
**Management of terminology
resources — TBX-compliant
representation of concept relations
and subject fields**

*Gestion des ressources terminologiques — Représentation des
relations conceptuelles et des domaines conforme à TBX*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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

This document was prepared by Technical Committee ISO/TC 37, *Language and terminology*, Subcommittee SC 3, *Management of terminology resources*.

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

Introduction

This document describes best practices for specifying subject fields and concept relations in terminology databases (termbases). It also demonstrates how to represent subject fields and concept relations in terminological document instances in a way that is compliant with ISO 30042.

Concept relations for specific TBX dialects are specified in the form of dedicated TBX modules. Subject fields can be declared in the TBX backmatter or implemented through an XML namespace. This document is intended to maximize interoperability of these types of information.

Throughout this document, reference is made to data categories (DCs). To maximize interoperability, it is essential that termbases use the same DCs, as described in this document, for the same purposes. DatCatInfo^[2] is a publicly available electronic repository of data category specifications. Data categories used in the examples in this document are taken from DatCatInfo.

This document complements ISO 30042.

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Management of terminology resources — TBX-compliant representation of concept relations and subject fields

1 Scope

This document provides requirements and recommendations for representing subject fields and concept relations in TBX-compliant terminological document instances. Examples in this document utilize the DCA style of TBX markup.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1087, *Terminology work and terminology science — Vocabulary*

ISO 12620-1¹⁾, *Management of terminology resources — Data categories — Part 1: Specifications*

ISO 12620-2²⁾, *Management of terminology resources — Data categories — Part 2: Repositories*

ISO 30042, *Management of terminology resources — TermBase eXchange (TBX)*

W3C, *SKOS Simple Knowledge Organization System Reference*, W3C Recommendation 18 August 2009. Available at: <https://www.w3.org/TR/skos-reference/>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1087, ISO 12620-1, ISO 12620-2, ISO 30042 and the following apply:

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

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

3.1

concept relation

relation between concepts

[SOURCE: ISO 1087:2019, 3.2.11]

3.2

hierarchical relation

hierarchical concept relation

generic relation (3.3) or *partitive relation* (3.4)

[SOURCE: ISO 1087:2019, 3.2.12]

1) Under preparation. Stage at the time of publication: ISO/DIS 12620-1:2021.

2) Under preparation. Stage at the time of publication: ISO/DIS 12620-2:2021.

3.3

generic relation

generic concept relation

genus-species relation

concept relation (3.1) between a generic concept and a specific concept where the intension of the specific concept includes the intension of the generic concept plus at least one additional delimiting characteristic

[SOURCE: ISO 1087:2019, 3.2.13, modified — Example and Notes to entry omitted.]

3.4

partitive relation

partitive concept relation

part-whole relation

part-of relation

concept relation (3.1) between a comprehensive concept and a partitive concept

[SOURCE: ISO 1087:2019, 3.2.14, modified — Example omitted.]

3.5

associative relation

associative concept relation

pragmatic relation

non-hierarchical *concept relation* (3.1)

[SOURCE: ISO 1087:2019, 3.2.23, modified — Example omitted.]

3.6

concept entry

terminological entry

part of a terminological data collection which contains the terminological data related to one concept

[SOURCE: ISO 30042:2019, 3.5, modified — Term “entry” omitted.]

3.7

data category

DC

class of data items that are closely related from a formal or semantic point of view

EXAMPLE /part of speech/, /subject field/, /definition/.

Note 1 to entry: A data category can be viewed as a generalization of the notion of a field in a database.

Note 2 to entry: In running text, such as in this document, data categories are enclosed in forward slashes (e.g. /part of speech/).

[SOURCE: ISO 30042:2019, 3.8]

3.8

picklist

list of permissible values of a closed *data category* (3.7)

3.9

subject field

domain

field of special knowledge

[SOURCE: ISO 10241-1:2011, 3.3.1, modified — “subject field” is the preferred term, and Notes to entry omitted.]

3.10**subject-field classification**

organization of the *subject fields* (3.9) and subfields dealt with in a *terminological data collection* (3.12) into a logical structure

3.11**termbase**

terminology database

database comprising a *terminological data collection* (3.12)

[SOURCE: ISO 30042:2019, 3.28]

3.12**terminological data collection**

resource consisting of *concept entries* (3.6) with associated metadata and documentary information

EXAMPLE A TBX document instance.

[SOURCE: ISO 30042:2019, 3.29, modified — Admitted term “TDC” omitted, and example “ISO 1087” omitted.]

