Terminology work — Principles and methods

Travail terminologique — Principes et méthodes
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Introduction</td>
<td>vi</td>
</tr>
<tr>
<td>1</td>
<td>Scope</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Normative references</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Terms and definitions</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Objects</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Concepts</td>
<td>2</td>
</tr>
<tr>
<td>5.1</td>
<td>Nature of concepts for terminology</td>
<td>2</td>
</tr>
<tr>
<td>5.2</td>
<td>Individual and general concepts</td>
<td>3</td>
</tr>
<tr>
<td>5.3</td>
<td>Characteristics</td>
<td>3</td>
</tr>
<tr>
<td>5.3.1</td>
<td>Nature of characteristics</td>
<td>3</td>
</tr>
<tr>
<td>5.3.2</td>
<td>Intension and extension</td>
<td>4</td>
</tr>
<tr>
<td>5.3.3</td>
<td>Essential vs. non-essential characteristics</td>
<td>4</td>
</tr>
<tr>
<td>5.3.4</td>
<td>Delimiting characteristics</td>
<td>5</td>
</tr>
<tr>
<td>5.4</td>
<td>Concept relations</td>
<td>5</td>
</tr>
<tr>
<td>5.4.1</td>
<td>Types of concept relations</td>
<td>5</td>
</tr>
<tr>
<td>5.4.2</td>
<td>Hierarchical relations</td>
<td>6</td>
</tr>
<tr>
<td>5.4.3</td>
<td>Associative relations</td>
<td>12</td>
</tr>
<tr>
<td>5.5</td>
<td>Concept systems</td>
<td>12</td>
</tr>
<tr>
<td>5.5.1</td>
<td>Nature of concept systems</td>
<td>12</td>
</tr>
<tr>
<td>5.5.2</td>
<td>Types of concept systems</td>
<td>13</td>
</tr>
<tr>
<td>5.6</td>
<td>Developing concept systems</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>Definitions</td>
<td>15</td>
</tr>
<tr>
<td>6.1</td>
<td>Nature of definitions</td>
<td>15</td>
</tr>
<tr>
<td>6.2</td>
<td>Types of definitions</td>
<td>15</td>
</tr>
<tr>
<td>6.2.1</td>
<td>Intensional definitions</td>
<td>15</td>
</tr>
<tr>
<td>6.2.2</td>
<td>Extensional definitions</td>
<td>17</td>
</tr>
<tr>
<td>6.3</td>
<td>Definition writing</td>
<td>17</td>
</tr>
<tr>
<td>6.3.1</td>
<td>Principles for definition writing</td>
<td>17</td>
</tr>
<tr>
<td>6.3.2</td>
<td>Systemic nature of definitions</td>
<td>18</td>
</tr>
<tr>
<td>6.3.3</td>
<td>Conciseness</td>
<td>18</td>
</tr>
<tr>
<td>6.3.4</td>
<td>Subject field</td>
<td>19</td>
</tr>
<tr>
<td>6.3.5</td>
<td>Principle of substitution</td>
<td>20</td>
</tr>
<tr>
<td>6.4</td>
<td>Deficient definitions</td>
<td>20</td>
</tr>
<tr>
<td>6.4.1</td>
<td>Circular definitions</td>
<td>20</td>
</tr>
<tr>
<td>6.4.2</td>
<td>Incomplete definitions</td>
<td>21</td>
</tr>
<tr>
<td>6.4.3</td>
<td>Negative definitions</td>
<td>22</td>
</tr>
<tr>
<td>6.5</td>
<td>Notes</td>
<td>22</td>
</tr>
<tr>
<td>6.6</td>
<td>Graphic representations</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>Designations</td>
<td>24</td>
</tr>
<tr>
<td>7.1</td>
<td>Types of designations</td>
<td>24</td>
</tr>
<tr>
<td>7.2</td>
<td>Terms</td>
<td>24</td>
</tr>
<tr>
<td>7.2.1</td>
<td>Term-concept relations</td>
<td>24</td>
</tr>
<tr>
<td>7.2.2</td>
<td>Monosemy</td>
<td>24</td>
</tr>
<tr>
<td>7.2.3</td>
<td>Homonymy</td>
<td>24</td>
</tr>
<tr>
<td>7.2.4</td>
<td>Synonymy</td>
<td>25</td>
</tr>
<tr>
<td>7.3</td>
<td>Term formation</td>
<td>25</td>
</tr>
<tr>
<td>7.3.1</td>
<td>Principles for term formation</td>
<td>25</td>
</tr>
</tbody>
</table>
7.3.2 Transparency ......................................................................................................................... 25
7.3.3 Consistency .......................................................................................................................... 26
7.3.4 Appropriateness .................................................................................................................... 26
7.3.5 Linguistic economy .............................................................................................................. 26
7.3.6 Derivability .......................................................................................................................... 27
7.3.7 Linguistic correctness ......................................................................................................... 27
7.3.8 Preference for native language ............................................................................................. 27
7.4 Appellations .......................................................................................................................... 27
7.5 Symbols ................................................................................................................................. 27
8 Standardization of terminologies ................................................................................................. 29
  8.1 Deprecation of terms .............................................................................................................. 29
  8.2 Harmonization ...................................................................................................................... 30
  8.3 Transliteration and transcription .......................................................................................... 30
Annex A (informative) Examples of term-formation methods ......................................................... 31
Alphabetical index .......................................................................................................................... 36
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 3.

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.

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

International Standard ISO 704 was prepared by Technical Committee ISO/TC 37, Terminology (principles and coordination), Subcommittee SC 1, Principles of terminology.

This second edition cancels and replaces the first edition (ISO 704:1987), of which it constitutes a technical revision.

Annex A of this International Standard is for information only.
0 Introduction

0.1 Overview

The terminological principles and methods laid down in this International Standard are based on current thinking and practices in terminology.

Terminology is multidisciplinary and draws support from a number of disciplines (e.g., logic, epistemology, philosophy of science, linguistics, information science and cognitive sciences) in its study of concepts and their representations in special language. It combines elements from many theoretical approaches that deal with the description, ordering and transfer of knowledge.

In line with current standardization trends to include guiding principles, this International Standard is intended to standardize the essential elements for quality work in terminology. The general purpose of this International Standard is to provide a common framework of thinking and explain how this thinking should be implemented by an organization or individuals involved in terminology.

It is further intended to provide assistance to those involved in terminology management. The principles and methods should be observed not only for the manipulation of terminological information but also in the planning and decision-making involved in managing a stock of terminology. The main activities include, but are not limited to the following:

— identifying concepts and concept relations;
— analysing and modelling concept systems on the basis of identified concepts and concept relations;
— establishing representations of concept systems through concept diagrams;
— defining concepts;
— attributing designations (predominantly terms) to each concept in one or more languages;
— recording and presenting terminological data, principally in print and electronic media (terminography).

Objects, concepts, designations and definitions are fundamental to terminology and therefore form the basis of this International Standard. Objects are perceived or conceived and abstracted into concepts which, in special language, are represented by designations and described in definitions. A set of designations belonging to one special language constitutes the terminology of a specific subject field.

0.2 Conventions and notation

In this International Standard and for the English language, “terminology” used in the singular and without an article designates the discipline, while “terminology” used in the plural or preceded by an article refers to the set of designations of a particular subject field, such as the terminology of chemistry.

For the sake of consistency in reference to objects, concepts, definitions and designations, the following wording conventions are used in this International Standard:

— objects
  — are perceived or conceived;
  — are abstracted or conceptualized into concepts;
— concepts

depict or correspond to a set of objects;

are represented or expressed in language by designations or by definitions;

are organized into concept systems;

— designations (terms, appellations or symbols)

designate or represent a concept;

are attributed to a concept;

— definitions

define or describe the concept.

The more complex a concept system, the more useful it is to clarify relations among concepts by representing them formally or graphically. Concept relations can be represented formally in a list. The formal representation used in this International Standard is a numbered and indented list as exemplified by the following:

1.

   1.1

   1.2

2.

   2.1

   2.2

The graphic representations used in this International Standard are the most typical ones.

Tree diagram to represent generic concept relations
The notation used throughout this International Standard is as follows:

- terms defined in ISO 1087-1 are in italics;
- concepts are indicated by single quotes;
- designations (terms, appellations or symbols) are in boldface;
- characteristics are underlined;
- examples are boxed.

It should be noted that the examples in this International Standard have been chosen and simplified for illustrative purposes. The translation into other languages may necessitate the selection of other examples to illustrate the point.

It should also be noted that the examples of term-formation methods, in informative annex A, are specific to the English language in the English version and to the French language in the French version. Annex A should not be translated but adapted to the needs of each language.
Terminology work — Principles and methods

1 Scope

This International Standard establishes and harmonizes the basic principles and methods for preparing and compiling terminologies both inside and outside the framework of standardization.

This International Standard describes the links between objects, concepts, and their representations through the use of terminologies. It also establishes general principles governing the formation of designations and the formulation of definitions. Full and complete understanding of these principles requires some background knowledge of terminology. The principles are general in nature and this International Standard is applicable to terminology work in scientific, technological, industrial, administrative, and other fields of knowledge.

This International Standard does not stipulate procedures for the layout of International Terminology Standards that are treated in ISO 10241.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.


3 Terms and definitions

For the purposes of this International Standard, the definitions given in ISO 1087-1 apply. The terminology defined in ISO 1087-1 appears as italicized terms in this International Standard. It should be noted that terms not italicized but found and defined in ISO 1087-1 are to be interpreted by their general language meaning.

4 Objects

For the purposes of this International Standard, an object is defined as anything perceived or conceived. Some objects, concrete objects such as a machine, a diamond, or a river, shall be considered material; other objects shall be considered immaterial or abstract, such as each manifestation of financial planning, gravity, flowability, or a conversion ratio; still others shall be considered purely imagined, for example, a unicorn, a philosopher’s stone or a literary character. In the course of producing a terminology, philosophical discussions on whether an object actually exists in reality are beyond the scope of this International Standard and shall be avoided. Objects are assumed to exist and attention shall be focused on how one deals with objects for the purposes of communication.

