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

Part 14: Manufacturing and processing systems

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

Partie 14: Systèmes de fabrication et de traitement

This draft is submitted to a parallel vote in ISO and in IEC.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 14: Manufacturing and processing systems

FOREWORD

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IEC 81346-14 has been prepared by IEC technical committee 3: Documentation, graphical symbols and representations of technical information, in close cooperation with ISO technical committee 10: Technical product documentation. It is an International Standard.

It is published as a double logo standard and has been given the status of a horizontal document in accordance with the ISO/IEC Directives, Part 1.

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The text of this International Standard is based on the following documents:

Draft	Report on voting
3/XX/FDIS	3/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by xx members out of xx having cast a vote.

The language used for the development of this International Standard is English.

This document is to be read in conjunction with IEC 81346-1:2022. The provisions of the general rules dealt with in IEC 81346-1:2022 are only applicable to this document insofar as they are specifically cited. When this document states "addition", "modification" or "replacement", the relevant text in IEC 81346-1:2022 is to be adapted accordingly.

Subclauses that are numbered with a 101 (102, 103, etc.) suffix are additional to the same subclause in IEC 81346-1:2022.

Tables, figures, notes and examples in this document that are new are numbered starting with 101.

New annexes in this document are lettered AA, BB, etc.

A list of parts of the 81346 International Standard, published under the general title *Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

NOTE In this document, the following print types are used:

- introductory statement in the clauses describing the applicability of the corresponding clause of IEC 81346-1:2022, *in italic type*;
- entry system, i.e. manufacturing system and technical system, in the definition of the entry classes, *in italic type*;
- name of the parent class in the definition of sub-classes, *in italic type*;
- in the classification scheme, class codes **in bold type**.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

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INTRODUCTION

This document considers and supports planning, design, utilization and maintenance of manufacturing systems. The application of a reference designation system for manufacturing systems (RDS-MS) can lead to new views and structuring of these activities and thereby offers opportunities and potential for increasing efficiency and economization.

This document is aligned with the structuring rules provided in IEC 81346-1, and the classification principles of IEC 81346-2. It also follows the principles for the classification of prime systems and technical systems provided in ISO 81346-10 and ISO 81346-12.

The focus of this document is to define classes of systems which are used in manufacturing, and to provide general guidelines for structuring of these systems.

The following advantages of designation systems in accordance with this document and the 81346 International Standard series are:

– the reference designation system can be applied to several technical fields. Mechanical, electrical and process equipment can be treated the same way – a basis for companywide synergy effects;
– the reference designation system allows for the integration of any kind of systems and components without changing the once defined designations;
– the application of different aspects allows, for instance, for the designation of functions independently from realizing products and their location. The different representation of systems through multiple aspects and the relations between these allows for a more inclusive and complete reference model of systems.

The users of this document will be able to manage objects, relations among these and related properties in a more efficient and consistent way. When implemented, information across various data processing systems can be handled in an unambiguous way.

Manufacturing is considered as a major part in the five-sector model of the economic sector. The influence and importance of manufacturing ripples throughout the entire model as described in the following:

– primary sector (natural sector):

  This sector involves the extraction and production of raw materials, for example, farming, mining, fishing, forestry. The secondary sector relies heavily on this sector for the raw materials needed to produce products.

  EXAMPLE 1 A steel manufacturer needs iron from the mining industry. A tyre manufacturer needs rubber from the agricultural industry. A car manufacturer needs steel and tyres, thus, implicitly needing iron from the mining industry and rubber from the agricultural industry.

– secondary sector (industrial sector):

  This sector takes the raw materials from the primary sector and transforms them into finished products. This includes factories producing for example, cars, clothing, electronics, steel, dairies, breweries. Building and construction is also part of this sector.

– tertiary sector (service sector):

  This sector provides services to both individuals and businesses. While manufacturing is not directly part of this sector, it relies heavily on it.

  EXAMPLE 2 Transportation services to move products. Financial services to handle transactions. Marketing services to sell products.

– quaternary sector (information sector):

  This sector deals with information processing and knowledge sharing. It includes IT, research and development, and consulting. Manufacturing increasingly relies on this sector for technological advancements, process optimization, and data analysis.

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– quinary sector (human services sector):

  This sector involves services that focus on human development and well-being, such as education, healthcare, and social work. While not directly involved in production, this sector contributes to a skilled and healthy workforce, which is essential for a thriving manufacturing industry.