4 Subject fields**4.1 General**

Terminology databases (termbases), particularly large ones, frequently need to be organized according to subject fields. In this case, there may be a /subject field/ data category at the concept level (this is implemented as a <descrip> element).

A picklist shall be used as the content model for subject fields. If the organization in question has a taxonomy that reflects its field of activity, the subject-field classification should reflect that taxonomy if appropriate.

Subject-field classifications can be declared in the backmatter of a TBX document instance, or through an XML namespace. In this document, the backmatter approach is described. The XML namespace approach requires a DCT style of TBX markup and can be modelled in parallel to the backmatter method.

A given TBX document instance can use more than one subject-field classification.

4.2 Specifying the name of the subject-field classification

The name of the subject-field classification used in a TBX document instance shall be declared in the TBX header.

EXAMPLE 1

```
<tbxHeader>
  <fileDesc>
    <sourceDesc>
      <p type="source">Termbase from ABC company</p>
      <p type="subjectFieldClass" id="ABC-Class">ABC Subject-Field Classification</p>
    </sourceDesc>
  </fileDesc>
</tbxHeader>
```

Additional information about the subject field shall be provided in the backmatter, as described in subsequent sections of this document. For this purpose, the *id* attribute acts as a unique pointer to the relevant section in the backmatter.

When more than one subject-field classification is used in a TBX document instance, the additional name declaration shall be provided.

EXAMPLE 2

```
<tbxHeader>
  <fileDesc>
    <sourceDesc>
      <p type="source">Termbase from ABC company</p>
      <p type="subjectFieldClass" id="ABC-Class">ABC Subject-Field Classification</p>
      <p type="subjectFieldClass" id="DEF-Class">DEF Subject-Field Classification</p>
    </sourceDesc>
  </fileDesc>
</tbxHeader>
```

If the additional subject-field classification is a result of the merging of two termbases, the name of the termbase may also be provided.

EXAMPLE 3

```
<tbxHeader>
  <fileDesc>
    <sourceDesc>
      <p type="source">Termbase from ABC company</p>
      <p type="subjectFieldClass" id="ABC-Class">ABC Subject-Field Classification</p>
      <p type="source">Termbase from DEF company</p>
      <p type="subjectFieldClass" id="DEF-Class">DEF Subject-Field Classification</p>
    </sourceDesc>
  </fileDesc>
</tbxHeader>
```

4.3 Defining the scope of subject-field values

Terminologists and other users of termbases often find it difficult to determine which subject field a concept should be assigned to. This is largely because historically the scope and meaning of subject fields themselves have not been defined for the users. Therefore, it is recommended that a clear description of the scope of each subject field be available to users of the termbase. In this document, a method is described for recording this information in the backmatter of a TBX document instance.

Some termbases use a publicly available subject-field classification, such as EuroVoc^[3] or Lench^[4]. These sources provide descriptions of the scope and meaning of their subject fields, and therefore, it is recommended to avoid duplicating this information in a termbase.

Termbases that adopt a unique subject-field classification should include information about the scope of the subject-field values in the backmatter of the TBX document instance.

In all cases, the subject-field description should be available or known to termbase users when they are assigning a subject-field value to a terminological entry. [Figure 1](#) shows an example of a subject-field description from an existing termbase.

Subject field

- Start date: 2010-01-08
- End date:
- Number of occurrences: 2845
- Allow single language module: No
- Created by: user_131216
- Creation date: 2010-01-08 11:25:36
- Last modified by: user_8217
- Last modified date: 2012-09-14 11:56:20
- Code: BCO
- Notes:
 - 2012-01-16 : Added synonyms and notes (user_131216).
 - 2012-02-14 : Modified synonyms and added definitions (user_131216).
 - 2012-09-14 : Modified SF descriptor in the definitions (user_8217).

