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Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations —
~~Part 101: Modelling concepts and guidelines for power supply systems~~

~~DTS stage~~

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Part 101:
Modelling concepts, guidelines and requirements for power supply systems

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

Partie 101: Concepts de modélisation, lignes directrices et exigences pour les systèmes d'alimentation électrique

ISO/DTS 81346-101:2024(E)

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Foreword

ISO (the International Organization for Standardization) ~~is a~~ and IEC (the International Electrotechnical Commission) ~~form the specialized system for worldwide federation of national standards~~ standardization. National bodies ~~(that are members of ISO member bodies). The work~~ or IEC ~~participate in the development 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. Internationally by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international~~ organizations, governmental and non-governmental, in liaison with ISO ~~and IEC~~, also take part in the work. ~~ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.~~

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ~~ISO documents~~ document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 ~~(see www.iso.org/directives 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs)).~~

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), ~~see www.iso.org/iso/foreword.html~~ see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

This document was prepared ~~jointly~~ by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation*, ~~in cooperation with the~~ and Technical Committee IEC/TC 3, *Information structures and elements, identification and marking principles, documentation and graphical symbols*.

A list of all parts in the ISO-~~81346 and~~ /IEC-81346 series can be found on the ISO ~~website~~ and IEC ~~websites~~.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html; www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

This document provides guidelines for the understanding and application of the ISO 81346 and IEC 81346 reference designation system (RDS) for ~~Power~~power supply ~~Systems~~systems (PS). It was developed in response to ~~a demand~~demands by the power supply sector for guidelines to the application of the ISO 81346 and IEC 81346 series, in particular ISO 81346-10:2022.

Power supply systems, and the target industries of this document, include but are not limited to: wind, photovoltaic, thermal, nuclear and hydropower production.

The very basics of the RDS are not explained in this document. It is assumed that the user of this document already is familiar with the major concepts detailed in IEC 81346-1:2022 and IEC 81346-2:2019. These concepts include the four RDS aspects, the basic RDS semantics and basic RDS classification rules.

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Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 101: Modelling concepts and guidelines for power supply systems

Part 101: Modelling concepts, guidelines and requirements for power supply systems

1 Scope

This ~~guide supports document gives guidelines to support~~ the ~~user in the understanding~~ application of the ISO 81346 and IEC 81346 series ~~to power supply systems~~. It also ~~proposes guidelines and specifies~~ best practice ~~to for~~ its use and implementation depending on the user and situation. ~~By following the suggestions in these supporting documents, the~~ The application of this document ~~will be harmonized~~ supports harmonization within and between the power supply technical domains and industries.

~~No part of this document is normative, only rules of thumb, proposed solutions and general guidelines on the application of the ISO 81346 and IEC 81346 series on power supply systems are given.~~

Introductory examples of the use of reference designation systems (RDS) can be found in ~~Annex A (informative) and Annex B (informative). Annex C (informative)~~ Annex A and Annex B. Annex C provides an example of a conversion table between ~~the proposed classes of an example~~ structuring system ~~in this document~~ and the classes specified in ~~this document and~~ other parts of the ISO 81346 and IEC 81346 series.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC 81346-10:2022, Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 10: Power supply systems~~

~~ISO 81346-12, Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 12: Construction works and building services~~

~~ISO 26324, Information and documentation — Digital object identifier system~~

~~IEC 61360-4, Standard data element types with associated classification scheme for electric components — Part 4: IEC reference collection of standard data element types and component classes[†]~~

~~IEC 81346-1:2022, Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 1: Basic rules~~

~~IEC 81346-2:2019, Industrial systems, installations and equipment and industrial products — Structuring principles and reference designations — Part 2: Classification of objects and codes for classes~~

~~IEC/TR 63213, Power measurement applications within electrical distribution networks and electrical installations~~

[†]Component Data Dictionary (CDD—V2.0011.0002). Online database featuring 440 classes and 1400 characteristic properties for electric/electronic components and materials. Free access to database: <http://std.iec.ch/iec61360>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 81346-1:2022, IEC 81346-2:2019 and the following apply.

ISO and IEC maintain ~~terminological~~terminology databases for use in standardization at the following addresses:

- ~~ISO online~~Online browsing platform: available at ~~https://www.iso.org/obp~~https://www.iso.org/obp
- ~~IEC~~electropediaElectropedia: available at ~~http://www.electropedia.org/~~https://www.electropedia.org/

3.1 horizontal system

system which has an impact or supports one or more ~~vertical~~systems ~~(3.3)~~(3.3) without being one

EXAMPLE Managing systems (e.g. =F1) or supporting systems (e.g. =D1)

Note 1-to-entry: There can be supporting systems within core process (vertical) systems (e.g. the monitoring system of the generator =A1.RA1.LE1).

3.2 preferred reference designation PRD

reference designation (RD) used as the main key to identify an object within a database

3.3 vertical system

system that is a part of the core process of the power production, distribution or transmission for power supply systems

EXAMPLE Production unit systems (e.g. =A1) or energy transport systems (e.g. =C1).

