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ISO/TC 211 Secretariat
Norwegian Technology Centre
Oscars gate 20
P.O. Box 7072 Majorstuen
NO-0306 Oslo, Norway

Telephone: + 47 22 59 01 16
Telefax: + 47 22 59 01 29
E-mail: bjs@nts.no
URL: <http://www.isotc211.org/>

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

ISO 19104 was prepared by Technical Committee ISO/TC 211, *Geographic information/Geomatics*.

Introduction

This International Standard, along with an electronically processable register of GIS terminology, which may be implemented by a terminology repository, is expected to be a central reference for the shared language between participants and users alike. It defines the criteria for including concepts in the vocabulary, specifies the terminological data to be recorded, and within the electronically processable register introduces an initial set of concepts with definitions that will be subject to ongoing maintenance.

This International Standard illustrates the structure of entries and the types of terminological data that are to be recorded. In addition, it introduces an accurate, homogeneous and concise definition style that is in accordance to ISO 10241. The structure of a terminological record is given in Clause 7.

Geographic information — Terminology

1 Scope

This International Standard is applicable to international communication in the field of geographic information.

This International Standard provides the guidelines for collection and maintenance of terminology in the field of geographic information. It establishes criteria for selection of concepts to be included in other standards concerning geographic information, which are developed by ISO/TC 211, specifies the structure of the terminological record, and describes the principles for definition writing.

This International Standard also lays down the guidelines for maintenance of the Terminology Repository.

2 Conformance

Any product that claims conformance with this International Standard shall comply with the requirements described in the normative clauses.

Where a new term has been created for an existing concept, or an existing term has been incorrectly applied, the candidate document shall not be in conformance. Concepts and their definitions may be included with the candidate terms until conformance is demonstrated.

3 Normative references

The following referenced documents are indispensable for the application 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.

The content for the electronically processable registry of GIS terminology will include terms from the ISO geographic information standards. The registry will normatively reference the standards from which the terms are taken; therefore it is not necessary for this International Standard to have an explicit reference.

ISO 639-2:1998, *Codes for the representation of names of languages — Part 2: Alpha-3 code*

ISO 704:2000, *Terminology work — Principles and methods*

ISO 1087-1:2000, *Terminology work — Vocabulary — Part 1: Theory and application*

ISO 860:1996, *Terminology work — Harmonization of concepts and terms*

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 10241:1992, *International terminology standards — Preparation and layout*

ISO 19108:2002, *Geographic information — Temporal schema*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

- 4.1 abbreviation**
designation formed by omitting words or letters from a longer form and designating the same concept
[ISO 1087-1]
- 4.2 admitted term**
term rated according to the scale of the term acceptability rating as a synonym for a **preferred term**
[ISO 1087-1]
- 4.3 concept**
unit of knowledge created by a unique combination of characteristics
[ISO 1087-1]
- NOTE Concepts are not necessarily bound to particular languages. They are, however, influenced by the social or cultural background which often leads to different categorizations.
- 4.4 concept system**
set of **concepts** structured according to the relations among them
[ISO 1087-1]
- 4.5 concept harmonization**
activity for reducing or eliminating minor differences between two or more **concepts** which are already closely related to each other
[ISO 860:1996]
- 4.6 definition**
representation of a **concept** by a descriptive statement which serves to differentiate it from related **concepts**
[ISO1087-1]
- 4.7 deprecated term**
term rated according to the scale of the **term** acceptability rating as undesired
[ISO 1087-1]
- 4.8 language identifier**
information in a terminological entry which indicates the name of a language
[ISO 1087-1]

4.9**obsolete term**

term which is no longer in common use

[ISO 1087-1]

4.10**preferred term**

term rated according to the scale of the **term** acceptability rating as the primary **term** for a given **concept**

[ISO 1087-1]

4.11**term**

verbal designation of a general **concept** in specific subject field

[ISO 1087-1]

NOTE A term may contain symbols and can have variants, e.g. different forms of spelling.

