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Principles and methods of terminology

Principes et méthodes de la terminologie

Reference number
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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 704 was prepared by Technical Committee ISO/TC 37, *Terminology (principles).*

It cancels and replaces ISO Recommendation R 704: 1968 of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Principles and methods of terminology

1 Scope and field of application

This International Standard establishes principles and methods which are designed to unify and standardize the elaboration of terminology standards at the national and international levels.

These principles (and methods) are general in nature and can be adapted if required to more specific terminology work or documents.

2 References

ISO 9, *Documentation — Transliteration of Slavic Cyrillic characters into Latin characters.*

ISO 233, *Documentation — Transliteration of Arabic characters into Latin characters.*

ISO 259, *Documentation — Transliteration of Hebrew characters into Latin characters.*

ISO 639, *Code for the representation of names of languages.*

ISO 843, *Documentation — Transliteration of Greek characters into Latin characters.*

ISO/R 860, *International unification of concepts and terms.*

ISO/R 1087, *Vocabulary of terminology.*

ISO 3602, *Documentation — Romanization of Japanese.*[1)]

ISO 5127-1, *Documentation and information — Vocabulary — Part 1 : Basic concepts.*

ISO 7098, *Documentation — Romanization of Chinese.*

3 Concepts

In the following text concepts marked with an asterisk are explained in the annex.

3.1 Concepts and objects

Concepts are mental constructs serving to classify individual objects* of the inner or outer world by way of more or less arbitrary abstraction.

1) At present at the stage of draft.

3.2 Characteristics*

Characteristics serve as a basis for the classification of concepts. They are necessary for the differentiation of a concept from other concepts of a specific field and for other functions as well.

For the creation of new concepts in certain applied fields *intrinsic* characteristics such as shape, size, material and colour are used in preference to *extrinsic* characteristics, such as origin, function, location, discoverer, inventor, position.

Examples :

intrinsic characteristics :

hollow ground (saw)

straight (saw)

circular (desk)

extrinsic characteristics :

for smooth cutting (saw)

rear (wheel)

milling (machine)

Woodruff (key)

Carrara (marble)

Characteristics can also be subdivided into *essential* characteristics and *inessential* characteristics. Essential characteristics are those characteristics which reflect the essence of an individual object in a specific field according to a given point of view.

NOTE — The distinction between essential and inessential characteristics depends on the purpose of the terminological work.

An individual object can be seen by different disciplines from different points of view which gives rise to the formation of different concepts representing the same individual object.

Examples :

In thermodynamics the essential characteristics of the concept "liquid" are those which indicate that it is "a substance in a condensed state, intermediate between a solid and a gas".

In hydromechanics the essential characteristics of the concept "liquid" are that it is a substance which is "incompressible", "very dense", and "capable of flowing".

3.3 Intension and extension

The totality of characteristics of a concept is called its *intension*.

The totality of all species, which belong to the same level of abstraction, or the totality of objects that have all the characteristics of the concept is called the *extension* of the concept.

Examples :

The intension of the concept "parallelogram" is comprised of the following characteristics : "quadrangle", "the opposite sides of which are parallel".

All of the possible kinds of parallelograms (rhombi, squares, etc.) from the extension of the concept "parallelogram".

The broader the intension of a concept, the narrower is its extension, i.e. the more characteristics comprise a concept, the fewer are the different objects that all have these properties as characteristics. Conversely, the narrower the intension, the broader the extension ("law of reverse correlation").

3.4 Relationships* between concepts

In terminology, concepts are always considered to be related to other concepts. For practical terminology work two types of relationships can be distinguished : hierarchical and non-hierarchical.

3.4.1 Hierarchical relationships

A hierarchical relationship is one of superordination and subordination of concepts. A superordinate concept is called a broader concept, and a subordinate one a narrower concept.

In practice two main types of hierarchical relationships can be distinguished.

— generic relationships;

— partitive relationships.

NOTE — In some schools of terminology only generic relationships are classified as hierarchical.

3.4.1.1 Generic relationships

Generic relationships indicate that all concept which belong to the category of the narrower concept (the species) are part of the extension of the broader concept (the genus). A narrower concept possesses all of the characteristics of the broader concept plus at least one additional distinguishing characteristic, which serves to differentiate narrower concepts of the same level of abstraction.