5 Concepts

5.1 Nature of concepts for terminology

To communicate, not every individual object in the world is differentiated and named. Instead, through observation and a process of abstraction called conceptualization, objects are categorized into mental constructs or units of thought called concepts which are represented in various forms of communication (object → concept → communication). This International Standard does not deal with all concepts represented in language but only with those represented by terminologies. For terminology, concepts are to be considered mental representations of objects within a specialized context or field.

Concepts are not to be confused with abstract or imagined objects (i.e., concrete, abstract or imagined objects in a given context are observed and conceptualized mentally and then a designation is attributed to the concept rather than to the objects themselves). For this International Standard, the link between an object and its designation or definition is made through the concept, a higher level of abstraction.

Producing a terminology requires understanding the conceptualization that underpins human knowledge in a subject area. Because a terminology always deals with special language in a particular field of knowledge, the concept shall be viewed not only as a unit of thought but also as a unit of knowledge.

The concepts contextualized in the special language of the subject field can be expressed in the various forms of human communication according to the system used. In natural language, concepts can take the form of terms, appellations, definitions or other linguistic forms; in artificial language, they can take the form of codes or formulae while in graphics, they can take the form of icons, pictures, diagrams or other graphic representations. Concepts may also be expressed with the human body as they are in sign language, facial expressions or body movements. This International Standard does not deal with the expression of concepts by sign or body language.

1) To be published.
5.2 Individual and general concepts

When the concept depicts a single object, it is called an individual concept and is represented in special language as an appellation (e.g., United Nations, Internet, Worldwide Web) or a symbol (e.g., Möbius Loop; Africa; Statue of Liberty). When the concept depicts a set of two or more objects, it is called a general concept and, in special languages, the designation takes the form of a term (e.g., floppy disk, liquidity, money market fund, etc.) or a symbol (®, >, $).

5.3 Characteristics

5.3.1 Nature of characteristics

Concept formation plays a pivotal role in organizing human knowledge because it provides the means for recognizing objects and for grouping them into meaningful units in a particular field. Objects perceived as sharing the same properties are grouped into units. Once similar objects, or occasionally a single object, are viewed as a meaningful unit of thought within a branch of human knowledge, the properties of an object or common to a set of objects are abstracted as characteristics which are combined as a set in the formation of a concept. Characteristics are constantly being combined in order to create concepts, although differently in different cultures, fields or schools of thought. The combination of unique sets of characteristics is represented in special language by a designation (i.e., a term, appellation or symbol). Since a designation is not attributed to every individual object, terminological analysis cannot begin unless the specific object in question corresponds to a concept represented by means of a designation or a definition. Therefore, the methodology used in the analysis of terminologies requires identifying the context or subject field in question, identifying the properties attributed to objects in the subject field, determining those properties which are abstracted into characteristics and then combining the characteristics to form a concept. It may be useful to begin an analysis with those concepts corresponding to concrete objects, since the characteristics are more easily abstracted given that the properties of the objects can be physically observed or examined.

Terminological analysis shall begin with the objects in question and the subject field contextualizing the objects in question. Properties shall be ascribed only to objects.

EXAMPLE 1

The specific object designated by the visual representation below has the following specific properties:

- made of a long, thin piece of graphite;
- the graphite core is surrounded by a wood casing;
- the casing is yellow;
- at one end there is an eraser;
- at the other end, the graphite and casing have been sharpened to a point;
- it is used for writing or making marks.

If the object in example 1 is contextualized in the field of stationery, this particular object is recognized as belonging to the category of objects that has been conceptualized as lead pencil. In the process of conceptualization, the properties of the objects forming the set are abstracted into characteristics, that is, the properties of the object are converted into generalizations applied to the entire set as opposed to the individual object, as illustrated in example 2.
Like the properties of objects, characteristics are grouped into types of characteristics such as colour, composition, function, use, origin, shape, location, movement, etc. To obtain a comprehensive listing, the properties of numerous objects corresponding to the concept under analysis should be identified followed by their abstraction as characteristics. For practical purposes, beginning with one of the more typical objects is recommended. The identification of characteristics shall be based on specialized subject knowledge of the field and often requires research. Experienced terminologists for whom the concept in question is clear and straightforward may move directly to identifying the characteristics.

The following example is a preliminary analysis of the concept ‘lead pencil’.

**EXAMPLE 2**

<table>
<thead>
<tr>
<th>Category</th>
<th>Property</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Object</strong></td>
<td><strong>Concept:</strong> abstraction based on the set of all lead pencils</td>
<td><strong>Designation (term):</strong> Lead pencil</td>
</tr>
<tr>
<td>Level of abstraction</td>
<td>Concreteness</td>
<td>Concreteness</td>
</tr>
<tr>
<td>Composition</td>
<td>Made of a long, thin piece of graphite</td>
<td>Graphite core</td>
</tr>
<tr>
<td>Composition</td>
<td>Wood casing surrounds graphite</td>
<td>Graphite core is encased in wood</td>
</tr>
<tr>
<td>Colour</td>
<td>Casing is yellow</td>
<td>Casing may be any colour</td>
</tr>
<tr>
<td>Composition</td>
<td>At one end there is an eraser</td>
<td>One end may have an eraser</td>
</tr>
<tr>
<td>Shape</td>
<td>Other end is sharpened to a point</td>
<td>One end may be sharpened to a point</td>
</tr>
<tr>
<td>Usage</td>
<td>Graphite and casing sharpened for usage</td>
<td>Graphite and casing must be sharpened for usage</td>
</tr>
<tr>
<td>Medium</td>
<td>Graphite is the writing medium</td>
<td>Graphite is the writing medium</td>
</tr>
<tr>
<td>Function</td>
<td>Used for writing or making marks</td>
<td>Used for writing or making marks</td>
</tr>
</tbody>
</table>

Characteristics shall be used in the analysis of concepts, the modelling of concept systems, in the formulation of definitions and, as often as possible, in the formation of designations.

5.3.2 Intension and extension

The set of characteristics that come together as a unit to form the concept is called the intension. The objects viewed as a set and conceptualized into a concept are known as the extension. The two, intension and extension, are interdependent. For example, the characteristics making up the intension of ‘lead pencil’ determines the extension, those objects that qualify as lead pencils and vice versa.

5.3.3 Essential vs. non-essential characteristics

Not all characteristics are equally important. For practical purposes, the essential characteristics of the intension shall be the focal point of any analysis and may differ according to specific fields. Characteristics are considered essential if they are indispensable for the understanding of the concept in a particular field of knowledge; the absence of an essential characteristic fundamentally changes the concept. The absence of an essential characteristic in the course of an analysis will lead to poor or even erroneous understanding of the concept. In the example of the ‘lead pencil’, if the characteristic graphite core is encased in wood were removed, the concept would be radically changed. It would represent a different concept corresponding to a different set of objects. Therefore, this is an essential characteristic. On the other hand, if the characteristic one end may be sharpened to a point were removed, the concept would not be altered. Although a lead pencil must be sharpened in order to write, it still qualifies as a lead pencil, even if it has not been sharpened. Therefore, this characteristic is not essential to the understanding of the concept of ‘lead pencil’. The essential characteristics of a concept, such as ‘lead pencil’, shall be identified. It is not always necessary to categorize the characteristics explicitly as in example 3; only in cases where the concept in question is highly complex.
EXAMPLE 3

<table>
<thead>
<tr>
<th>Level of abstraction</th>
<th>1 Concreteness</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>2. Graphite core</td>
<td>Essential</td>
</tr>
<tr>
<td>Composition</td>
<td>3. Graphite is encased in wood</td>
<td>Essential</td>
</tr>
<tr>
<td>Colour</td>
<td>4. Casing may be coloured</td>
<td>Non-essential</td>
</tr>
<tr>
<td>Composition</td>
<td>5. One end may have an eraser</td>
<td>Non-essential</td>
</tr>
<tr>
<td>Shape</td>
<td>6. One end may be sharpened to a point</td>
<td>Non-essential</td>
</tr>
<tr>
<td>Usage</td>
<td>7. Must be sharpened for usage</td>
<td>Essential</td>
</tr>
<tr>
<td>Medium</td>
<td>8. Graphite is the writing medium</td>
<td>Essential</td>
</tr>
<tr>
<td>Function</td>
<td>9. Used for writing or making marks</td>
<td>Essential</td>
</tr>
</tbody>
</table>

It must be noted that the same property of a given object may be abstracted as an essential characteristic of a concept in one subject field but may be non-essential in another.

5.3.4 Delimiting characteristics

After identifying the essential characteristics that make up the intension of a concept, the terminological analysis shall be taken a step further. Each essential characteristic of the concept under study shall be analysed in relation to the related concepts in the concept system. Common or shared characteristics indicate similarities between concepts; delimiting characteristics signal differences which set a concept apart (see examples 7 and 8). A delimiting characteristic is an essential characteristic that distinguishes one concept from another. However, delimiting and common are relative terms. The same essential characteristic may be delimiting in relation to one concept but common in relation to another related concept. Analysing the similarities and differences between concepts will result in the unique set of characteristics that typify a given concept. This unique combination of characteristics will situate the concept within a network of related concepts with similar or different characteristics. The relations between the concepts shall be used to determine the basic structure of the concept system. Understanding the characteristics used to develop the concept system simplifies the task of defining a concept.

5.4 Concept relations

5.4.1 Types of concept relations

Concepts do not exist as isolated units of thought but always in relation to each other. Our thought processes constantly create and refine the relations between concepts, whether these relations are formally acknowledged or not.

In organizing concepts into a concept system, it is necessary to bear in mind the field of knowledge that gave rise to the concept and to consider the expectations and objectives of the target users. The subject field shall act as the framework within which the concept field, the set of related but unstructured concepts, is established.

EXAMPLE 4

If our task were to list and compile the terminology of writing instruments for the stationery industry, our example of ‘lead pencil’ would form part of the concept field dealing with pencils as conceptualized by those in the stationery industry. Pencils outside the field of stationery, such as eyebrow pencil or styptic pencil, would be excluded.
To model a concept system, the concepts of the concept field have to be examined and compared. For the purposes of this International Standard, at least the following relations shall be used to model a concept system:

- hierarchical relations:
  - generic relations;
  - partitive relations;
  - associative relations.