1 Basic semantics and abbreviations

Throughout this document, the basic semantics and classification rules for reference designation systems according to IEC 81346-1:2022 and IEC 81346-2:2019 are used.

4 Abbreviated terms

For the purposes of this document, the ~~abbreviations~~abbreviated terms listed in ~~Table 1~~Table 1 apply.

Table 1 — List of abbreviations

Abbreviation	Meaning
BIM	Building Information Modelling <u>building information modelling</u>
CB	Circuit <u>circuit</u> breaker-
CDD	IEC Common Data Dictionary <u>common data dictionary</u>
CID	Construction Identifier <u>construction identifier</u>

Abbreviation	Meaning
CW	Construction Works <u>construction works</u>
DOI	Digital Object Identifier <u>digital object identifier</u>
GIS	Geographic Information System <u>geographic information system</u>
HSE	Health Security <u>health security</u> and Environment <u>environment</u>
IOD	Individual Object Database <u>individual object database</u>
P&ID	Piping <u>piping</u> and Instrumentation Diagram <u>instrumentation diagram</u>
PRD	Preferred Reference Designation <u>preferred reference designation</u>
PS	Power <u>power</u> supply Systems <u>systems</u>
RD	Reference Designation <u>reference designation</u>
RDS	Reference Designation System <u>reference designation system</u>
SCADA	Supervisory Control And Data Acquisition <u>supervisory control and data acquisition</u>
SSOT	Single Source <u>single source</u> of Truth <u>truth</u>

4.5 Modelling principles

4.15.1 Design for purpose

A system can be a constituent of a large and complex system. If so, it will often have a multi-levelled reference designation (RD). Or it can be such a simple overall system, and the constituents will be represented by a single level RD. It is the designer's responsibility to select the appropriate structure to reflect the complexity of the system in question.

The depth and complexity of a structured representation will be influenced by the innate complexity of the overall system in question. A nuclear power plant ~~will need~~ needs many levels to correctly represent and model all the functionality within it. Not all systems ~~will~~ need that level of detail. The representation of highly complex systems can often benefit from simplifications. It would ~~probably~~ likely not make sense to include every single system down to individual bolts and screws when modelling a complete nuclear power plant.

The purpose of creation of the structure (also called model in this document) should also influence the complexity and granulation of the representation of the system. A model designed to provide an overview of a chemical park main processes, for example, does not need to include a detailed overview of the layers in the roof construction of the gardening equipment shed.

~~Also keep in mind the~~ The framework set by the selection of aspect should be considered when designing a structure. When structuring a system based on the functional aspect, the system functional complexity and process criticality should be looked at, not physical size or cost. Large ~~and~~ or costly objects, or both, are not always complex from a functional point of view. A transformer could be considered quite simple in the functional aspect, no matter what physical size, complexity of construction or costs it has. It usually has few functional sub-systems, and a simple functionality. With an RD-based model, depth and level of details should

be influenced by its intended use. The structure should be a tool to benefit the user, not an absolute mirror of reality and all its ~~tiny~~ details.

EXAMPLE 1 A component in the lower levels of a complex structure (e.g. a motor within a critical sub-system for the process, =A1.KA1.KK1.MAA1) can be of such importance to the process that a data collecting system could be required and of interest to the operating party (e.g. =A1.KA1.KK1.MAA1.KED1). Even the sensors connected ~~could~~can be of interest and could be represented (e.g. =A1.KA1.KK1.MAA1.KED1.BTA1) if useful.

EXAMPLE 2 A simple gate can be represented by a simple structure e.g. only two levels, all within the component system:

=C1.QQF1 – Gate system

- =C1.QQF1.MAA1 – Gate motor

~~or it could be a complex system with heating system, auxiliary power supply, monitoring systems and so on:
or it could be a complex system with heating system, auxiliary power supply, monitoring systems and so on:~~

=C1.KA1 – Gate system

- =C1.KA1.LE1 – Gate system monitoring system

- - =C1.KA1.LE1.BPA1 – Upstream pressure monitoring system

- - - =C1.KA1.LE1.BPA1.BPA1 – Upstream pressure monitoring 1

- - - = C1.KA1.LE1.BPA1.BPA2 – Upstream pressure monitoring 2

- - - = C1.KA1.LE1.BPA1.BPA3 – Upstream pressure monitoring 3

- =C1.KA1.HE1 – Gate heating system

- ...

The structure gives the proper representation of the system, and lets the user of this document understand the system complexity through the model complexity.

Throughout this document, the basic semantics and classification rules for reference designation systems in accordance with IEC 81346-1:2022 and IEC 81346-2:2019 are used.

4.25.2 Receiver's ownership principle

According to the receiver's ownership principle shown in ~~Figure 1~~Figure 1 and the example in ~~Figure 2~~Figure 2, when a system is intended to link two other systems on the same hierarchical level, and when it is unclear to which system it belongs, the linking system should be part of the receiving system (in terms of information, matter or energy of any kind).