A sequence of subordinate concepts forms a vertical sequence.

Example :

machine
machine tool
grinding machine

Concepts which are differentiated at the same level of abstraction form a horizontal sequence of concepts.

Example :

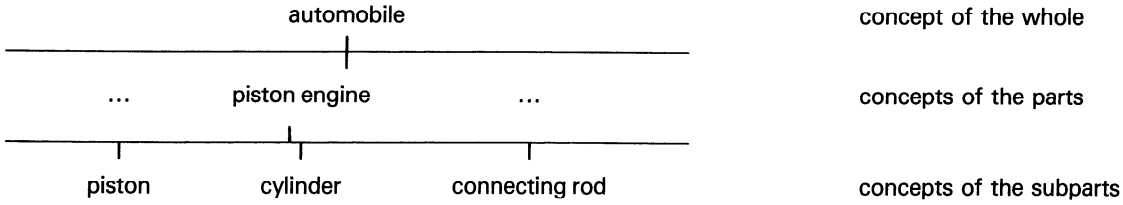
grinding machine, drilling machine, milling machine.

3.4.1.2 Partitive relationships

A partitive relationship is the relationship between a whole and its parts.

Since, in a partitive relationship, the concept of the part depends on the concept of the whole, it cannot be defined prior to the definition of the concept of the whole. One cannot define "an automobile engine" before one defines "an automobile".

Concepts which are in a partitive relationship can form horizontal and vertical series which are similar to the horizontal and vertical series formed by generic relationships :



3.4.2 Non-hierarchical relationships

Non-hierarchical relationships are such relationships as contiguity in time, space or of causal connection.

Examples :

cause — effect
before — after
left — right
up — down

They may also represent stages of a process, for example development, production, legal proceedings, administrative procedure. Concepts of this type often but not always represent actions which may be subdivided into partitive actions taking place consecutively or simultaneously.

The following relationships can be also classified as non-hierarchical relationships : producer-product, material-product, tool-application of tool, etc.