5.4.2 Hierarchical relations

5.4.2.1 Types of hierarchical relations

In a hierarchical relation, concepts are organized into levels where the superordinate concept is subdivided into at least one subordinate concept. Subordinate concepts at the same level and having the same criterion of subdivision are called coordinate concepts. The coordinate concepts resulting from the application of the same criterion of subdivision to the superordinate concept constitute a dimension. A superordinate concept can have more than one dimension, in which case the concept system is said to be multidimensional. Concepts are superordinate, subordinate or coordinate, not on their own, but always in relation to each other in a hierarchy.

In this International Standard, two types of hierarchical relations are recognized:

- generic relations;
- partitive relations.

5.4.2.2 Generic relations

A generic relation exists between two concepts when the intension of the subordinate concept includes the intension of the superordinate concept plus at least one additional delimiting characteristic. The superordinate concept in a generic relation is called the generic concept and the subordinate concept is called the specific concept.

In a generic relation, there is an inverse relationship between the intension of a concept and its extension. Hence, if a concept has a narrow intension, its extension will be relatively broader and, inversely, if the intension is broad, the extension will be relatively narrower.

EXAMPLE 5

In the concept diagram below, ‘pencil’ is a specific concept in relation to the generic concept ‘writing instrument’. Similarly, the concepts ‘lead pencil’ and ‘mechanical pencil’ are each a specific concept in relation to the generic concept ‘pencil’. Each of the coordinate concepts ‘lead pencil’ and ‘mechanical pencil’ has a generic relation with the generic concept ‘pencil’. The criterion used to increase the specificity of the concept is the nature of the outer casing and graphite core.

Comparing the essential characteristics of a concept and its related concepts (i.e., generic, coordinate and specific) may require an adjustment and refinement of the intension.
EXAMPLE 6

Comparison of the essential characteristics of 'lead pencil' with related concepts in example 5

<table>
<thead>
<tr>
<th>Level of abstraction</th>
<th>Composition</th>
<th>Usage</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Concreteness</td>
<td>2. Graphite core is fixed</td>
<td>4. Usage involves the removal of the casing (i.e., sharpening)</td>
<td>5. Used for writing or making marks</td>
</tr>
<tr>
<td></td>
<td>3. Wood casing</td>
<td></td>
<td>COMMON with those of the generic 'writing instrument', the generic 'pencil', and the coordinate 'mechanical pencil'</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DELIMITING in relation to all related concepts in question</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DELIMITING in relation to all related concepts in question</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>COMMON with those of the generic 'writing instrument', marks the generic 'pencil', and the coordinate 'mechanical pencil'</td>
<td></td>
</tr>
</tbody>
</table>

When modelling a concept system, one shall concentrate on the essential and delimiting characteristics.

EXAMPLE 7

A sequence of concepts reflecting generic relations constitutes a vertical series of concepts, whereas a group of coordinate concepts, i.e., concepts that rank at the same level of abstraction in a concept system, form a horizontal series of concepts.
In a generic relation, there may be several ways of subdividing a concept into subordinate concepts depending on the criteria or type of characteristic chosen. When more than one criterion are used in the construction of a generic concept system, it is considered multidimensional. Only subordinate concepts on the same level and in the same dimension are called coordinate concepts. In a generic concept system, a node may not have an established designation, or may have a designation in one language but not in another.

**EXAMPLE 8**

```
writing instrument
  • concreteness
  • used for writing or making marks

... marker pencil pen...

lead pencil mechanical pencil office pencil golf pencil
  • type of pencil
  • graphite core = writing medium
  • type of writing instrument
  • graphite core = writing medium
  • type of pencil
  • lead or mechanical pencil
  • used in the office
  • type of pencil
  • half-length of a lead pencil
  • used to record golf scores

'lead pencil' and 'mechanical pencil' are coordinate concepts because they share the same dimension; 'office pencil' and 'golf pencil' constitute another set of coordinate concepts.
```

The concept diagram most commonly used to illustrate generic relations in a concept system is the tree diagram as in example 8 above or the indented list of concepts as in example 9.

**EXAMPLE 9**

```
1 writing instrument
  1.1 marker
  1.2 pencil
    1.2.1
      1.2.1.1 lead pencil
      1.2.1.2 mechanical pencil
    1.2.2
      1.2.2.1 office pencil
      1.2.2.2 golf pencil
  1.3 pen...
```
5.4.2.3 Partitive relations

A partitive relation is said to exist when the superordinate concept represents a whole, while the subordinate concepts represent parts of that whole. The parts come together to form the whole. The superordinate concept in a partitive relation is called the comprehensive concept and the subordinate concept is called the partitive concept. Subordinate concepts at the same level and sharing the same dimension are also called coordinate concepts.

Partitive, like generic relations can be expressed as vertical and horizontal series.

The parts that make up the whole may be similar in nature (e.g., atom in an oxygen molecule) or distinctly different from each other. One or more parts may be compulsory (i.e., essential) or optional (i.e., non-essential). Some parts are not only essential but delimiting in that they allow the whole to be distinguished from other similar comprehensive concepts. Some parts may be multiple (e.g., concept of ‘page’ as part of a book) or variable within a range (e.g., a pen may have as a part an ink reservoir, an ink cartridge or an ink refill).

EXAMPLE 10

In the following concept diagram, the comprehensive concept ‘mechanical pencil’ represents a whole, while the partitive concepts ‘barrel’, ‘lead-advance mechanism’, ‘lead (refill)’, ‘clip’, ‘refill eraser’, and ‘finger grip’ are the parts that make up the whole. The parts ‘clip’, ‘eraser (refill)’ and ‘finger grip’ are optional since they are not found on all mechanical pencils. The parts, ‘barrel’, ‘lead-advance mechanism’ and ‘lead (refill)’ are essential components of all mechanical pencils. The partitive concepts ‘lead (refill)’ and ‘lead-advance mechanism’ are delimiting parts because they behave like delimiting characteristics in that they allow one to distinguish the comprehensive concept, mechanical pencil, from other closely related writing instruments such as ball-point pens, fine-tipped markers, etc.

To identify the essential characteristics of the partitive concepts, it is necessary to determine the intension of the comprehensive concept first.
EXAMPLE 11

In relation to other pencils (see example 8), one of the delimiting characteristics of the concept ‘mechanical pencil’ is the graphite core is not fixed. It should be noted that, as in the case of delimiting characteristics, considering a part to be delimiting is relative and depends on the concept system and on the coordinate concepts being compared.

In the partitive relation (see example 10), the graphite core is conceptualized as ‘lead (refill)’. Hence, the characteristic replaceable is an essential characteristic of the partitive concept ‘lead (refill)’.

A partitive concept system does not always allow for a complete analysis of a concept. If a partitive concept is not particular to the comprehensive concept, then the extension of the partitive concept is not accounted for completely and essential characteristics of its intension may be lacking. A partitive concept shall be defined on the basis of a partitive relation only if the complete extension and the essential characteristics of the intension can be determined.

EXAMPLE 12

The part ‘barrel’ is not conceptually unique to mechanical pencils. In English, the barrel of a mechanical pencil does not form a separate concept with its own designation but rather constitutes a portion of the set of objects that make up the extension of the concept ‘barrel’. Other types of writing instruments also have barrels. The complete extension of the concept ‘barrel’ can only be determined when ‘barrel’ is analysed in relation to the more generic concept ‘writing instrument’.

The parts ‘lead-advance mechanism’, ‘lead (refill)’ and ‘eraser (refill)’ designate partitive concepts with complete extensions. Only the terms ‘lead-advance mechanism’, ‘lead (refill)’ and ‘eraser (refill)’ should be defined on the basis of partitive relations.

Hierarchical relations, generic or partitive, may be either monodimensional or multidimensional.
EXAMPLE 13

<table>
<thead>
<tr>
<th>Dimension:</th>
<th>Parts of the concept ‘tree’ viewed as a living plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehensive concept:</strong></td>
<td><strong>Partitive concepts:</strong></td>
</tr>
<tr>
<td>tree</td>
<td>root, trunk, branch, leaf</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimension:</th>
<th>Parts of the concept ‘tree’ viewed according to the permanence of its organs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comprehensive concept:</strong></td>
<td><strong>Partitive concepts:</strong></td>
</tr>
<tr>
<td>tree</td>
<td>permanent organ, non-permanent organ</td>
</tr>
</tbody>
</table>

The concept diagrams commonly used to illustrate partitive relations in a concept system are the bracket or rake diagrams (see examples 10, 12, 13) or the indented list below.

EXAMPLE 14

1. tree
   1.1 (“parts based on composition”)
     1.1.1 branch
     1.1.1.1 leaf
     1.1.2 root
     1.1.3 trunk
     1.1.3.1 bark
     1.1.3.2 cortex
   1.2 (“parts based on permanence”)
     1.2.1 permanent organ
     1.2.2 non-permanent organ

It is to be noted that the indented display only indicates a hierarchical relationship; it does not allow one to distinguish between generic and partitive relations.
5.4.3 Associative relations

Associative relations are non-hierarchical. An associative relation exists when a thematic connection can be established between concepts by virtue of experience.

Some associative relations exist when dependence is established between concepts with respect to their proximity in space or time. These relations may involve raw material – product, action – equipment/tool, quantity – unit, material – property, material – state, matter/substance – property, concrete item – material, concrete item – shape, action – target, action – place/location, action – actor, etc. Some relations involve events in time such as a process dependent on time or sequence; others relate cause and effect.

There are many kinds of associative relations. The following are some examples.