Languages

- English
 - Descriptor: Aquaculture
 - Synonyms: aquiculture; aquafarming; fish breeding; fish culture; fish farming; fish husbandry; fish rearing; fish spawning; shellfish farming; shellfishery
 - Definition: Terms related to both seawater farming (mariculture or sea farming) and freshwater farming, i.e. the cultivation of marine or fresh water aquatic plants or animals. Includes breeding or raising fish (fishfarming or pisciculture) and various shellfish such as shrimp, crayfish, oysters, mussels, scallops and abalone. Can also include pearl farming (pearl culture), seaweed farming (algal culture or algoculture) and coral farming (coral culture or coral gardening). Note that names of species are classified in subject fields under Botany (SF) or Zoology (SG).
- French
 - Descriptor: Aquaculture
 - Synonyms: aquiculture; culture marine; pisciculture; thalassiculture
 - Definition: Comprend la terminologie de l'élevage et de la multiplication des animaux et des plantes aquatiques, à des fins commerciales. Ce domaine regroupe la terminologie liée non seulement à l'aquaculture marine (mariculture), mais à l'élevage en eau douce (potamoculture). Comprend l'élevage de poissons (pisciculture ou élevage piscicole) et de crustacés tels que les crevettes (pénéiculture ou crevetticulture) ou les écrevisses (astaciculture), et l'élevage des coquillages (conchyliculture), notamment la culture des moules (mytiliculture), des huîtres (ostréiculture), des pétoncles ou des coquilles Saint-Jacques (pectiniculture) et des ormeaux (haloticulture). Peut également comprendre la culture d'algues (algoculture ou phycoculture), et la culture des perles (perliculture) ou du corail (culture de coraux ou coralliculture).
Nota : Les noms d'espèces sont classés dans des domaines sous Botanique (SF) ou Zoologie (SG).
- Spanish
 - Descriptor: Acuicultura
 - Synonyms:
 - Definition:
- Portuguese
 - Descriptor: Aquicultura
 - Synonyms:
 - Definition:

Figure 1 — Sample description of a subject field**4.4 Hierarchy of subject fields**

Frequently it is not sufficient to have a simple list of subject-field values without any parent/child relationships (referred to as a “flat” list). For subsetting and search purposes, large termbases benefit from a multi-level hierarchy of subject fields. [Figure 2](#) shows a multi-level subject-field classification, with *Energy* having two subordinate levels, and *Environment and Natural Resources* having one subordinate level. [Figure 3](#) shows another example from the field of mining.

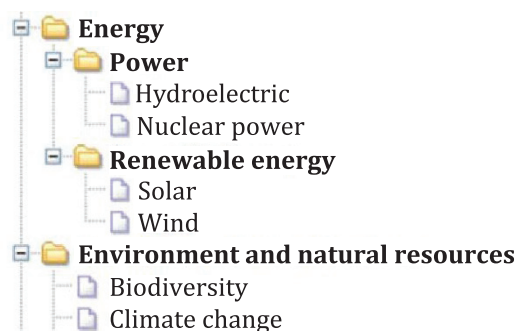


Figure 2 — Multi-level subject-field classification, sample 1

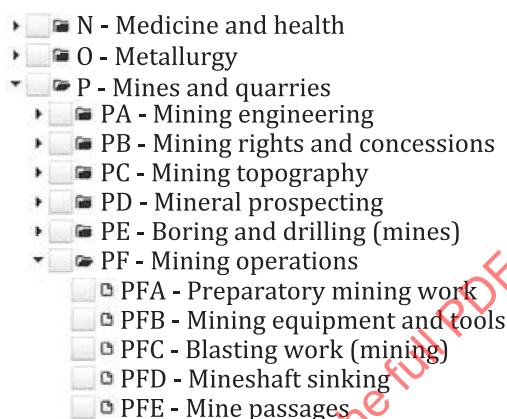


Figure 3 — Multi-level subject-field classification, sample 2

4.5 Representing subject-field values in concept entries

4.5.1 General

In a TBX document instance, the value of a subject field in a specific concept entry is indicated as the content of a `<descrip>` element with the "subjectField" type attribute value.

EXAMPLE 1

```
<descrip type="subjectField">Nuclear power</descrip>
```

If the TBX document instance features more than one subject-field classification, a `<descripGrp>` element can be used to indicate the relevant subject-field classification.

EXAMPLE 2

```
<descripGrp>
  <descrip type="subjectField">Nuclear power</descrip>
  <descrip type="subjectFieldClass">ABC-Class</descrip>
</descripGrp>
```

However, except in cases where the subject-field classification comprises only one level, information about the position of the subject-field value within the overall hierarchy is also required.

The position of a subject field in a multi-level hierarchy, such as the one represented by *Energy > Power > Nuclear power* from [Figure 2](#), can be represented in concept entries in two ways: (1) by referencing its position in the backmatter, where the full subject-field classification is described, or (2) by indicating its position in the concept entry itself.

4.5.2 Referencing the backmatter

The full hierarchy of the entire subject-field classification can be defined once in the backmatter of a TBX document instance by using unique identifiers to link the levels (see [Clause 5](#)). In this case, a concept entry need only specify, for example, *Nuclear power*. The position of this value in the hierarchy can be determined by consulting the backmatter (the content of the `<back>` element). With this method, the entire hierarchy need only be defined once in the TBX document instance. However, the position of *Nuclear power* in the hierarchy is not visible in the TBX entry in the TBX document instance.