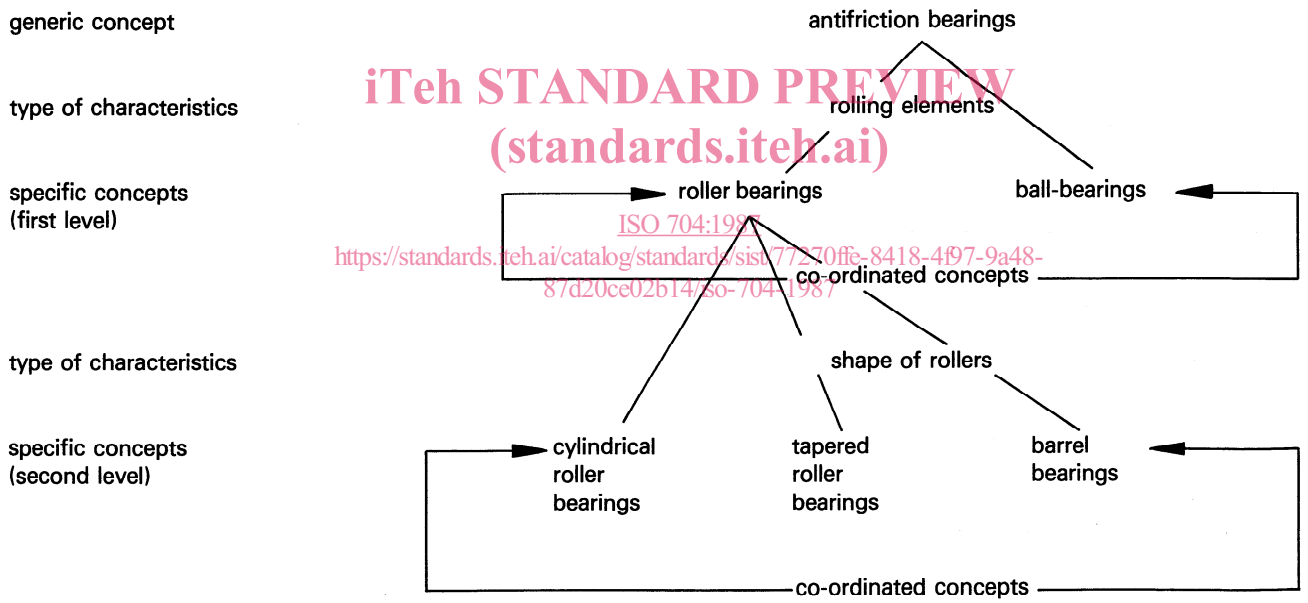
3.5 Systems of concepts

The set of concepts of a particular subject field forms a system in which each concept occupies a definite position.

A system of concepts

- serves as a means of mental ordering of our knowledge;
- visualizes and clarifies the relationship between concepts;
- permits the optimization of unified and standardized terminology;
- makes it possible to establish equivalence between terminologies in different languages.

Example of graphical representation of concepts in a generic system



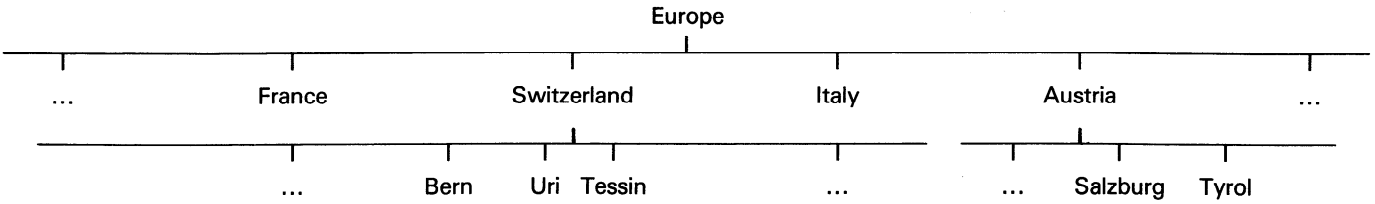
Types of characteristics :

1st level (rolling elements) : roller, ball;

2nd level (types of rollers) : cylindrical, conical, barrel shaped.

Partitive relationships between the concepts of a particular whole and its parts, as well as between the part of the parts, can be represented graphically in the following way :

Example of graphical representation of concepts in a partitive system



A description of types of concept systems, and the appropriate methods for their representation will form the object of a future International Standard.

4 Definitions*

4.1 General

A definition is a comprehensive description of a concept by means of known concepts expressed mainly by verbal means.

The purpose of a definition is to

— describe a concept at a given level of abstraction;

— distinguish the concept from related concepts;

— establish the relationships between the concepts in question and the other concepts in the system in order to determine the position of the concept in the system;

— delimit a concept for the purpose of normative terminology work.

The definition should be the starting point for selecting and analyzing terms*. When selecting or seeking an appropriate term for a concept it is necessary to start with a clear definition of the concept. For clarifying the concept, its intension and its extension have to be determined.

4.2 Types of definitions

The definitions most frequently used in terminology work are intensional and extensional definitions.

4.2.1 Intensional definitions

Intensional definitions (in the classical sense) consist of a listing of the characteristics of the concept to be defined, i.e. the description of the intension of the concept. For this purpose the nearest genus that has either been defined already or can be expected to be generally known, and the characteristic(s) restricting (determining) this genus are given. One or several of these characteristics differentiate also the concept to be defined from other concepts of the same horizontal series of concepts.

Example :

incandescent lamp : Electric lamp, in which a high-melting material is heated by an electric current in such a way that the lamp begins to emit light.

An "incandescent lamp" is defined with the aid of the closest genus "electric lamp" and the characteristics :

— high-melting material

— light emitting owing to heating by electric current.

These characteristics distinguish such lamps from all other types of "electric lamps" which together with the above mentioned concepts, make up a horizontal series.

4.2.2 Extensional definitions

An extensional definition consists of an enumeration of all species which are on the same level of abstraction. Sometimes all individual objects are enumerated. The extensional definition may not be valid for long since additional species, for instance new objects may come into existence which fall under the same genus or whole. Quite often an extensional definition is more easily understood than an intensional definition.

