
**Industrial systems, installations and
equipment and industrial products —
Structuring principles and reference
designation —**

**Part 10:
Power plants**

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*Systèmes industriels, installations et appareils et produits
industriels — Principes de structuration et désignation de
référence —*

ISO/TS 81346-10:2015

Partie 10: Centrales électriques
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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 normative 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;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

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order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn.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 81346-10 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation and tpd-symbols*.

Documents in the 80000 to 89999 range of reference numbers are developed by collaboration between ISO and IEC.

ISO 81346 consists of the following parts, under the general title *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designation*:

- *Part 3: Application rules for a reference designation system* [Technical Specification]
- *Part 10: Power plants* [Technical Specification]

IEC 81346 consists of the following parts, under the general title *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designation*:

- *Part 1: Basic rules*
- *Part 2: Classification of objects and codes for classes*

Further parts on sector-specific rules are under consideration.

NOTE ISO/TC 10/SC 10 and IEC/TC 3 have agreed to integrate their publications on structuring principles and reference designation in the ISO/IEC 81346 series to ensure a consistent set of publications based on IEC 81346-1 and -2. Against this background, ISO/TS 16952-10 has been converted to ISO/TS 81346-10 following its systematic review. At this time, apart from necessary updates, no further changes have been made. Among the issues to be considered at the next review/revision is how to make the referenced VGB publications, although recognized as having wide acceptance and authoritative status as well as being publicly available, better accessible to ISO/IEC users, e.g. by integrating them in the ISO/IEC 81346 series.

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Introduction

Based on ISO/TS 81346-3, this part of ISO 81346 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 81346 and other documents, ISO 81346 breaks down these rules into interdisciplinary guidelines for practical application.

The relationships of input documents with this part of ISO 81346 are shown in [Figure 1](#).

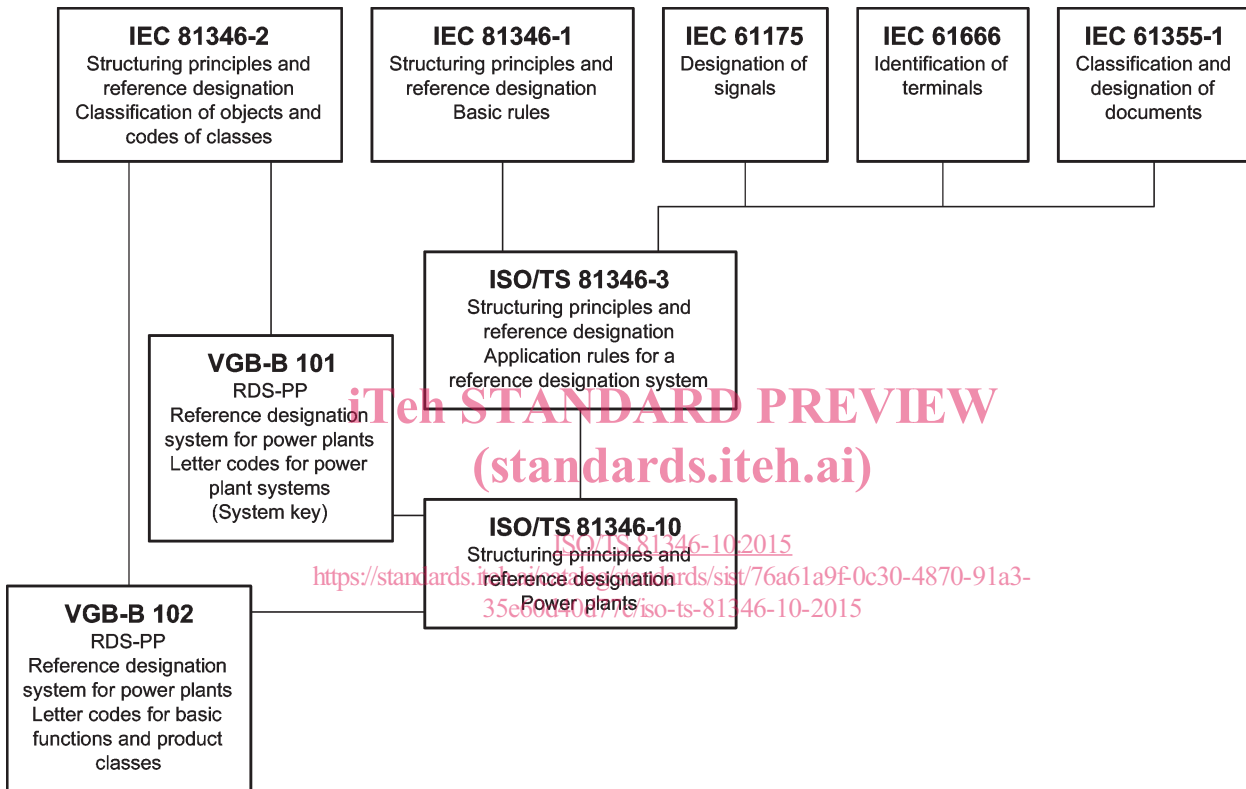


Figure 1 — Structuring and designation standards

This part of ISO 81346 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.