The different sectors of the five-sector model of the economic sector can be subdivided into subsectors or industries.

For the primary sector (natural sector), the following subsectors are common:

– biotic sector;
– geological sector.

For the secondary sector (industrial sector), the following subsectors are common:

– construction, partly covered by ISO 81346-12.
– manufacturing sector;
  - chemicals;
  - electrical and optical;
  - heavy industry;
  - light industry;
  - materials.
– utilities, partly covered by ISO 81346-10;

This document is intended to cover manufacturing systems from the geological aspect of the primary sector, such as minerals, fossil fuels, and land. It is also intended to cover manufacturing and construction subsectors from the secondary sector.

The specifications in this document apply for processing, transportation and storage of final products, as well as for auxiliary systems to support the manufacturing process such as electrical systems, management systems and waste disposal systems.

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1 Scope

This part of 81346 International Standard, published jointly by IEC and ISO, provides, in combination with IEC 81346-1 and IEC 81346-2, rules and recommendations on the structuring of systems and the information on systems of manufacturing systems. It also provides additional classification schemes to those of IEC 81346-2 for use in reference designations within manufacturing systems.

The structuring principles and the classes of objects are intended to provide a clear identification and localization of the objects, and for use in their labelling in the manufacturing plant, for their designation in technical documents and for the designation of the technical documents as well.

The requirements in this document apply for processing, transportation and storage of products, as well as for systems to support the manufacturing process such as electrical systems, management systems and waste disposal systems.

This document applies to different areas within the manufacturing industry such as light industry, electrical and optical industry, chemical industry, material industry and heavy industry.

This document is not applicable for designations related to product individuals (e.g. inventory number, serial number) nor to the products manufactured.

This document is also a horizontal publication intended for use by technical committees in preparation of publications related to reference designations in accordance with the principles laid down in IEC Guide 108.

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.

IEC 81346-1:2022, *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 object and codes for classes*[1]

[1] Third edition under preparation. Stage at time of publication IEC CDV 81346-2:2025.

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3 Terms and definitions

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

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

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1
information
intelligence or knowledge capable of being represented in forms suitable for communication, storage or processing

Note 1 to entry: Information may be represented for example by signs, symbols, pictures or sounds.

[SOURCE: IEC 60050-701:1988, 701-01-01]

3.2
data
representation of information (3.1) in a formalized manner suitable for human or automatic processing

Note 1 to entry: Processing includes communication and interpretation.

Note 2 to entry: In English, the word "data" is generally used in plural form. For use in singular form, it can be called "data item".

[SOURCE: IEC 60050-171:2019, 171-01-02]

3.3
plant
assembly of different systems on a specific site

[SOURCE: ISO 81346-10:2022, 3.10]

3.4
manufacturing
<structuring principles and reference designations> production or processing in defined quantities

3.5
production
<structuring principles and reference designations> making a single product by a particular series of actions

3.6
processing
<structuring principles and reference designations> treating matter or information by a particular series of actions

[2] Third edition under preparation. Stage at time of publication IEC CDV 81346-2:2025.

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3.7
equipment
single apparatus or set of devices or apparatuses, or the set of main devices of an installation, or all devices necessary to perform a specific task

Note 1 to entry: Examples of equipment are a power transformer, the equipment of a substation, measuring equipment.

[SOURCE: IEC 60050-151:2001, 151-11-25]

3.8
gaseous matter
compressible medium which takes shape of its surrounding container

3.9
liquid matter
incompressible medium which takes shape of its surrounding container

3.10
solid matter
incompressible medium which does not take shape of its surrounding container

4 General concepts

4.1 Object

IEC 81346-1:2022, 4.1 applies.

4.2 Aspect

IEC 81346-1:2022, 4.2 applies.

4.3 Systems

IEC 81346-1:2022, 4.3 applies.

Add the following subclauses:

4.3.101 Prime systems

A prime system provides an overall manufacturing step in the manufacturing process or provides a support for such steps.

A prime system shall be classified in accordance with to the classification scheme in Annex AA, Table AA.1.

A prime system may incorporate another prime system as one of its constituent system elements.

4.3.102 Technical systems

A technical system provides a technical solution for a specific step in the manufacturing process or provides the necessary support for such a technical solution.

A technical system shall be classified in accordance with the scheme defined in Annex AA, Table AA.2

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