4.12**term equivalent**

term in another language which designates the same **concept**

4.13**term instance classification**

classification identifying the status of a **term**

4.14**terminology repository**

place where **terms** are stored or may be found

4.15**terminological record**

structured collection of terminological data relevant to one **concept**

[ISO 1087]

4.16**terminological record identifier**

unique, unambiguous, and linguistically neutral identifier assigned to a **term**/definition

5 Abbreviated terms

CD committee draft

DIS draft International Standard

FDIS final draft International Standard

GIS Geographic Information System

IT information technology

PT project team

TC technical committee

TMG Terminology Maintenance Group

WD working draft

WG working group

6 Criteria for the selection of concepts

Any concept requiring a definition for the clarity of reading of any of the ISO/TC 211 Geographic information International Standards shall be included in that International Standard within the core list of entries stored (the terminology repository), subject to the following conditions:

- a) the term that represents the concept, is not a trade name, name of research project, or colloquial term (local informal term to describe a formal term e.g. "guy" instead of "man");
- b) the concept is not selected if its definition in general language dictionaries corresponds to its definition in the field of geographic information;
- c) only concepts with a single definition are included;
- d) concept is central to understanding the standard, used at least twice, and is not self-explanatory.

7 Structure of the terminological record

7.1 Record content

Provision shall be made for specifying language code and, if needed, country code for equivalents in other languages. The terminological record of an entry may contain the following terminological data fields, in the order listed below:

- a) entry number – a terminological record identifier;
- b) entry language identifier – the code representing natural language utilised for the terminological record based on ISO 639-2;
- c) preferred term;
- d) abbreviated term – if preferred, the abbreviated term shall precede the full form, otherwise an abbreviated form shall follow the full form;
- e) admitted term(s) – national variants shall be followed by a country code as defined in ISO 3166-2, numeric 3-digit code is used for the IT-interface (i.e. stored in the database), while the meaning of this code is presented in the human language used by the user (i.e. the human interface);
- f) definition – if taken from another normative document, a reference shall be added in square brackets after the definition; or, if referring to another concept in the vocabulary, then that concept shall be named by its preferred term and presented in bold face characters;
- g) deprecated or obsolete terms (in alphabetical order);
- h) references to related entries;
- i) examples of term usage;
- j) notes – may be used to provide additional information, (if a definition has been adapted from a source, this may be explained in a note);

- k) term instance classification (for on-line repository only);
- l) beginning date of the instance (for on-line repository only) (see ISO 19108);
- m) ending date of the instance (for on-line repository only) (see ISO 19108).

7.2 Mandatory data fields

The terminological record shall include at least the following data types from those defined in 7.1.

- a) entry number;
- b) preferred term;
- c) definition;
- d) beginning date of the instance;
- e) terminological data type.

7.3 Optional data fields

All data fields from 7.1 not listed in 7.2 are optional.

7.4 Term equivalents – other languages

Term equivalents shall be used to designate equivalents, in languages other than the definition language, of the preferred terms and admitted terms, or their abbreviated form. Term equivalents shall be preceded by:

- a) the numeric 3-digit country code as defined in ISO 3166-1 if needed;
- b) the Terminology alphabetic-3 digit language code as defined in ISO 639-2 (e.g. "fra" for French, "deu" for German);
- c) linguistically equivalent terms may be submitted by national bodies and class 'A' liaisons to the TMG for consideration.

Annex A (normative)

Principles for definition writing (ISO 704:2000)

A.1 Basic principles

For the purpose of creating the terminology standard, the following basic principles, based on ISO 10241, shall apply:

- A.1.1** standardized definitions shall be used whenever possible;
- A.1.2** definitions shall have the same grammatical form as the term; to define a verb, a verbal phrase shall be used; to define a singular noun, the singular shall be used;
- A.1.3** definitions shall not begin with expressions such as "term used to describe..." or "term denoting..." neither shall they take the form "term is..." or "term means...";
- A.1.4** definitions shall not be given in full-sentence form;
- A.1.5** definitions shall be lowercase, including the first letter, except for any uppercase letters required by the normal spelling of a word in running text;
- A.1.6** definitions shall not begin with an article;
- A.1.7** references to other entries in the vocabulary shall be indicated by using a preferred term defined elsewhere in the vocabulary;
- A.1.8** references to standardized definitions shall be presented within square brackets after the definition;
- A.1.9** where a standardized definition in another field has to be adapted, an explanation shall be given in a note.