EXAMPLE 15

<table>
<thead>
<tr>
<th>Concepts</th>
<th>Associative relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>pencil case</td>
<td>container – contained</td>
</tr>
<tr>
<td>writing</td>
<td>activity – tool</td>
</tr>
<tr>
<td>gametes</td>
<td>steps of a cycle</td>
</tr>
<tr>
<td>humidity</td>
<td>cause – effect</td>
</tr>
<tr>
<td>baker</td>
<td>producer – product</td>
</tr>
<tr>
<td>time</td>
<td>duration – measuring device</td>
</tr>
<tr>
<td>painter</td>
<td>profession – typical tool</td>
</tr>
<tr>
<td>screw</td>
<td>object – associated tool</td>
</tr>
<tr>
<td>Islam</td>
<td>organization – associated building</td>
</tr>
</tbody>
</table>

5.5 Concept systems

5.5.1 Nature of concept systems

The terminology of a field shall not be an arbitrary collection of terms. The terminology of a subject field is the collection of designations attributed to concepts making up the knowledge structure of the field. The concepts shall constitute a coherent concept system based on the relations established between concepts. The unique position of each concept within a system is determined by the intension, i.e. the unique set of characteristics constituting the concept, and the extension.

Different subject fields view the same bodies of knowledge in different ways. The same objects may be combined to form different units of knowledge with different intensions and extensions, thus resulting in different concept systems and distinct designations. For example: hypothetical-deductive approaches such as mathematics may create concept systems based on statistics or abstract mathematical formulae, whereas the natural sciences may view the same body of knowledge, but draw up systems resulting from the classification of observed phenomena. Engineering and technology may structure a system according to production processes, whereas specialists in law or sociology can view the same phenomena in terms of legal liability or social interaction. A concept system serves to:

- model concept structures based on specialized knowledge of a field;
- clarify the relations between concepts;
- form the basis for a uniform and standardized terminology;
— facilitate the comparative analysis of concepts and designations across languages;

— facilitate the writing of definitions.

5.5.2 Types of concept systems

The types of concept systems are:

— generic concept system: a system in which all the concepts in a vertical series relate to each other as generic and specific concepts, see examples 7 and 8;

— partitive concept system: a system in which all the concepts in a vertical series relate to each other as a whole and its parts, see example 10;

— associative concept system: a system in which all the concepts relate to each other by association. The type of associative relation between any two concepts may vary within a system, see example 16.

EXAMPLE 16

mixed concept system: a system constructed using a combination of the concept relations, see example 17.
EXAMPLE 17

5.6 Developing concept systems

A concept field is the group of unstructured but thematically related concepts that shall be used as the starting point for building a concept model.

The modelling of concept systems involves a series of interactive operations leading, for example, to the compilation of a vocabulary in a specific subject field. These operations generally include:

— selecting the concept field, the preliminary designations and concepts to be treated by taking into account the subject field, the user group and its needs;

— analysing the intension and extension of each concept;

— determining the relation and position of these concepts within the concept system;

— formulating and evaluating definitions for the concepts based on the concept relations;

— attributing designations to each concept.
The steps involved in modelling concept systems and defining concepts are closely related. Definitions shall reflect the concept system; the relations within the system shall be established primarily by analysing the characteristics of each concept included in its respective definition, if a formal definition already exists. Consequently, modelling and diagramming the structure of a concept system, and writing definitions for the concepts treated in that system, can require review and repetition of some operations.

6 Definitions

6.1 Nature of definitions

A definition shall define the concept as a unit with a unique intension and extension. The unique combination of characteristics creating the intension shall identify the concept and differentiate it from other concepts. The quality of most terminological products will be determined by the quality of the definitions.

Some terms are so long and complex that they could almost serve as definitions; some definitions are so short they could almost be thought of as terms. In spite of this, the definition should not be confused with the designation.

A definition may be complemented by a note or a graphic representation.

In terminology, the following types of definitions are recognized:

— intensional definition;

— extensional definition.

6.2 Types of definitions

6.2.1 Intensional definitions

Intensional definitions shall indicate the superordinate concept, either immediately above or at a higher level, followed by the characteristic(s) that distinguish the concept from other concepts. The superordinate concept situates the concept in its proper context in the concept system (e.g., pencils among writing instruments, trees among plants). In practice, intensional definitions are preferable to other concept descriptions. Intensional definitions should be used whenever possible as they most clearly reveal the essential characteristics of a concept within a concept system.

The intensional definition should be based on the concept relations determined during analysis. A definition based on a generic relation shall state the generic concept sharing the same dimension, either immediately above or at some higher level, followed by the essential characteristics that differentiate the given concept from coordinate concepts in a generic concept system.

By stating the generic concept, the characteristics that make up the intension of the superordinate concept are implicitly assumed in the definition.

EXAMPLE 18

<table>
<thead>
<tr>
<th>lead pencil</th>
</tr>
</thead>
<tbody>
<tr>
<td>pencil whose graphite core is fixed in a wooden casing that is removed for usage by sharpening</td>
</tr>
<tr>
<td>NOTE</td>
</tr>
</tbody>
</table>

The definition of ‘lead pencil’ is based on the generic concept system in example 8:

Superordinate concepts: pencil and writing instrument

Essential and delimiting characteristics:

— casing must be removed for usage by sharpening;

— graphite core is fixed in wood casing.
A definition based on a partitive relation shall describe a concept as a part of a particular whole or comprehensive concept. It is therefore necessary to analyse the comprehensive concept first and to indicate its relation to the partitive concepts. Partitive definitions typically begin with formulations that clearly indicate the partitive relation such as: part of, component of, section of, period of, element in, ingredients making up, etc., followed by the superordinate concept (i.e., the comprehensive concept) and the delimiting characteristics. To avoid circularity, defining concepts on the basis of a partitive analysis is to be restricted to one level, either the subordinate level or the superordinate level, not both.

A concept should be defined as a partitive concept only if it constitutes an essential part of the comprehensive concept and the extension of the concept is complete.

**EXAMPLE 19**

<table>
<thead>
<tr>
<th>lead cartridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>that part of a lead advance mechanism which stores and guides the lead refill as it advances forward</td>
</tr>
</tbody>
</table>

The definition of ‘lead cartridge’ is based on the partitive concept system in example 17:

Superordinate concept: lead-advance mechanism

Essential and delimiting characteristics:

- stores the lead;
- guides the lead as it is advanced forward.

If the partitive concepts of the lead advance mechanism (lead cartridge, lead aligner, lead clamp and feed spring) are defined on the basis of a partitive relation, then the comprehensive concept “lead-advance mechanism” must not be defined on the basis of a partitive relation of the whole to its parts. This avoids circularity.

A comprehensive concept may be defined on the basis of a mixed concept system. The definition shall state the generic concept above followed by the essential parts that make up the comprehensive concept in question. Optional parts shall not be included in the definition. Optional parts frequently associated with a concept may be mentioned in a note. This type of definition is practical only if the number of parts to be enumerated is limited.

**EXAMPLE 20**

<table>
<thead>
<tr>
<th>mechanical pencil</th>
</tr>
</thead>
<tbody>
<tr>
<td>writing instrument composed of a barrel, lead and a lead-advance mechanism</td>
</tr>
</tbody>
</table>

The definition is based on the mixed concept system in example 17:

Superordinate concepts: pencil and writing instrument

Essential and delimiting parts:

- barrel;
- lead refill;
- lead advance mechanism.

A concept may be defined on the basis of the associative relation between two concepts. The definition should state the superordinate concept followed by characteristics that indicate the relationship between the concepts in question. It should be noted that, in many cases, the superordinate concept is not a specialized concept and therefore, care shall be taken to ensure that the complete intension and extension of the concept have been analysed thoroughly before defining the concept on the basis of an associative relation. For example, the associative concept system in example 16 shows a container-contained relationship between pencil case and pencil. However, a pencil case is a container designed to hold and carry not only pencils but writing instruments in general.
EXAMPLE 21

<table>
<thead>
<tr>
<th>pencil case</th>
</tr>
</thead>
<tbody>
<tr>
<td>container designed to hold and carry pencils and other writing instruments</td>
</tr>
</tbody>
</table>

The definition is based on the associative concept system in example 16 and on the associative relationship of container-contained.

Superordinate concept: container
Essential characteristics:
— designed to hold and carry pencils and other writing instruments.

6.2.2 Extensional definitions

In highly specialized terminological documents directed at field specialists, the definition can be formulated as a list of the subordinate concepts, in only one dimension, which correspond to objects making up the extension of the concept. The list of subordinate concepts may consist of either individual or general concepts. It is important to remember that the extension is not the same as an extensional definition. The list stands for concepts that depict the objects making up the extension and not the objects themselves. The operator “or” in the definition shall be used to indicate a generic relation between the subordinate concepts in the definition and the superordinate concept that is being defined; the operator “and” shall be used to indicate a partitive relation.

Extensional definitions are to be used only when intensional definitions are difficult to elaborate. Extensional definitions shall be used only if the number of concepts to be enumerated is limited, the list of concepts is complete in one dimension and the subordinate concepts can be clarified by intensional definitions or are well known.

EXAMPLE 22

<table>
<thead>
<tr>
<th>threatened species</th>
</tr>
</thead>
<tbody>
<tr>
<td>critically endangered species, endangered species or vulnerable species</td>
</tr>
</tbody>
</table>

6.3 Definition writing

6.3.1 Principles for definition writing

A terminological entry shall be composed of a statement explaining what the concept is. The statement is made up of a subject, copula and predicate. The subject is the designation, the copula is understood to be the verb “is” and the predicate constitutes the definition. Typographical conventions, such as a colon, a dash or by starting a new line of text, introduce the beginning of the predicate (see ISO 10241 for layout).

EXAMPLE 23

<table>
<thead>
<tr>
<th>lead pencil</th>
</tr>
</thead>
<tbody>
<tr>
<td>pencil whose graphite core is fixed in a wooden casing that is removed for usage by sharpening</td>
</tr>
</tbody>
</table>

NOTE To be used for writing or making marks, a lead pencil must be sharpened at least at one end.

The entry should read as follows:

“[A] lead pencil [is a] pencil whose graphite core is fixed in a wooden casing that is removed for usage by sharpening”.

