it.

NOTE 2   Depending on its purpose, an object may be viewed in different ways called "aspects".

[IEC 61346-1]

3.13
operating equipment
all products, which serve to implement technical tasks as a whole or in individual parts

3.14
physical unit
item under consideration, defined according to construction or configuration

NOTE 1   One or several functional units may be implemented in a single physical unit. The corresponding functional unit(s) is/are in some cases not explicitly designated.

NOTE 2   The various parts of a physical unit need not be functionally interrelated. For example, a physical unit may be in the form of an integrated circuit with four independent AND modules.

NOTE 3   If compound terms are used to designate physical units, the following should be used as the last word (in ascending order of rank):

— component;

— assembly;

— device;

— plant.

For the subject under consideration it is understood that "component" should designate the smallest physical unit in each case.

NOTE 4   The designations of conceptually corresponding functional units and physical units are stated together in the following if they are commonly used but different from each other.

[IEC 60050-351]

3.15
plant
complete set of technical equipment and facilities for solving a defined technical task

NOTE   A plant includes apparatus, machines, instruments, devices, means of transportation, control equipment and other operating equipment.

[IEC 60050-351]

3.16
plant section
part of a process plant that can, at least occasionally, be operated independently

[ISO 10628]

3.17
power plant process
process for the generation of electrical energy and/or heat energy products, including the conversion, supply, and disposal processes

3.18
power plant unit
technical plant including all equipment needed for fulfilment of a power plant process

3.19
system
set of interrelated objects

NOTE 1   Examples of a system: a drive system, a water supply system, a stereo system, a computer.

NOTE 2   When a system is part of another system, it may be considered as an object.

[IEC 61346-1]

3.20
technical equipment
physical or functional unit used to fulfil a technical task

3.21
terminal
point of access to an object intended for connection to an external network

NOTE 1   The connection may refer to

a)   a physical interface between conductors and/or contacts, or piping and/or duct systems to provide a signal, energy or material flow path,

b)   an association of functional nature established between logical elements, software modules, etc. for conveying information.

NOTE 2   The external networks may be of different nature and accordingly they may be classified. IEC 81714-3 provides such classifications.

[IEC 61666]

3.22
works
system of industrial complexes and the associated infrastructure in one location

[ISO 10628]

4   Designation systematic

4.1   General

The designation systematic has to be understood as a well-organized, methodical process of forming permanent designations with ergonomic notation according to simple, easily learned rules that are based on predefined standards.

4.2   Process of forming designations

Starting from site plans, process flow diagrams, overview diagrams, etc., the entire power plant shall be broken down into plant sections, units and, if necessary, sub-units.

These shall then be further broken down, based on functional aspects, into systems, subsystems and technical equipment. Consistent compliance with the rule of constituency (an object can contain more than one sub-objects but is a constituent of one higher object only) shall be ensured. The objects identified in this way shall be classified based on specified letter codes in accordance with VGB B 101 for systems and subsystems and IEC/PAS 62400 for technical objects, and then provided with reference designations. All information about the object is governed under this designation.

Structuring of location-specific systems (structures, sites, etc.) shall be performed in the same way.

In further processing, the products required for fulfilment of the tasks shall be specified and designated. The combination of the function and product aspects generates a unique designation.

The results shall be documented.

4.3   General rules for designation structure

The general designation structure corresponds to ISO/TS 16952-1:2006, 6.1. It shall consist of a maximum of three main parts, see Figure 3.

Identifier		
Conjoint designation	**Reference designation**	**Specific designation**
– Site	Technical objects based on	– Signals
– Factory complex	– Function aspect	– Terminals
– Power plant unit	– Product aspect	– Documents
– Subsystems based on project-specific requirements	– Location aspect	

Figure 3 — Parts of the identifier

The permitted combinations and their sequence are given in Figure 4.

Conjoint designation		
Conjoint designation	Reference designation	
Conjoint designation	Reference designation	Specific designation
Conjoint designation		Specific designation
	Reference designation	
	Reference designation	Specific designation

Figure 4 — Permitted combinations of identifier parts

Each of the three identifier parts consists of one or more designation blocks (see Figure 5 and Clause 6). Each designation block always contains

— a prefix in accordance with Table 1 and

— letters and numbers in accordance with Figure 6.

Prefix	Letters and numbers

Figure 5 — Designation block

The designation blocks are distinguished by prefixes and thus uniquely identified. The prefixes are always the first data characters in the designation blocks.

Table 1 — Prefixes for designation tasks

Prefix		Designation	Designation tasks/aspect	Prefix origin, basic principles specified in
1	2			
	#	Number	Conjoint designation	ISO/TS 16952-1
	=	Equals	Function-oriented designation	IEC 61346-1
=	=	Equals-Equals	Functional allocation	ISO/TS 16952-1
	+	Plus	Point of installation	IEC 61346-1
+	+	Plus-Plus	Location	ISO/TS 16952-1
	−	Minus	Product-oriented designation	IEC 61346-1
	:	Colon	Terminal designation	IEC 61666
	;	Semicolon	Signal designation	IEC 61175
	&	Ampersand	Document designation	IEC 61355

The letter codes and numbers in the designation blocks are subdivided into breakdown levels, sections and data characters as the smallest information unit.