A.2 Developing definitions

The following principles for developing definitions, taken from ISO 704, shall be used:

- A.2.1** definition shall describe a concept, not the words that make up a designation;
- A.2.2** 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;
- A.2.3** if a definition already exists, in a standard for example, it shall be adopted, as it stands, only if it reflects the concept system in question. Otherwise it shall be adapted;
- A.2.4** 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 super-ordinate concepts. When drafting a new definition, use shall be made of basic concepts or concepts defined elsewhere in the document as far as possible;

A.2.5 definition shall reflect the concept system describing the concept and its relations to others in the system. Definitions shall be co-ordinated 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;

A.2.6 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;

A.2.7 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;

A.2.8 definition should not contain characteristics that belong logically to super-ordinate or subordinate concepts;

A.2.9 extension and the characteristics reflected in a definition shall be appropriate to the concept system in a given subject field;

A.2.10 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;

A.2.11 substitution principle shall be used to test the validity of a definition. A definition is valid if it can replace a designation in the text without loss of, or change in, meaning;

A.2.12 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;

A.2.13 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;

A.2.14 definition shall describe the content of the concept precisely. It shall be neither too narrow nor too broad. Otherwise, the definition is considered incomplete. A definition shall describe what a concept is, not what it is not.

Annex B (normative)

Maintenance of terminology

B.1 Introduction

Amendments and additions to the ISO geographic information standards will inevitably necessitate amendments to the Terminology Repository. Maintenance mechanisms have been developed that will:

- Enable proposed terms (and their associated definitions) to be added to, or amended in, the Terminology Repository as required,
- Facilitate the assessment and harmonization of proposed terms prior to their parent draft standards becoming final.

B.2 Terminology Repository

B.2.1 Overview

A Terminology Repository shall be maintained for ISO geographic information standards.

The Terminology Repository shall take the form of an on-line computer database.

On-line read-only access will be available to all ISO/TC 211 members. Write and update access will be available to WG convenors, PT leaders and editors. The ISO/TC 211 Terminology Repository shall also be publicly available on the Internet with the restriction of maintenance being controlled by the TMG.

All terms (existing and proposed) occurring in ISO geographic information standards and drafts shall be included in the Terminology Repository.

B.2.2 Terminology entry and update

The relevant WG convenor or PT leader will be responsible for electronically submitting all terms from a new ISO geographic information standard WD (working draft), CD (committee draft), DIS (draft International Standard) or FDIS (final draft International Standard) to the Repository. The person responsible for entering the term shall also be responsible for entering the status of the term and also for entering related useful terms from outside ISO/TC 211.

All concepts, terms and definitions submitted to the Terminology Repository shall satisfy the criteria for the selection of concepts as specified in Clause 6.

All terminological records shall be structured as specified in Clause 7.

At the time of entry to the Repository:

- terms shall be classified as being Candidate, regardless of whether the same term is classified as being draft or harmonized elsewhere in the Repository.

B.2.3 Attribution and classification of terms

Every term in the Terminology Repository shall be accompanied by its parent document's ISO standard number (for example, ISO 19104) where applicable, the document type (for example, WD1 or CD3) and the date of entry. A term may also have classifiers indicating that it is to be deleted or requires harmonization.