A definition shall describe a concept, not the words that make up a designation.
EXAMPLE 24

<table>
<thead>
<tr>
<th>inappropriate definition</th>
<th>coniferous</th>
<th>coniferous = bearing cones</th>
</tr>
</thead>
<tbody>
<tr>
<td>definition of the concept</td>
<td>tree bearing cones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>coniferous tree</td>
<td></td>
</tr>
<tr>
<td>inappropriate definition</td>
<td>tree with needle-like or scale-like leaves and exposed or naked seeds</td>
<td></td>
</tr>
<tr>
<td>definition of the concept</td>
<td>dependability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the collective term used to describe the availability performance and its influencing factors: reliability performance, maintainability performance and maintenance support performance</td>
<td></td>
</tr>
<tr>
<td>definition of the concept</td>
<td>dependability</td>
<td></td>
</tr>
<tr>
<td></td>
<td>totality of the characteristics of an entity related to availability performance and its influencing factors: reliability performance, maintainability performance and maintenance support performance</td>
<td></td>
</tr>
</tbody>
</table>

Before drafting a definition for a given concept, it is necessary to determine the relations between the concept and its related concepts and to model a concept system within which the concept is situated.

If a definition already exists, in an International Standard for example, it shall be adopted as it stands only if it reflects the concept system in question. Otherwise, it shall be adapted.

When modelling the concept system and formulating the corresponding system of definitions, it is essential to determine which concepts are so basic and familiar that they need not be defined. Generally, one begins by defining superordinate concepts. When drafting a new definition, use shall be made of basic concepts or concepts defined elsewhere in the document as far as possible.

6.3.2 Systemic nature of definitions

A definition shall reflect the concept system describing the concept and its relations to others in the system. Definitions shall be coordinated so as to be able to reconstruct the concept system. The characteristics used in the definition should therefore be selected to indicate the connection between the concepts or the delimitation that distinguish one concept from another.

6.3.3 Conciseness

Ideally, definitions shall be as brief as possible and as complex as necessary. Complex definitions can contain several dependent clauses, but carefully written definitions contain only that information which makes the concept unique. Any additional descriptive information deemed necessary should be included in a note.

EXAMPLE 25

<table>
<thead>
<tr>
<th>lead pencil</th>
<th>pencil whose graphite core is fixed in a wooden casing that is removed for usage by sharpening</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOTE</td>
<td>To be used for writing or making marks, a lead pencil must be sharpened at least at one end.</td>
</tr>
</tbody>
</table>
A definition shall describe only one concept. It shall not include hidden definitions for any concepts used to identify characteristics. Any characteristic that requires an explanation shall be defined separately as a concept or given in a note.

**EXAMPLE 26**

<table>
<thead>
<tr>
<th>lead pencil</th>
</tr>
</thead>
<tbody>
<tr>
<td>pencil whose wooden casing is fixed around graphite, a soft, black form of carbon</td>
</tr>
</tbody>
</table>

This definition of ‘lead pencil’ includes a hidden definition for the concept ‘graphite’, an essential characteristic. The characteristic a soft, black form of carbon, should be removed and used in a separate definition for the concept ‘graphite’.

The definition should not contain characteristics that belong logically to superordinate or subordinate concepts.

**EXAMPLE 27**

In the definition of ‘mechanical pencil’, it is not necessary to indicate the characteristic concreteness (all the objects in the extension are concrete) since this characteristic is part of the intension of the superordinate concept. In the definition of ‘pencil’, it is unnecessary to note that a pencil can be either a ‘lead pencil’ or a ‘mechanical pencil’ because the generic concept ‘pencil’ allows for both of these subordinate concepts.

### 6.3.4 Subject field

The extension and the characteristics reflected in a definition shall be appropriate to the concept system in a given subject field.

If the specific field of the concept is not clearly indicated in the designation or is not generally understood, it shall be added to the beginning of the definition (see example 28 and ISO 10241 for layout).

**EXAMPLE 28**

<table>
<thead>
<tr>
<th>pointer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(programming) variable that contains the memory location of some data rather than the data itself</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pointer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(user interface) on-screen symbol that is controlled by an input device and is used as a means of indicating and selecting locations or choices on the screen</td>
</tr>
</tbody>
</table>

**NOTE** An example of an on-screen symbol is an arrowhead and a mouse is a common input device.

When restricting the definition to a specific subject field, the extension of the concept should not be narrowed incorrectly, as illustrated in example 29.

**EXAMPLE 29**

<table>
<thead>
<tr>
<th>fertility</th>
</tr>
</thead>
<tbody>
<tr>
<td>(forest management) ability of a tree to produce offspring</td>
</tr>
</tbody>
</table>

The concept of ‘fertility’ was created to designate a unit of knowledge arising from the field of biology, not forest management. The extension includes all living things, not just trees. Limiting ‘fertility’ to forest management and trees narrows and distorts the extension.
6.3.5 Principle of substitution

The substitution principle shall be used to test the validity of a definition. A definition is valid if it can replace a designation in a text without loss of or change in meaning. See example 32.

6.4 Deficient definitions

6.4.1 Circular definitions

Common types of deficient definitions are: circular, incomplete and negative definitions.

If one concept is defined using a second concept, and that second concept is defined using the term or elements of the term designating the first concept, the resulting definitions are said to be circular. Circular definitions do not add to our understanding of the concept and shall be avoided as much as possible.

Definitions can be circular:

— within a single definition;
— within a system of definitions.

Circularity within a definition occurs when the designation is repeated to introduce the definition or an element of the designation is used as a characteristic. When formulating a definition, it is not permissible to repeat the designation to introduce the definition (see example 30). The use of an element of the designation, other than the head word, as a characteristic in the definition should be avoided as much as possible (see example 31).

EXAMPLE 30

<table>
<thead>
<tr>
<th>circular definition</th>
<th>tree height</th>
</tr>
</thead>
<tbody>
<tr>
<td>corrected definition</td>
<td>tree height measured from the ground surface to the top of a tree</td>
</tr>
<tr>
<td></td>
<td>distance between the ground surface and the top of a tree</td>
</tr>
</tbody>
</table>

EXAMPLE 31

<table>
<thead>
<tr>
<th>circular definition</th>
<th>evergreen tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>corrected definition</td>
<td>tree with evergreen foliage</td>
</tr>
<tr>
<td></td>
<td>tree that retains its foliage throughout its lifetime</td>
</tr>
</tbody>
</table>

A definition is circular within a system of definitions when two or more concepts are defined by means of each other. The substitution principle clearly reveals repetition and circularity.

EXAMPLE 32

<table>
<thead>
<tr>
<th>circular definitions</th>
<th>virgin forest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>forest constituted of a natural tree stand</td>
</tr>
<tr>
<td></td>
<td>natural tree stand</td>
</tr>
<tr>
<td></td>
<td>stand of trees grown in a virgin forest</td>
</tr>
</tbody>
</table>

The substitution of the term ‘virgin forest’ in the definition of ‘natural tree stand’ results in:

<table>
<thead>
<tr>
<th>substitution</th>
<th>stand of trees grown in a forest constituted of a natural tree stand</th>
</tr>
</thead>
<tbody>
<tr>
<td>corrected definition</td>
<td>stand of trees grown without interference by man</td>
</tr>
</tbody>
</table>

Once the definition of ‘natural tree stand’ has been modified to remove the circularity, the definition of ‘virgin forest’ can remain as it is.
6.4.2 Incomplete definitions

A definition shall describe the content of the concept precisely. It shall be neither too narrow nor too broad. Otherwise, the definition is considered incomplete. Non-essential or irrelevant characteristics in the definition may unintentionally include or exclude objects from the extension of the concept. A definition is considered too broad if the characteristics selected to describe the concept allow for objects that should not be part of the extension. A definition is considered too narrow if the characteristics selected exclude objects that should be part of the extension.

EXAMPLE 33

<table>
<thead>
<tr>
<th></th>
<th>mechanical pencil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>too broad</strong></td>
<td>writing instrument composed of a barrel and a refill</td>
</tr>
<tr>
<td>By not specifying precisely the type of refills, this definition broadens the extension to include ball-point, roller-ball and felt-tip pens as well as mechanical pencils.</td>
<td></td>
</tr>
<tr>
<td><strong>too narrow</strong></td>
<td>writing instrument composed of a barrel, a lead refill and push-button advance mechanism</td>
</tr>
<tr>
<td>By specifying a push-button advance mechanism, this definition narrows the extension to exclude those mechanical pencils using other types of advance mechanisms.</td>
<td></td>
</tr>
<tr>
<td><strong>corrected definition</strong></td>
<td>writing instrument composed of a barrel, a lead refill and a lead-advance mechanism</td>
</tr>
</tbody>
</table>

In adapting an existing definition to a specific subject field or context, care should be taken not to change the extension of the concept. A change to the extension leads to a new unit and a different concept. Similarly, changes to any of the essential characteristics in a definition result in a new concept.

A particular context rarely refers to all the objects making up the extension of a concept. Definitions in laws and regulations tend to be interpretive rather than defining. Definitions in International Standards should be defining rather than interpretive. If a concept is restricted to a particular interpretation for a given text, it shall be explained in the body of the International Standard rather than by creating a new concept with a narrower extension. If specification information is associated with the concept, then this should be given in an appropriate specification clause rather than in a definition.

EXAMPLE 34

<table>
<thead>
<tr>
<th></th>
<th>organization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>too narrow</strong></td>
<td>for the purposes of this regulation, bodies not operating for profit</td>
</tr>
<tr>
<td>This definition of ‘organization’ does not define the concept ‘organization’ but merely signals how to interpret the concept in a given context. From all the objects that make up extension of the concept ‘organization’, this context considers only those not operating for profit.</td>
<td></td>
</tr>
</tbody>
</table>

Designations for parts whose extension extends beyond the partitive relation under study are not to be defined narrowly in terms of the comprehensive concept.

EXAMPLE 35

<table>
<thead>
<tr>
<th></th>
<th>eraser</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>too narrow</strong></td>
<td>(pencil) rubber part found at the end of pencils and used to rub out pencil marks</td>
</tr>
<tr>
<td>The definition of the concept ‘eraser’ should not be written in terms of pencils, even though erasers are often found at the end of pencils.</td>
<td></td>
</tr>
</tbody>
</table>
An extensional definition must list all the subordinate concepts corresponding to objects in the extension. Open-ended formulations (such as, for example, the following items, etc.) are not acceptable. Incomplete lists may be given in a note to the definition.