EXAMPLE

```
<descrip type="subjectField" id="ABC-Class-SF1-1-1">Nuclear power</descrip>
```

where ABC-Class identifies the subject-field classification in the backmatter, and SF1-1-1 points to the ID of the relevant value in that classification.

4.5.3 Expressing the position of the subject-field value in each entry

The position of each value in the hierarchy can be expressed each time the value occurs in a concept entry, by specifying the relevant section of the hierarchy. For instance, for the value *Nuclear power* shown in [Figure 2](#), Energy|Power|Nuclear power shall be specified in the entry. The advantage of this method is that readers of the TBX document instance can see the hierarchical position of this subject-field value in the entry itself. The disadvantage is data redundancy, since this information is repeated in all entries that contain that value.

The following TBX markup shall be used, including the pipe character (|) to separate the subject-field values, and adopting the order of highest to lowest in the hierarchy.

EXAMPLE

```
<descrip type="subjectField">Energy|Power|Nuclear power</descrip>
```

4.6 Using a publicly available subject-field classification

When a publicly available subject-field classification is adopted, such as Lench or EuroVoc, the name of the subject-field classification and a unique identifier shall be declared in the TBX header as described in [4.2](#).

EXAMPLE 1

```
<tbxHeader>
  <fileDesc>
    <sourceDesc>
      <p type="subjectFieldClass" id="EuroVoc">EuroVoc</p>
    </sourceDesc>
  </fileDesc>
</tbxHeader>
```

The fact that this is a public classification shall be indicated in the backmatter, as well as a URI pointing to the location of the public classification (see [Clause 5](#)).

In a concept entry, the subject-field value, taken from the public classification, is declared in a `<descrip>` element.

EXAMPLE 2

```
<descrip type="subjectField">taxation</descrip>
```

There is no need to indicate the position in the hierarchy, since this information is available from the public subject-field classification.

5 Representing subject-field classifications in the backmatter

In the backmatter, the list of subject-field classifications shall be provided in a `<refObjectSec>` element. Each subject-field classification is identified by the unique identifier that was used in the header. Information about whether the classification is private or public, and how many levels there are in the hierarchy, is provided in `<item>` elements. After the `<refObjectSec>` element, the full description of each subject-field classification shall be provided using SKOS RDF markup.

The following example shows sample markup in a TBX document instance that includes three different subject-field classifications. It is followed by a description of one of the subject-field classifications in SKOS markup. The use of `<skos:Concept>` in SKOS refers to the “subject field” in TBX, and the `<skos:definition>` allows for describing the scope of the subject field.

EXAMPLE 1

```
<back>
  <refObjectSec type="subjectFieldClass">
    <refObject id="ABC-Class">
      <itemSet>
        <item type="subjectFieldClassType">private</item>
        <item type="subjectFieldClassLevels">2</item>
      </itemSet>
    </refObject>
    <refObject id="DEF-Class">
      <itemSet>
        <item type="subjectFieldClassType">private</item>
        <item type="subjectFieldClassLevels">1</item>
      </itemSet>
    </refObject>
    <refObject id="EuroVoc">
      <itemSet>
        <item type="subjectFieldClassType">public</item>
        <item type="subjectFieldClassURI">https://eur-lex.europa.eu/browse/eurovoc.
html</item>
      </itemSet>
    </refObject>
  </refObjectSec>
</rdf:RDF>
<skos:ConceptScheme rdf:ID="ABC-Class">
  <skos:Concept rdf:ID="SF1">
    <skos:definition>The Energy subject field covers all forms of energy, both
renewable and non-renewable.</skos:definition>
    <skos:prefLabel xml:lang="en">Energy</skos:prefLabel>
    <skos:prefLabel xml:lang="fr">Énergie</skos:prefLabel>
    <skos:narrower rdf:resource="SF1-1">Power</skos:narrower>
    <skos:scopeNote>...</skos:scopeNote>
  </skos:Concept>
  <skos:Concept rdf:ID="SF1-1">
    <skos:definition>The Power subject field covers all forms of energy that
are non-renewable.</skos:definition>
    <skos:prefLabel xml:lang="en">Power</skos:prefLabel>
    <skos:prefLabel xml:lang="fr">Puissance</skos:prefLabel>
    <skos:narrower rdf:resource="SF1-1-1">Nuclear power</skos:narrower>
    <skos:broader rdf:resource="SF1">Energy</skos:broader>
    <skos:scopeNote>...</skos:scopeNote>
  </skos:Concept>
  <skos:Concept rdf:ID="SF1-1-1">
    <skos:definition>The Nuclear power subject field covers power that is
generated through the process of fission.</skos:definition>
    <skos:prefLabel xml:lang="en">Nuclear power</skos:prefLabel>
    <skos:prefLabel xml:lang="fr">Puissance nucléaire</skos:prefLabel>
    <skos:broader rdf:resource="SF1-1">Power</skos:broader>
    <skos:scopeNote>...</skos:scopeNote>
  </skos:Concept>
</skos:ConceptScheme>
<skos:ConceptScheme rdf:ID="DEF-Class">
...
</skos:ConceptScheme>
</rdf:RDF>
</back>
```