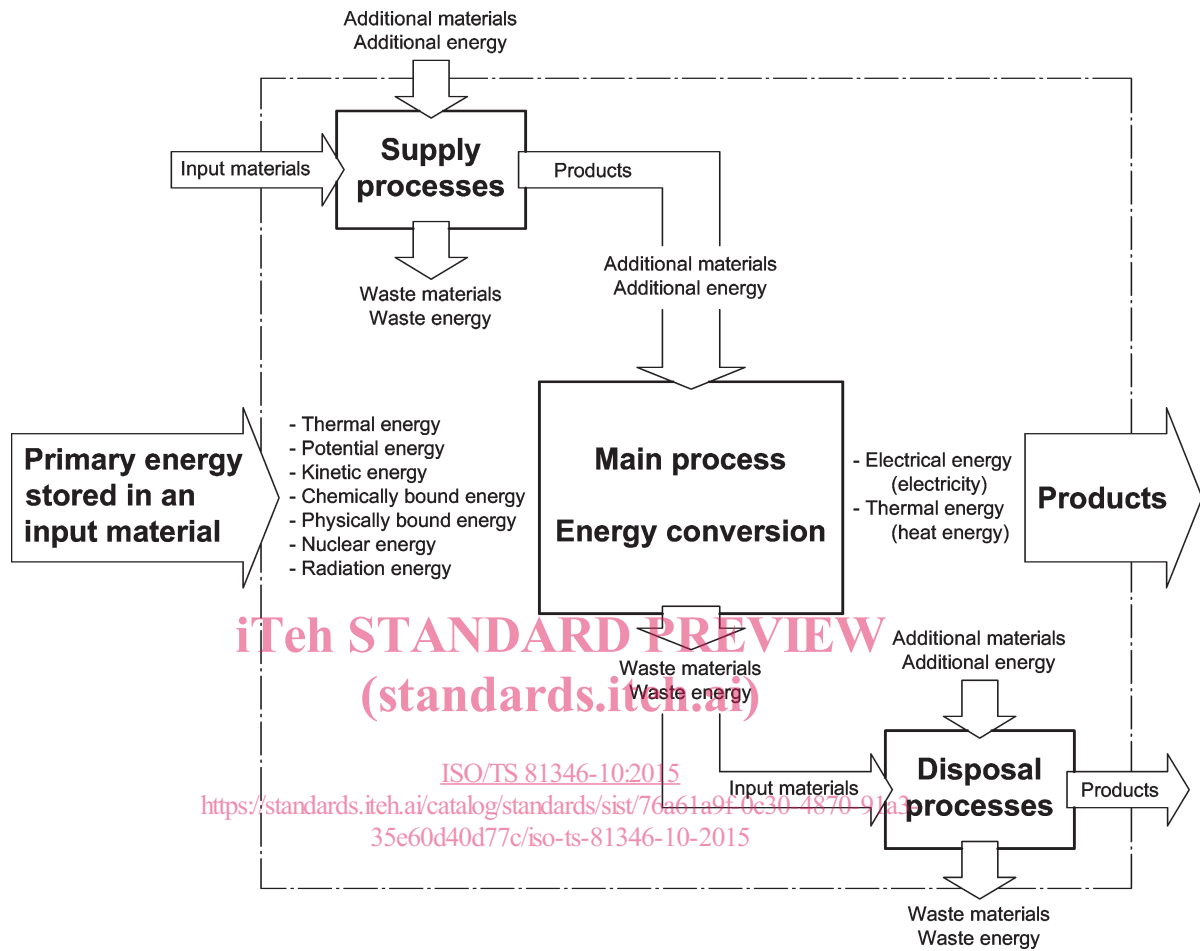


Figure 2 — Principle of energy conversion including supply and disposal processes

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Industrial systems, installations and equipment and industrial products — Structuring principles and reference designation —

Part 10: Power plants

1 Scope

This part of ISO 81346 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 IEC 81346-2, ISO/TS 81346-3, VGB-B 101 and VGB-B 102 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 81346 encompasses the process of energy conversion. The specifications in this document 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 81346 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 61355-1, *Classification and designation of documents for plants, systems and equipment — Part 1: Rules and application tables*

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

IEC 81346-1, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 1: Basic rules*

IEC 81346-2, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 2: Classification of objects and codes for classes*

ISO/TS 81346-3:2012, *Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 3: Application rules for a reference designation system*

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

VGB-B 101, *Reference designation system for power plants (RDS-PP) — Letter codes for power plant systems (system key)*¹⁾

VGB-B 102, *Reference designation system for power plants (RDS-PP) — Letter codes for basic functions and product classes* ¹⁾

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO/TS 81346-3 and the following apply.