**EXAMPLE 36**

<table>
<thead>
<tr>
<th>Complete</th>
<th>coniferous tree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>incomplete</strong></td>
<td>conifer such as cedars, cypresses, firs, larches, pines, etc.</td>
</tr>
<tr>
<td><strong>(open-ended formulation)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>extensional definition</strong></td>
<td>coniferous tree</td>
</tr>
<tr>
<td><strong>(not all concepts listed)</strong></td>
<td>juniper, larch, fir, cedar, cypress, redwood or pine</td>
</tr>
<tr>
<td><strong>corrected definition</strong></td>
<td>tree with needle-like leaves and exposed or naked seeds</td>
</tr>
</tbody>
</table>

**NOTE** Familiar representatives of conifers are cedars, yews, firs, junipers, larches, redwoods and pines.

### 6.4.3 Negative definitions

A definition shall describe what a concept is, not what it is not.

**EXAMPLE 37**

<table>
<thead>
<tr>
<th>Complete</th>
<th>deciduous tree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>inappropriate negative definition</strong></td>
<td>tree other than an evergreen tree</td>
</tr>
<tr>
<td><strong>corrected definition</strong></td>
<td>tree that loses its foliage seasonally</td>
</tr>
</tbody>
</table>

However, when the absence or non-existence of a characteristic is essential to the understanding of a concept, a negative definition may be required.

**EXAMPLE 38**

<table>
<thead>
<tr>
<th>Complete</th>
<th>nonconformity</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-fulfilment of a specified requirement</td>
<td></td>
</tr>
</tbody>
</table>

### 6.5 Notes

All secondary and extra information on a concept and its designations shall be given in a note that complements the definition. A note shall be clearly distinguished from the definition, for example, by its typography or indentation (see ISO 10241 for layout).

Notes may include non-essential characteristics or optional parts often associated with the concept, typical elements that make up the extension of the concept, or explanatory information that complements the definition but is not essential for understanding the concept. See examples 18 and 36.
6.6 Graphic representations

Graphic representations of a concept may be used to complement a definition. A graphic representation serves its purpose well if it illustrates the characteristics of a given concept and/or its relations to other concepts.

There are various types of graphic representations.

- Iconic illustrations:
  - drawings, etchings, etc.,
  - photographs;
- Abstract illustrations:
  - network diagrams,
  - matrix diagrams,
  - schematic diagrams;
- Statistical diagrams:
  - line charts,
  - bar charts,
  - pie charts, etc.;
- Mixed figures, which combine two or more forms.

Iconic illustrations present images of objects that may be unfamiliar, such as a photograph or drawing of an exotic plant. They are especially useful in complementing partitive definitions since they show the relationship between the whole and its parts (e.g., an industrial machine and its parts).

However, it is necessary not to confuse the concept and the object selected to illustrate the concept. A graphic representation is but a depiction of only one object among all the other objects that make up the extension of the concept.

EXAMPLE 39

This picture of a fir tree could be used to illustrate the concept tree. However, it must be noted that this is merely an illustration of the object, not the object itself. Furthermore, one must not confuse the specific tree illustrated with the concept tree whose extension includes other objects such as deciduous trees, palm trees, etc.

More abstract illustrations such as diagrams, schematics or statistical data are also graphic representations. They provide a means of visualizing a complex concept that may be difficult to grasp from textual descriptions alone.
EXAMPLE 40

— functional diagrams for machines;
— computer flow charts;
— functional diagrams used in neural anatomy.

7 Designations

7.1 Types of designations

The designation acts as a synthesis of the definition. A designation is a representation of a concept by linguistic or non-linguistic means. For the purposes of this International Standard, designations are categorized as

— terms designating general concepts;
— appellations designating individual concepts, and
— symbols designating both individual and general concepts.

It should be noted that not all symbols are designations.

7.2 Terms

7.2.1 Term-concept relations

A term is a designation consisting of one or more words representing a general concept in a special language. A simple term contains only one root while a term containing two or more roots is called a complex term.

A term has to be accepted and used by subject specialists. A new term created to designate a concept is a type of neologism and is called a neoterm. Although most neoterms designate new concepts, some designate established concepts.

Ideally, the objective of term-concept assignment in a given special language is to ensure that a given term is attributed to only one concept and a given concept is represented by only one term, a condition called monosemy. This condition reduces ambiguity while homonymy and synonymy can lead to ambiguity.

7.2.2 Monosemy

Monosemy is the relation between designations and concepts in which one designation represents only one concept. Designations in such a relation are called monosemes.

7.2.3 Homonymy

Homonymy involves the relation between designations and concepts in which designations in a given language have identical forms, either phonetic or written, but designate different and unrelated concepts.

Terms that are phonetically identical but written differently are called homophones, while homographs have identical written forms but are pronounced differently. Full homonyms are both written and pronounced the same way.
EXAMPLE 41

<table>
<thead>
<tr>
<th>homophones</th>
<th>sun – son</th>
</tr>
</thead>
<tbody>
<tr>
<td>homographs</td>
<td>tear (weeping) – tear (separating)</td>
</tr>
<tr>
<td>full homonyms</td>
<td>bloom (efflorescence) – bloom (type of ingot)</td>
</tr>
</tbody>
</table>

7.2.4 Synonymy

Synonymy is the relation between differing designations that designate the same concept, i.e., having the same intension, in a given language. Designations in a synonymous relation are called synonyms. Given the same level of language, synonyms are interchangeable. If two or more terms are attributed to concepts whose intensions are almost identical, they are called quasi-synonyms and are interchangeable only in some contexts.

EXAMPLE 42

<table>
<thead>
<tr>
<th>synonyms</th>
<th>term bank = terminological data bank</th>
</tr>
</thead>
<tbody>
<tr>
<td>quasi-synonyms</td>
<td>dashboard = instrument panel</td>
</tr>
</tbody>
</table>

7.3 Term formation

7.3.1 Principles for term formation

Since term formation patterns depend on the lexical, morphosyntactic, and phonological structures of individual languages, language-specific principles of term formation shall be described in national and regional standards dealing with a particular language rather than in International Standards. See annex A for examples of term formation methods applicable to the English language.

For a standardized terminology, it is desirable that a term be attributed to a single concept. Before creating a new term, it is required to ascertain whether a term already exists for the concept in question. Well-established usage has to be respected. Established and widely used designations, even if they are poorly formed or poorly motivated, should not be changed unless there are compelling reasons. If several designations exist for a single concept, the one that satisfies the largest number of principles listed below should be selected.

The following principles, even though they are not all applicable for any one term, can provide assistance when creating new terms or systematizing existing terminologies.

7.3.2 Transparency

A term is considered transparent when the concept it designates can be inferred, at least partially, without a definition. In other words, its meaning is visible in its morphology. To make a term transparent, a key characteristic, usually a delimiting characteristic, is used in the creation of the term itself.

It is advisable that only essential or delimiting characteristics not likely to change quickly as a result of technological evolution be used. Otherwise, one may be faced with the task of renaming the concept as soon as the technology changes.
EXAMPLE 43

1. torque wrench vs. monkey wrench
The term torque wrench (wrench used to measure torque, usually when tightening a nut or bolt component of an assembly) is transparent while the term monkey wrench (wrench named after its inventor, Möncke) is opaque (not transparent).

2. thermal noise vs. Johnson noise
Similarly, the term thermal noise is more transparent than and therefore preferred over the term Johnson noise.

3. chalk board vs. blackboard
The once transparent term blackboard has been replaced by another transparent term chalk board. With the introduction of green surfaces and white boards for markers, the complexity of the concept system increased. It is no longer clear whether the concept ‘blackboard’ includes these green surfaces and how it is related to marker boards. The term chalk board is now more transparent.

7.3.3 Consistency
The terminology of any subject field should not be an arbitrary and random collection of terms, but rather a coherent terminological system corresponding to the concept system. Existing terms and new terms must integrate into and be consistent with the concept system.

EXAMPLE 44

synthetic fabrics: nylon, orlon, dacron, rayon, ... etc.

Any designation for a new synthetic fabric should be consistent (end in “on”) and respect the pattern arising from the concept system.

7.3.4 Appropriateness
Proposed terms should adhere to familiar, established patterns of meaning within a language community. Term formations that cause confusion shall be avoided.

EXAMPLE 45

The term atomic energy is confusing and misleading because it suggests that the energy or power is created from the atom. A more scientifically precise and appropriate term is nuclear energy.

Terms shall be as neutral as possible. They should avoid connotations, especially negative ones.

EXAMPLE 46

The term genetic manipulation was replaced with a more appropriate designation, genetic engineering, a term without the negative connotations of the word manipulation.

7.3.5 Linguistic economy
A term shall be as concise as possible. Undue length is a serious shortcoming. It violates the principle of linguistic economy and it frequently leads to ellipsis (omission).

EXAMPLE 47

term bank instead of terminological data bank
The requirement for conciseness often conflicts with that for accuracy. The greater the number of characteristics included in a term, the greater the precision and transparency of the term. However, increasing the number of characteristics often makes a term too long and inconvenient to use. Practicality should govern any decision to give preference to one pattern of term formation over another. For instance, shortened forms should be favoured whenever a long, precise term is not suitable (e.g., oral communication in a factory). In contrast, complex terms, even made up of five or six words, are acceptable in scientific publications.

7.3.6 Derivability

Productive term formations that allow derivatives (according to whatever conventions prevail in an individual language) should be favoured.

**EXAMPLE 48**

<table>
<thead>
<tr>
<th>herb vs. medicinal plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>The <em>term</em> herb with its derived <em>terms</em> herbaceous, herbal, herbalist and herby is preferred over medicinal plant which produces no derivatives.</td>
</tr>
</tbody>
</table>

7.3.7 Linguistic correctness

A term shall conform to the morphological, morphosyntactic and phonological norms of the language in question.