Every term in the Terminology Repository shall have one of six classifications as follows:

- Candidate – newly entered term, or a term that is associated with multiple definitions and/or concepts.
- Draft – new or amended term that appears in a single draft ISO geographic information standard and that conforms to the 'one term, one definition, one concept' principle.
- Harmonized – term that appears in multiple ISO geographic information draft standards but for which the 'one term, one definition, one concept' principle has been negotiated by the relevant working groups.
- Normative – term that has already been published in an International Standard and does not conflict with the terms and definitions in the ISO geographic information standards.
- Normative/Conflict – term that has been published in more than one International Standard with different definitions in different standards.
- Deleted – term that has been identified for deletion from the repository.

These classifications will be assigned to a code list to be referred to as 'term instance classification' as illustrated in Table B.1.

Table B.1 — Term instance classification

Instance classification number	Classification description
001	Candidate
002	Draft
003	Harmonized
004	Normative
005	Normative/Conflict
006	Deleted

Progression of a term from Candidate to Draft to Harmonized status will depend on either:

- an assessment by the TMG (Terminology Maintenance Group), or;
- harmonization consultations between affected working groups.

Draft or Harmonized status indicates that significant stability has been achieved as regards the term and its definition. Progression to Normative status can only occur when a term is published in an International Standard.

B.2.4 Authority of the Terminology Repository

The Terminology Repository and its associated maintenance processes are not a substitute for normal ISO practices in relation to standards development. The Repository provides a summary for existing and proposed ISO/TC 211 terminology and helps facilitate harmonization where necessary. The Candidate, Draft

and Harmonized status classifications have no official meaning or authority beyond the Terminology Repository.

B.3 Terminology status review process

B.3.1 Terminology Maintenance Group

Assessment of Candidate terms shall be the responsibility of a terminology maintenance group.

The TMG shall comprise:

- a convenor,
- at least two members from each ISO/TC 211 working group (preferably representing different national bodies). Ideally there should be more than one language represented,
- additional members as necessary to ensure the representation of at least two languages, the inclusion of terminology expertise and the engagement of national bodies and liaisons.

Membership of the TMG shall be for a two-year term or for the balance of a two year term in the case of a working group that is established part-way through a term. Each term shall commence on 1st January of even-numbered years (2002, 2004, etc). Members of the TMG will be eligible for reappointment for further terms.

In the event of a working group being dissolved (for example, as a result of all its work items being completed), the representatives from the working group shall remain members of the TMG until all related terminology issues have been resolved. They will then withdraw.

In the event of all working groups being dissolved, the chair of ISO/TC 211, upon the completion of all related terminology work, shall suspend the TMG until such time as new work items are introduced.

B.3.2 Responsibilities

The Chair of ISO/TC 211 shall be responsible for ensuring the existence of the TMG and for nominating the convenor.

Each ISO/TC 211 working group leader shall be responsible for nominating representatives to the TMG and for advising the convenor of the availability of relevant new documents.

The convenor shall be responsible for the operation of the TMG.

The convenor shall be responsible for advising members of the TMG regarding the availability of new documents and for ensuring the update of the status of terms.

B.3.3 Assessment by TMG

B.3.3.1 Objective

The TMG shall review Candidate terms within two months of receipt. The objective of the review shall be to ensure that Candidate terms conform to the 'one term, one definition, one concept' criterion "(i.e. a one-to-one association between a term and a definition, and a one-to-one association between a definition and a concept) and do not conflict with existing terminology. Candidate terms that satisfy the criterion shall be nominated as Draft terms pending their publication in an International Standard. Candidate terms that do not satisfy the criterion shall retain their Candidate status and be referred for harmonization. The TMG will work on-line whenever possible and, when necessary, convene meetings in accordance with the ISO directives.

NOTE In instances where a Candidate term/definition conflicts with an existing Draft term/definition, the existing term/definition shall retain its status pending harmonization deliberations.

B.3.3.2 Candidate terms

The review process shall consider each Candidate term individually and shall proceed as follows.

- a) Perform Concept, Structure and Circularity Tests;
 - 1) determine if the criteria for the selection of concepts in Clause 6 have been satisfied;
 - 2) determine if the terminological record is currently structured in the parent document according to Clause 7;
 - 3) determine if the definition can be understood and is non-circular;
 - 4) terms from working drafts that fail to satisfy the above requirements will immediately be referred back to the appropriate working group for correction. Terms from committee drafts or later that fail to satisfy the above requirements will be referred back through appropriate national body comments.