When RDF and SKOS markup is used, the appropriate namespace declaration shall be included in the root <tbx> element.

EXAMPLE 2

```
<tbx xml:lang="en" style="dca" type="TBX-dialect"
  xmlns="urn:iso:std:iso:30042:ed-2"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:skos="http://www.w3.org/2004/02/skos/core#">
```

6 Concept relations

6.1 Typology of concept relations

Concept relations reflect the links between concept entries. It is recommended that ISO 704 be used as a guideline for determining the types of concept relations in any termbase. Users may extend or subset this set of concept relations for their own purposes. The full typology of concept relations for the termbase in question shall be declared in a TBX module definition.

There are three types of concept relations: generic, partitive and associative. Concept relations can be hierarchical or non-hierarchical. Hierarchical relations reflect a superordinate or subordinate relation between the entry in question and another entry. They are generic relations and partitive relations.

Associative relations are non-hierarchical. An example of an associative relation is “school” and “learn”. ISO 704:—³⁾ includes a two-level typology of associative relations. The top level comprises the following types:

- contiguity;
- sequential;
- activity;
- origination;
- instrumental;
- interactional;
- transmission;
- opposite.

Each of these types is further divided into sub-types. For example, sequential relations include four sub-types: temporal, spatial, causal and developmental. For the full typology of associative relations, see [Annex A](#). Customized associative relations are also permitted. See [Annex B](#) for examples.

6.2 TBX markup

The TBX markup for concept relations as declared in this document utilizes the *descrip* element. The target concept is identified by the value of the *target* attribute, which is a unique concept identifier. The type and direction of the relation is indicated by using values of the *type* attribute, which indicate the nature of the target concept in relation to the source concept. For example:

- *genericConcept* – indicates that the target concept is the superordinate concept in a generic relation;
- *specificConcept* – indicates that the target concept is the subordinate concept in a generic relation;
- *comprehensiveConcept* – indicates that the target concept is the superordinate concept in a partitive relation;

3) Under preparation. Stage at the time of publication: ISO/DIS 704:2021.

- `partitiveConcept` – indicates that the target concept is the subordinate concept in a partitive relation;
- `associativeConcept` – indicates that the target concept is in an associative relation.

Associative concept relations can optionally have additional sub-types and/or roles (see [Annex A](#)). These are indicated using the `<descripNote>` element. See [Annex B](#) for examples.

In some termbases, subject fields are defined as concepts, with the use of an attribute to indicate that it is a subject-field concept. In this case, terminological concepts are associated to a subject-field concept via a relation.

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Annex A

(informative)

Typology of associative concept relations

The typology of associative concept relations in [Table A.1](#) is adopted from ISO 704:—⁴⁾.

Table A.1 — Typology of associative concept relations

Type (description)	Subtype (relation role)	Examples
contiguity relation (based on proximity between objects)	enhancement relation (tool – accessory)	smartphone – selfie stick
	attachment relation (tool – connection)	computer screen – HDMI port
	locative relation (container – contained; contained – contained)	milk carton – milk; fish – shellfish (with regard to sea)
	material relation (concrete item – material)	seawater – salt (one of several materials); steel tyre – steel (one material only)
	property relation (material – state)	air – humidity
	ownership relation (object – owner)	public enterprise – state
	rank relation (level of hierarchy – level of hierarchy)	chair – vice-chair
sequential relation (based on a criterion for ordering objects)	temporal relation (earlier occurrence – later occurrence)	production – consumption
	spatial relation (object in space – object in space)	floor – ceiling
	causal relation (cause – effect)	humidity – corrosion
	developmental relation (step of a process – step of a process)	tadpole – frog

⁴⁾ Under preparation. Stage at the time of publication: ISO/DIS 704:2021.