7.3.8 Preference for native language

Even though borrowing from other languages is an accepted form of term creation, native language expressions should be given preference over direct loans.

7.4 Appellations

An appellation designates an individual concept, that is, a concept whose extension is made up of a single object. In terminology, the focus is placed on the names of individual concepts representing objects which are members of a set but manifest a certain individuality rather than names designating individuals as individuals (e.g., Mary, Tom). In a generic concept system, they occupy the very bottom level of the hierarchy.

**EXAMPLE 49**

| The House of Commons, Ministry of Agriculture | — specific political institutions or units |
| United Nations, The Liver Foundation | — specific organizations |
| Distinguished Service Cross, Nobel Peace Prize | — specific awards |
| Haley’s Comet, Saturn | — specific scientific phenomena |
| Tylenol, Nike, Kleenex | — specific brand names |

The formation of appellations should follow the principles and formation processes used for terms.

7.5 Symbols

Symbols are an important aid to international communication because their visual representation of concepts functions independently of any given language. They can communicate information directly under difficult circumstances (e.g., traffic signs).

Iconic symbols should bear some visual resemblance to the concept they represent. Generally their meaning should be directly apparent without explanation. In some cases, however, the visual resemblance of the symbol is
Terms using the letters of the alphabet as iconic symbols to communicate the shape of the letter itself rather than its sound shall not be considered a symbol (see example 50).

**EXAMPLE 50**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U-turn</td>
<td>a turn in the shape of a U</td>
</tr>
<tr>
<td>I-beam</td>
<td>a steel beam in the shape of an I</td>
</tr>
</tbody>
</table>

Characters that replace words or parts of words, such as mathematical symbols or currency symbols, are considered symbols.

**EXAMPLE 51**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>§, $, £, &amp;, %, #, =, &lt;, –</td>
<td></td>
</tr>
</tbody>
</table>

It should be noted that the designations of SI units are considered symbols rather than abbreviations since they do not vary from language to language, have no plural and are never written with periods or full stops, except for normal punctuation.

**EXAMPLE 52**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>l</td>
<td>litre</td>
</tr>
</tbody>
</table>

Alphanumeric codes made up of combinations of letters, numbers or both are considered symbols, if they do not represent words in a natural language or abbreviated forms (see A.2.3 in informative annex A).

**EXAMPLE 53**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₂H₅OH</td>
<td>(chemical compound ethyl alcohol)</td>
</tr>
<tr>
<td>A4</td>
<td>(paper format, 210 mm × 297 mm)</td>
</tr>
</tbody>
</table>

A symbol should be

— simple and easy to recognize and, if possible, self-explanatory,
— monosemic in a specific context,
— unambiguous,
— easy and economical to reproduce, and
— consistent and appropriate, i.e., designed to permit coordination with and differentiation from other related symbols.
EXAMPLE 54

1. Symbols used to designate sports activities at the Olympics

2. The Möbius Loop used in the field of environment to designate recyclability

8 Standardization of terminologies

8.1 Deprecation of terms

Standardized terminologies shall reflect a coherent terminological system that corresponds to the concept system of the field in question. The terminology defined in an International Standard is to be precise and lead to increased clarity in communication.

One primary function of a standardized terminology shall be to indicate preferred, admitted and deprecated terms. A term recommended by a technical committee shall be considered a preferred term whereas an admitted term shall represent an acceptable synonym to a preferred term. Deprecated terms are terms that have been rejected.

Terms are rejected or deprecated for a number of reasons. A term may be a possible synonym for the preferred term but is deprecated in the interests of monosemy. A term may be flawed or inaccurate.

EXAMPLE 55

The term fireproof is misleading and inaccurate; the terms fire resistant or fire retardant are more precise.

The term prebake resistance is not necessarily false, but it is deprecated in favour of precure heat tolerance, a more precise term.

A term may be reserved for use in conjunction with another concept.

EXAMPLE 56

The term load is deprecated as a synonym for the term force, but is used to represent the related concept ‘application of a force’.

The inclusion of a designation in a terminology standard shall constitute an implicit deprecation of other designations that may be used as synonyms in the subject field. It is wise to consider these terms and to identify them explicitly as admitted or deprecated terms and to explain the reasons for deprecation if at all possible.
8.2 Harmonization

The standardization of terminologies in various subject fields frequently leads to harmonization within a subject field, across subject fields and across languages. To reduce duplication and to reduce the high cost of terminology, efforts should be made to harmonize whenever minor differences exist (see ISO 860).

8.3 Transliteration and transcription

In the dissemination of standardized terminologies, it may be necessary to render a term written in one alphabet by means of a different alphabet. In such instances, the latest International Standards on transliteration or romanization shall be used (e.g. ISO 9, ISO 233, ISO 259, ISO 843, ISO 3602 and ISO 7098).

In the case of phonetic transcription, the International Phonetic Alphabet (IPA) of the International Phonetics Association shall be used.
Annex A
(informative)

Examples of term-formation methods

A.1 General

The examples found in this annex are based on the English language and are not intended to cover all the methods used for English term formation. For a more complete description of the various formation methods of the English language, reference works on word formation should be consulted.

Term-formation patterns depend on the lexical, morphosyntactic, and phonological structures of individual languages and recommendations cannot be given in an International Standard. For instance, each language has its own rules for the abbreviation process and language-specific conventions dictate whether a term will consist of a single lexical element, several morphological elements combined to form a single unit, several words arranged in a string, or a terminological phrase. Therefore, this annex should not be translated but adapted to the specific rules applicable to the language in question.

However, the following term-formation methods apply to the English language, and may also apply to other languages:

— creating new forms;
— using existing forms;
— translingual borrowing.

A.2 New forms

A new form is the creation of a new lexical entity that never existed before. Formation processes such as derivation, compounding or abbreviation can be used to create new forms for terms or appellations.

A.2.1 Derivation

The derivation process involves forming a new term by adding one or more morphological elements, or affixes, to a root or a word.

EXAMPLE A.1

<table>
<thead>
<tr>
<th>Form</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>phosphor + ous</td>
<td>phosphorous</td>
</tr>
<tr>
<td>co- + education + al</td>
<td>co-educational</td>
</tr>
<tr>
<td>de- + tox(in) + fi + -cation</td>
<td>detoxification</td>
</tr>
</tbody>
</table>
A.2.2 Compounding

Compounding involves combining existing words or word elements to create a new form that contains two or more roots but designates a single concept. Compounds may be complex terms, phrases or blends. The elements of the complex term or phrase may be joined by a hyphen or by fusing, or may not be joined at all. Blends result from fusing two or more words, after one or more of them have been clipped. The formation of blends uses a combination of two processes, compounding after clipping (see A.2.3).

When the combining of words involves an essential characteristic from the intension of the concept, the compound is considered a transparent term (see 7.3.2).

**EXAMPLE A.2**

| complex terms | (joined by hyphenation): composer-conductor, high-definition television |
| phrase | (joined by fusing): downsizing, outflow |
| blend | (not joined): member country, information highway |
| phrase | video-on-demand |
| blend | (back and front clipping) information + entertainment = infotainment |
| blend | (back and back clipping) cybernetics + organism = cyborg |
| blend | (back clipping only) cybernetics + space = cyberspace |
| blend | (back and front, back clipping) quasi- + stellar object = quasar |

A.2.3 Abbreviated forms

Excessive length makes some terms difficult to use. Shortening the word or words designating a concept can create new abbreviated forms. The original long term is called the full or expanded form.

Good writing practice dictates that both the full form of a term and the abbreviated form be indicated the first time a potentially unfamiliar abbreviated form is used in a text. In general, an abbreviated form should be easy to pronounce.

In English, the types of abbreviated forms are:

- short forms,
- clipped terms,
- abbreviations,
- initialisms, and
- acronyms.

A very long complex term or appellation can be reduced. The short form uses fewer words to designate the same concept (see example A.3).

A clipped term is formed by truncating the front, middle or back portion of a simple term. Both ends may also be truncated.

Abbreviations are created by omitting words and/or parts of a word making up a term. In some cases, the first letter of a word will suffice. In others, the first letters of short phrases are grouped together. Abbreviations usually end with a period (full stop).
Initialisms are abbreviations created by using the first letter (or sound) of each or some of the elements of a complex term or appellation. Initialisms are always pronounced letter by letter.

Acronyms are abbreviations created by combining initial letters or syllables from each or some of the elements of the full form. The new designation is pronounced syllabically like a word.

**EXAMPLE A.3**

<table>
<thead>
<tr>
<th>Full form</th>
<th>Abbreviated form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intergovernmental <strong>Group of Twenty-four</strong> on International Monetary Affairs</td>
<td><strong>short form:</strong></td>
</tr>
<tr>
<td>Group of Twenty-four</td>
<td><strong>clipped terms:</strong></td>
</tr>
<tr>
<td>parachute</td>
<td>chute</td>
</tr>
<tr>
<td>taxonomy</td>
<td>taxon</td>
</tr>
<tr>
<td>influenza</td>
<td>flu</td>
</tr>
<tr>
<td>prefabricated house</td>
<td>prefab</td>
</tr>
<tr>
<td><strong>abbreviations:</strong></td>
<td></td>
</tr>
<tr>
<td>page</td>
<td>p.</td>
</tr>
<tr>
<td>et cetera</td>
<td>etc.</td>
</tr>
<tr>
<td><strong>initialisms:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>United Nations</strong></td>
<td>U.N.</td>
</tr>
<tr>
<td><strong>ante meridian</strong></td>
<td>a.m.</td>
</tr>
<tr>
<td><strong>personal computer</strong></td>
<td>PC</td>
</tr>
<tr>
<td>United Nations <strong>Educational, Scientific and Cultural Organization</strong></td>
<td>UNESCO</td>
</tr>
<tr>
<td>disc <strong>operating system</strong></td>
<td>DOS</td>
</tr>
<tr>
<td>light <strong>amplification by stimulated emission of radiation</strong></td>
<td>laser</td>
</tr>
<tr>
<td><strong>surface active agent</strong></td>
<td>surfactant</td>
</tr>
</tbody>
</table>

Terms can be formed by any combination of formation processes.