3.1 ancillary system

system which is not directly required for the power plant process

Note 1 to entry: 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 viewing an object

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Note 1 to entry: 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).

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[SOURCE: IEC 81346-1:2009, definition 3.3]

3.3 auxiliary system

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

Note 1 to entry: 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

[SOURCE: IEC 60050-351:2013, definition 351-42-19]

Note 1 to entry: 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

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

[SOURCE: IEC 61355-1:2008, definition 3.7]

3.7**documentation**

collection of documents assigned to a specific object

Note 1 to entry: This may include technical, commercial and/or other documents.

[SOURCE: IEC 61082-1:2006, definition 3.1.4]

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 to entry: A functional unit produces the interactive effect between input variables and output variables.

Note 2 to entry: A functional unit may be implemented by one or several physical units or program modules.

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

- element,
- system.

Note 4 to entry: This entry was numbered 351–32–02 in IEC 60050–351:2006.

[SOURCE: IEC 60050-351:2013, definition 351-56-02]

3.11**multi-level reference designation**

reference designation consisting of concatenated single-level reference designations

[SOURCE: IEC 81346-1:2009, definition 3.13]

3.12**object**

entity treated in the process of development, implementation, usage and disposal

Note 1 to entry: The entity may refer to a physical or non-physical “thing”, i.e. anything that might exist, exists or did exist.

Note 2 to entry: The object has information associated to it.

[SOURCE: IEC 81346-1:2009, definition 3.1]

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 to entry: 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 to entry: 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 to entry: 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.

Note 4 to entry: The entry was numbered 351-32-03 in IEC 60050-351:2006.

[SOURCE: IEC 60050-351:2013, definition 351-56-03]

3.15

plant

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

Note 1 to entry: A plant includes apparatus, machines, instruments, devices, means of transportation, control equipment and other operating equipment.

Note 2 to entry: This entry was numbered 351-21-45 in IEC 60050-351:2006.

[SOURCE: IEC 60050-351:2013, definition 351-42-35]

3.16

plant section

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

[SOURCE: ISO 10628:1997, definition 3.7]

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 considered in a defined context as a whole and separated from their environment

Note 1 to entry: A system is generally defined with the view of achieving a given objective, e.g. by performing a definite function.

Note 2 to entry: Elements of a system may be natural or man-made material objects, as well as modes of thinking and the results thereof (e.g. form of organization, mathematical methods, programming languages).

Note 3 to entry: The system is considered to be separated from the environment and from the other external systems by an imaginary surface, which cuts the links between them and the system.

Note 4 to entry: The term “system” should be qualified when it is not clear from the context to what it refers, e.g. control system, colourimetric system, system of units, transmission system.

Note 5 to entry: When a system is part of another system, it may be considered as an object as defined in this standard.

[SOURCE: IEC 81346-1:2009, definition 3.2]

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 to entry: 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 to entry: The external networks may be of different nature and accordingly they may be classified. IEC 81714–3 provides such classifications.

[SOURCE: IEC 61666:2010, definition 3.9]

3.22

works

system of industrial complexes and the associated infrastructure in one location

[SOURCE: ISO 10628:1997, definition 3.4]

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 VGB-B 102 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 81346-3:2012, 6.1. It shall consist of a maximum of three main parts, see [Figure 3](#).

Identifier		
Conjoint designation	Reference designation	Specific designation
<ul style="list-style-type: none"> – Site – Factory complex – Power plant unit – Subsystems based on project-specific requirements 	Technical objects based on <ul style="list-style-type: none"> – Function aspect – Product aspect – Location aspect 	<ul style="list-style-type: none"> – Signals – Terminals – Documents

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 81346-3
	=	Equals	Function-oriented designation	IEC 81346-1
=	=	Equals-Equals	Functional allocation	ISO/TS 81346-3
	+	Plus	Point of installation	IEC 81346-1
+	+	Plus-Plus	Location	ISO/TS 81346-3
	-	Minus	Product-oriented designation	IEC 81346-1
	:	Colon	Terminal designation	IEC 61666
	;	Semicolon	Signal designation	IEC 61175
	&	Ampersand	Document designation	IEC 61355-1

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 VGB-B 101 and VGB-B 102).

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	3			4			5			
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.