- b) Perform the 'One Term, One Definition' Test;
 - 1) determine if there are other records for the same term in the Repository originating from other standards or earlier drafts of the standard in question. If yes, extract all definition records for the term from the Repository. If no, classify the term as having satisfied the 'One Term, One Definition' criterion but requiring 'One Term, One Concept' testing;
 - 2) if a record for the same item, originating from an earlier draft of the same standard, has been extracted from the Repository, determine if the definitions are identical. If yes, classify the earlier record for removal from the Repository. If no, retain the term's Candidate status and document the need for harmonization with other standards that have adopted the definition in the earlier draft;
 - 3) if other records for the same term, originating from other draft standards, have been extracted from the Repository, determine if all definitions are identical to those of the Candidate term. If yes, reclassify the Candidate term as Draft. If no, retain the term's Candidate status and document the need for harmonization;
 - 4) if other records for the same term, originating from published International Standards, have been extracted from the Repository, determine if all definitions are identical to those of the Candidate term. If yes, the term is already Normative. Ensure that cross-referencing is correct. If no, retain the term's Candidate status and document the need for harmonization.

- c) Perform the 'One Term, One Concept' Test;
 - 1) each Candidate term that has not previously appeared in other standards or earlier drafts of the standard in question will be subjected to a 'One Term, One Concept' test by members of the TMG. The members shall individually examine the Terminology Repository to determine whether the concept described by the definition is already adequately described by another term. Consultation with relevant working groups will be required. If an alternative term exists, retain the term's Candidate status and classify it as requiring harmonization. Do not change the status of the alternative term. If no alternative term is identified, classify the term as being Draft.

B.3.3.3 Normative terms

A working draft or committee draft may include Normative terms that have been adopted from other International Standards. The TMG shall review these terms to ensure that they harmonize with ISO 19100 series concepts and terminology. The TMG shall refer any problems to the appropriate working group or editing committee (in the latter case through national body comments).

B.3.3.4 Deleted terms

The test for deleted terms is to be performed if the terminology from an earlier draft of the standard has been entered into the Terminology Repository.

- for each item in the earlier draft, check if an identical Candidate term occurs in the current draft;
- if a Candidate term does not exist in the current draft, check if the term appears in other standards;
- if a Candidate term does not exist in the current draft and the term does not appear in other standards, classify the term and its definition as deleted in the Terminology Repository.

Terms that have been specifically nominated for deletion shall be classified accordingly in the Terminology Repository. ISO/TC 211 shall be formally advised of the intention to delete the terms. Deletion shall take place following a plenary meeting of ISO/TC 211.

B.3.4 Harmonization

Candidate terms that require harmonization shall be directly referred to the appropriate working groups. In addition, where the source document is at CD or DIS, the convenor of the TMG shall identify terminology harmonization issues in comments formally forwarded to the TC secretariat.

It is expected that harmonization issues will mostly occur in working drafts and early committee drafts. The TMG will facilitate discussions between the interested parties (generally via e-mail) to achieve a resolution of the issues. Should resolution not be possible within the period allowed for consideration and comment, the TMG convenor will call a meeting at the next ISO/TC 211 plenary to resolve the issues.

B.3.5 Revision of terminology status

In instances where there is consensus in relation to the harmonization of the term, the term shall be reclassified as Harmonized pending publication in an ISO standard.

In instances where there is consensus as regards the retention or deletion of a term nominated for deletion, the term shall be retained or classified as deleted in the Terminology Repository as appropriate.

Any terms for which consensus cannot be achieved during the consultation process will retain their Candidate status and will be considered further by the relevant ISO/TC 211 working groups. The TMG will facilitate this process. The TMG will not make decisions about the definitions to be adopted for terms but may make recommendations to the working groups.