The letters classify an object and are specified as letter codes in the corresponding tables (see IEC/PAS 62400, VGB B 101).

The numbers are used to distinguish between objects with the same letter code, if they are constituents of the same object.

The basic structure is shown in Figure 6. Details of the individual designation blocks are specified in Clause 6.

Breakdown level	1					2				
Section	1			2		3		4		
Number/type of data position	A	A	A	N	N	A	A	N	N	N

Key

A = Letter

N = Number

Figure 6 — Basic structure of the designation part of a designation block

4.4   Rules for forming designations

— **Rule 1:** Each object can be viewed in one or more ways called aspects (see 5.3.1). The considered aspect is indicated by a prefix (see Table 1). The prefix shall be written always when a misinterpretation of the aspect is possible.

— **Rule 2:** Sections at the beginning and/or at the end of a designation block may be omitted.

— **Rule 3:** Only the transition from the function aspect to the product aspect is allowed.

— **Rule 4:** Designation of operating equipment shall be achieved exclusively by the transition from the functional aspect to the product aspect. The location-oriented designation carries the allocation information only.

— **Rule 5:** When designation blocks are combined, the prefix of the block that is the furthest to the right (smallest object of consideration) shall determine the aspect of the entire designation.

— **Rule 6:** The structure within an aspect shall comply with the principle of constituency in accordance with IEC 61346-1. Each object has only one predecessor, but can have one or more successors.

— **Rule 7:** Information regarding the installation and location of an object as well as the interaction of the object in the power plant process shall be represented by attaching the designations "+ point of installation", "++ location" and "== functional allocation" respectively as a separate additional designation.

— **Rule 8:** The multi-level reference designations shall be presented in designation blocks with a fixed structure. The designation blocks shall be identified with regard to their aspect by prefixes, which have their own data character positions.

— **Rule 9:** Each designation section shall consist of a maximum of three data characters, but not all of these need to be written, depending on the application. The sections shall be structured with alternating alphabetic (A) and numeric (N) characters.

— **Rule 10:** The letter codes from IEC/PAS 62400 and VGB B 101 shall be used for the classification of objects. Only Roman capitals from A to Z, with the exception of "I" and "O", are permitted; country-specific letters and mnemonic assignments shall be avoided.

— **Rule 11:** Arabic numerals "1" to "9" and "0" (zero) shall be used for numerical data characters; numbers shall be written with leading zeros.

— **Rule 12:** For certain designation blocks between breakdown levels, the breakdown mark "**.**" (full stop) with its own data position shall be applied. In this case Rule 2 shall apply for each part of the designation block on the left and on the right side of the breakdown mark.

5   Designation tasks

5.1   General

The designation system for power plants shall fulfil the following main tasks:

a)   unambiguous identification of the technical objects and documents;

b)   classification of objects according to their purpose, task or composition;

c)   coded representation of technical structures;

d)   coded representation of networked relationships.

This enables the designation of the following:

— conjoint allocations (factories, plant complexes, power plant units, etc.);

— technical objects (systems, plants, technical equipment, components, etc.);

— electrical and mechanical connections;

— signals and potentials;

— documents.

The structure and contents of designation for these different tasks are specified in Clause 6.

5.2 Conjoint designation (optional)

It may be required to identify different sites. Moreover, different power plant units, non-unit-aligned or common plants and systems, different extension stages as well as power plant extrinsic works can exist or be planned on the same site (e.g. at cogeneration power plants). Conjoint designation facilitates a unified identification of such different plant complexes (for an example see Figure D.1).

Conjoint designation is a reference designation of a plant/system with respect to the site not being related to one of the defined aspects.

If it is used as part of the identifier, then systems, objects and products which fulfil the same task in different plants can have the same reference designation. The unambiguous nature of the equipment designation is achieved by using different conjoint designations. This provides significant ergonomic and economic advantages.

The use of the conjoint designation is optional.

5.3 Designation of technical objects — Reference designation

5.3.1 General

Reference designation identifies objects for the purpose of correlating information about an object among different kinds of documents with the products implementing the system. A reference designation shall unambiguously identify an object of interest within the considered system.

An object within a system can be viewed in different ways, called aspects:

— What does the object do? (function aspect)

— How is the object constructed? (product aspect)

— Where is the object located? (location aspect)

5.3.2 Function aspect

A function-oriented structure is based on the purpose of a system, without necessarily taking into account the products with which this purpose is fulfilled or their location.

Designation by function aspect is applied in an early planning phase of a project, and remains unchanged over the entire service life of an overall plant.

In power plant engineering, a distinction is made between functional units with static tasks (see 6.3.1) and those with dynamic effect (see 6.3.2).

Figure 7 shows a diagram of a system consisting of several functions.

NOTE   The notations in this diagram are not based on standardized letter codes.