Example :

"The planets of the solar system are : Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto".

4.3 Concordance of definitions

A definition should fix and if possible reflect in words the position of the given concept in the system of all related concepts to which it belongs. For this reason the characteristics should be selected in such a way that the concept is delimited against related concepts. The definitions of all concepts of a system of concepts should be consistent with one another.

NOTE — In alphabetical dictionaries definitions are often inconsistent, since they may be formulated without considering their interdependence.

4.4 Principles for developing definitions

Concepts which are used in definitions should be expressed by terms which are either already used within the given system or which are well known. In either case, the specialist who is constructing the definition should be certain that all the terms can be correctly understood.

In order to construct satisfactory definitions the following should be observed.

4.4.1 Characteristics reflected in a definition

The definition should include the essential characteristics of the concept representing a certain object.

Both intrinsic and extrinsic characteristics can be essential characteristics.

Example :

The distinguishing characteristic for the concept "metal" is one which describes the structure of the atoms of metals. The characteristic through which we associate this concept with a more general one is that all metals are sub-class members of the broader class of substances. If we were to choose the characteristic "metallic lustre" as the specific difference we would not be able to derive many important properties of metals.

4.4.2 Adequacy of a definition

A definition should contain the characteristics which are essential and immediately relevant for the identification of a concept within a particular system of concepts. The distinguishing characteristics should be chosen according to the relevant system of concepts.

Example :

water (chemistry) : Compound of hydrogen and oxygen...

water (physics) : Liquid with the freezing point of 0 °C and the boiling point at 100 °C...

4.4.3 Systematic nature of a definition

A definition should reflect the characteristics of the concept and the systemic relationships between the concepts by

— indicating the essential characteristics of the broader concept, on which the relationship is based;

Example :

When defining the concepts "infra-red lamp", "visible light lamp" and "ultraviolet lamp", the definition of each of these should include the characteristic of the closest generic concept ("electric lamp").

— differentiation among co-ordinated concepts

Example :

The distinguishing characteristics should be variants of the classification characteristic "visible spectrum" ("infra-red range", "visible range", "ultraviolet range").

When defining the concept of a part (in partitive relationships) it is necessary to state to which whole the part belongs.

Example :

When defining a "light-diffusing bulb" one should indicate not only that it is a *part* (detail, element) of a "light-diffusing lamp", but also that it has the shape of a bulb, i.e. that it is a particular type in the systemization of objects by shape.

When defining concepts representing a whole, one has to indicate that the given concept is an aggregate of definite objects (this should be expressed by using the term "aggregate") which are to be listed.

4.4.4 Conciseness of a definition

A definition should include only essential (intrinsic or extrinsic) characteristics of the given concept. The definition should not include any characteristics which can be derived from these characteristics.

Example :

When defining the concept "diamond" there is no need to indicate that a diamond can be "natural" or "synthetic" in as much as diamond includes the concepts "synthetic diamond" and "natural diamond", when these are viewed as specific concepts with respect to "diamond", and this is being reflected in their definitions.

4.4.5 Incomplete definitions

To be complete, a definition should strictly correspond to the extension of the concept to be defined.

Examples :

(1) Definition "**screw** : Device for fastening or kind of fastening device" is incomplete (it is too broad), since it does not contain a specific characteristic, i.e. one which distinguishes screws from other fastening elements, such as wedges or rivets, for instance.

(2) The definition "**electronic vacuum device** : An electronic device in the shape of a tube" is incomplete (it is too narrow) in as much as not every electronic vacuum device has a tubular shape.

An incomplete definition can easily be recognized by the fact that the two sides of the equation cannot be interchanged.

4.4.6 Circular reasoning

As concepts are defined with the aid of other concepts, a situation can result where a concept is described with the aid of a concept, or several concepts, which are in turn defined with the aid of a given concept.

This results in two types of circular reasoning.

— those within a single definition (this type must be avoided);

— those within a system of definitions.

Example :

"Textile industry" can be defined as the "branch of industry which produces textiles". "Textiles" can in turn be defined as "products of the textile industry". These definitions exhibit circular reasoning.

One type of circular reasoning is tautology.