**EXAMPLE A.4**

<table>
<thead>
<tr>
<th>CD-Rom technology</th>
<th>Compact Disk-Read only memory technology initialism + acronym + compounding</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARC</td>
<td>AIDS(Acquired Immune Deficiency Syndrome)-related complex acronym which includes an acronym</td>
</tr>
</tbody>
</table>

**A.3 Existing forms**

Existing forms can be used to create new terms by processes such as conversion, terminologization, semantic transfer and transdisciplinary borrowing. It should be borne in mind that using existing forms may lead to *homonymy*, and as a result lead to confusion and ambiguity. However, the use of existing terms in new combinations (e.g. compounding, derivation) can be useful in the creation of new forms.
A.3.1 Conversion

New terms can be created by changing the syntactic category (e.g., grammatical function) of existing forms.

EXAMPLE A.5

<table>
<thead>
<tr>
<th>Field</th>
<th>Old Form</th>
<th>New Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>in economics</td>
<td>output (noun)</td>
<td>to output (verb)</td>
</tr>
<tr>
<td>in mathematics</td>
<td>constant (adj.)</td>
<td>constant (noun)</td>
</tr>
<tr>
<td>in recycling</td>
<td>empty (adj.)</td>
<td>to empty (verb)</td>
</tr>
</tbody>
</table>

A.3.2 Terminologization

Terminologization is the process by which a general language word or expression is transformed into a term designating a concept in a special language.

EXAMPLE A.6

<table>
<thead>
<tr>
<th>General Language</th>
<th>Electrotechnical Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>circuit</td>
<td>line enclosing an area</td>
</tr>
<tr>
<td></td>
<td>arrangement of devices or media through which electric current can flow</td>
</tr>
</tbody>
</table>

A.3.3 Semantic transfer within a special language

Semantic transfer is the process whereby an existing term within a special language is used to designate another concept by logical extension: terms designating a concept corresponding to concrete objects can be extended to abstract objects, a part extended to the whole, a container extended to the substance contained, etc.

EXAMPLE A.7

<table>
<thead>
<tr>
<th>Term</th>
<th>Concrete:</th>
</tr>
</thead>
<tbody>
<tr>
<td>screen</td>
<td>the portion of a computer monitor on which information is displayed</td>
</tr>
<tr>
<td></td>
<td>the information displayed on a computer screen</td>
</tr>
</tbody>
</table>

A.3.4 Transdisciplinary borrowing

In transdisciplinary borrowing, also known as internal borrowing, a term from one subject field is borrowed and attributed to a new concept in another subject field within the same language. The characteristics that make up the intension of the concepts in the two fields are often comparable by analogy.

EXAMPLE A.8

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>virus</td>
<td>(medicine) infectious agent which causes diseases</td>
</tr>
<tr>
<td></td>
<td>(computer science) infectious agent causing computer malfunctions</td>
</tr>
</tbody>
</table>
A.4 Translingual borrowing

Existing terms or concepts in one language can be introduced into another language by borrowing, either by direct loan or loan translation.

A.4.1 Direct loan

Existing terms are frequently adopted from one language to another if there is no current term for the concept in the second language. The borrowed term may be pronounced, spelled, or inflected differently in the borrowing language.

EXAMPLE A.9

| de Raster | ⇒ | en raster (digitizer grid) |

A.4.2 Loan translation

Loan translation is the process whereby the morphological elements of a foreign term are translated to form a new term.

EXAMPLE A.10

| de Weltanschauung | ⇒ | en worldview |
Alphabetical index

A
abbreviated forms A.2.3, example A.3
abbreviated term A.2.3
abbreviation (process) A.2.3
abstract illustration 6.6
abstract object 4, 5
abstraction 5.1
acronym A.2.3, example A.3
admitted term 8.1
alphanumeric code 7.5
appellation 5.2, 7.4, example 53
appropriateness 7.3.4, example 45
artificial language 5.1
associative concept system 5.5.2, example 16
associative concept system 5.5.2, example 16
associative relations 5.4.3, example 15

B
blend A.2.2, example A.2
body language 5.1
boldfaced
designations Introduction: conventions and notation
borrowing transdisciplinary
borrowing A.3.4
translingual borrowing A.4
boxed text Introduction: conventions and notation
bracket diagram Introduction: conventions and notation, example 10, 12, 13

C
characteristic 5.3
circular definition 6.4.1, example 30, 31, 32
cognitive sciences Introduction
common characteristic 5.3.4, example 6
compound term 7.2.1
composing A.2.2, example A.2
comprehensive concept 5.4.2.3, example 10
concept 5
comprehensive concept 5.4.2.3
collection formation 5.5.1
concept relations 5.4
concept representation 5.1
coordinate concept 5.4.2.1, 5.4.2.2, 5.4.2.3, example 5, 8
generic concept 5.2, 7.2.1
generic concept 5.4.2.2
individual concept 5.2, 7.4
partitive concept 5.4.2.3
related concept 5.4.1
specific concept 5.4.2.2
subordinate concept 5.4.2.1, 5.4.2.2, 5.4.2.3
superordinate concept 5.4.2.1, 5.4.2.2, 5.4.2.3
concept field 5.4.1, example 4
concept formation 5.5.1
concept relations 5.4
associative relation 5.4.3, example 15, 16, 17
generic relation 5.4.2.2, 5.4.2.3, example 5, 7, 8, 9, 17
hierarchical relations 5.4.2.3
partitive relations 5.4.2.3
types of concept relations 5.4.1
concept system 5.5
associative concept system 5.5.2, example 16
diagramming 6.6
formal representation Introduction: conventions and notation
generic concept system 5.5.2, example 5, 7, 8, 9
graphic representation Introduction: conventions and notation
hierarchical concept systems 5.5.2, example 5, 7, 8, 9, 10, 12, 13, 14
mixed concept system 5.5.2, example 17
modelling 5.6
monodimensional concept system example 5, 7, 10
multidimensional concept system example 8, 13
multidimensional generic concept system 5.4.2.2, example 8
multidimensional partitive concept system 5.4.2.3, 5.5.2, example 13
nature of concept systems 5.5.1
partitive concept system 5.5.2, example 12, 14
conceptualization 5.5.1
conciseness (of definition) 6.3.3
concrete object 4, 5
consistency (of terms) 7.3.3, example 44
conventions used Introduction: conventions and notation
correction A.3.1, example A.5
coordinate concept 5.4.2.1, 5.4.2.2, 5.4.2.3, example 5, 8

D
definition 6
circular definition 6.4.1, example 30, 31, 32
consciseness 6.3.3
deficient definition 6.4
definition writing 6.3
extensional definition 6.4.2
hidden definition 6.3.3, example 26
incomplete definition 6.4.2, example 33, 34, 35, 36
intensional definition 6.2.1, example 18, 19, 20, 21
interpretive definition 6.4.2, example 34
negative definition 6.4.3, example 37, 38
principle of substitution 6.3.5
principles for definition writing 6.3.1
substitution principle 6.3.5
subject field 6.3.4, example 28, 29
systemic nature 6.3.2
types of definitions 6.2
writing definitions 6.3
deficient definitions 6.4
delimiting characteristic 5.3.4, 5.4.2.2, example 6
deprecation of terms 8.1
derivability 7.3.6
derivation A.2.1, example A.1
S

semantic transfer A.3.3, example A.7
simple term 7.2.1
short form A.2.3, example A.3
sign language 5.1
single quote Introduction: conventions and notation
special language Introduction, 5.1, 5.2, 7.2.1
standardization 8
statistical diagram 6.6
subject field 5.1, 5.3.1, 5.3.3, 5.5.1, 5.6, 6.3.4, 8.1, 8.2, A.3.4
subordinate concept 5.4.2.2, 5.4.2.3
superordinate concept 5.4.2.1, 5.4.2.2, 5.4.2.3
symbol 5.2, 7.1, 7.5, example 51, 52, 53, 54
alphanumeric code 7.5, example 53
iconic symbol 7.5
synonym 7.2.4, example 42
synonymy 7.2.4, example 42
system coherence 5.5
systematic nature of definitions 5.5.2, example 17

T

term 7.2
admitted term 8.1
appropriateness 7.3.4, example 45, 46
consistency 7.3.3, example 44
deprecated term 8.1, example 55, 56
derivability 7.3.6, example 48
linguistic correctness 7.3.7
linguistic economy 7.3.5, example 47
preference for native language 7.3.8
preferred term 8.1
rejected term 8.1
term formation 7.3, annex A
term-concept relations 7.2.1
transparency 7.3.2, example 43
term-concept relations 7.2.1
term formation 7.3, annex A
abbreviated forms A.2.3, example A.3
abbreviation A.2.3
acronym A.2.3, example A.3
affixation A.2.1, example A.1
blend A.2.2, example A.2
clipping A.2.2, A.2.3, example A.2, A.3
complex term 7.2.1, A.2.2, example A.2
compounding A.2.2, example A.2
conversion A.3.1, example A.5
derivation A.2.1, example A.1
direct loan A.4.1, example A.9
existing form A.3
full form A.2.3, example A.3
initialism A.2.3, example A.10
new forms A.2
phrase A.2.2, example A.2
principles 7.3.1
semantic transfer A.2.3, example A.7
short form A.2.3, example A.3
terminologization A.3.2, example A.6
transdisciplinary borrowing A.3.4, example A.8
translational borrowing A.4
terminological analysis 5.1
terminological entry 6.3.1
terminologization A.3.2, example A.6
terminological entry 8.3
terminology
management
terminology
Introduction
principles and methods
Introduction
standardized terminology 8
terminology work Introduction
terminography Introduction
transcription 8.3
transdisciplinary borrowing A.3.4, example A.8
transfer of knowledge Introduction
translational borrowing A.4
transliteration 8.3
transparency of terms 7.3.2, example 43
tree diagram Introduction: conventions and notation
types of characteristics 5.3
types of definitions 6.1

U

underlined words Introduction: conventions and notation
unit of thought 5.1

V

vertical series (of concepts) 5.4.2.2, 5.4.2.3

W

whole 5.4.2.3
writing definitions 6.3