

Begriff in englisch	Begriff in deutsch
relation type	Beziehungsart
representation of relation type semantic link	Semantische Verbindung; Repräsentation der Beziehungsart
type of characteristics	Merkmalart
essential characteristic	wesentliches Merkmal
delimiting characteristic	begrenzendes Merkmal
intension	Begriffsinhalt; Intension
extension	Begriffsumfang; Extension
instance of a concept	Ausprägung eines Begriffs
definition	Definition
intensional definition	Inhaltsdefinition; intensionale Definition
extensional definition	Umfangsdefinition; extensionale Definition
sanctioned characteristic representation of type of characteristic	sanktioniertes Merkmal
characterising category range value domain	Merkmalskategorie
designation designator	Bezeichnung
appellation name	Name
term	Benennung
terminology 1	Terminologie; Fachwortschatz
terminology 2	Terminologielehre; Terminologie
nomenclature	Nomenklatur
subject field domain	Fachgebiet; Sachgebiet
general concept	Allgemeinbegriff
domain constraint range constraint sanction	Fachgebietseinschränkung
domain concept model	Begriffsmodell für ein Fachgebiet
categorical structure reference terminology model	Kategoriale Struktur Referenzterminologiemodell

— Leerseite —

English version

**Health informatics —
Categorial structures for systems of concepts**

Informatique de santé —
Structure catégorielles des systèmes de concepts

Medizinische Informatik —
Kategoriale Strukturen für Begriffssysteme

This European Standard was approved by CEN on 29 April 2005.

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Foreword

This European Standard (EN 12264:2005) has been prepared by Technical Committee CEN/TC 251, "Health informatics", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

Computer-based processing and interchange of medical or clinical information require various kinds of terminological systems of concepts to represent that information, such as controlled vocabularies, classifications, nomenclatures, terminologies and thesauri, with or without coding schemes.

The specific terminological issues in the field of health informatics are:

- large number of different terminological systems are available in different clinical specialties;
- large overlap among the subject fields involved;
- large number of codes and rubrics, typically in the order of magnitude of 10,000 to 100,000 entries, in commonly used terminological systems;
- increasing need for re-use of coded data in different health-care contexts;
- polysemy across different clinical specialties and sometimes within them.

The integration of computer-based medical records and administrative information systems in Electronic Health Records (EHR) requires rationalisation in the field, and a uniform way to represent the meaning of medical concepts to ensure that the receiver EHR of a message will catch the meaning introduced by the sender EHR and not only the string of characters embedded in it. It is not possible to impose a rigid uniform standardised natural language clinical terminology on healthcare providers.

Instead a domain specific semantic model has been envisioned and applied in a series of specific European standards (EN) and international standards (ISO) on various subject fields to describe a set of categorial structures in partially overlapping subject fields: a European standard for surgical procedures (EN 1828), an ISO standard on integration of a reference model for nursing (EN ISO 18104) and an ISO technical specification on medical devices. There are also several European Pre standards (ENV) for: clinical laboratory measurements (ENV 1614), medical devices (ENV 12611), vital signs (EN ISO:IEEE 11073-10101 - Part 10101: Nomenclature), point-of-care medical device communication (EN ISO:IEEE 11073-10101 - Part 10101: Nomenclature), medicinal products (ENV 12610), nursing (ENV 14032) and continuity of care (ENV 13940).

This European Standard specifies the terminology and categorial structure description to be used for systems of concepts. Field testing in several countries, revision and integration have provided the comprehensive basis for this document.

1 Scope

1.1 Main purpose

The purpose of this European Standard is to establish the characteristics and the conformance rules required to synthetically describe the organisation and content of a terminological system in health. This European Standard has been developed to allow the production of specific standards on categorial structures for particular healthcare subject fields with the minimum requirements to support meaningful exchange of information.

This European Standard is applicable to:

- facilitate the construction of new terminological systems in a regular form which will increase their coherence and expressiveness;
- facilitate maintenance of terminological systems;
- increase consistency and coherence of existing terminological systems;
- allow systematic cross-references between items of different types of terminological systems;
- facilitate convergence among terminological systems;
- make explicit the overlap between different health care domains terminological systems;
- provide elements for negotiation about integration of different terminological systems into information systems between the respective developers;
- enable the systematic evaluation of terminological systems.

1.2 Target groups

The target groups for this European Standard are:

- designers of specialised standard healthcare terminological categorial structures;
- developers of healthcare terminological systems including classifications and coding systems;
- producers of services for terminological systems and designers of software including applications for natural language processing;
- information modellers, knowledge engineers, and standards developers building models for health information management systems;
- developers of information systems that require an explicit system of concepts;
- developers of mark-up standards for representation of healthcare documents.

1.3 Topics outside the scope

This European Standard has been developed for use as an integrated part of computer-based applications and for the electronic healthcare record. It would be of limited value for manual use.

This European Standard itself is not suitable for or intended for use by individual clinicians or hospital administrators.

It is not the purpose of this European Standard to standardise the end user classification or to conflict with the concept systems embedded in national practice and languages.

This European Standard is applicable to any healthcare terminology in any healthcare terminological system.

2 Normative references

Not applicable.

3 Terms and Definitions

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

3.1

concept

unit of knowledge created by a unique combination of characteristics (3.2)

NOTE Concepts are not necessarily bound to particular languages. They are, however, influenced by the social or cultural background often leading to different categorisations.[ISO 1087-1:2000]

3.2

characteristic

abstraction of a property of an **object** (3.3) or of a set of **objects** (3.3)

[ISO 1087-1:2000]

NOTE Characteristics are used for describing concepts (3.1) or of members of a set of objects (3.3) which form the extension (3.27) of a concept (3.1)

3.3

object

anything perceivable or conceivable

NOTE Objects may be material (e.g. an engine, a sheet of paper, a diamond), immaterial (e.g. conversion ratio, a project plan) or imagined (e.g. a unicorn).

[ISO 1087-1:2000]

3.4

concept system

system of concepts

set of **concepts** (3.1) structured according to the relations among them

[ISO 1087-1:2000]

3.5

formal representation

system of symbols which stand for **concepts** (3.1) and/or the relations between them and which is governed by explicit rules

3.6

concept representation

formal representation (3.5) of a **concept** (3.1)

NOTE Informally, we often talk of 'concepts' when we mean 'concept representations'. However, this leads to confusion when precise meanings are required. Concepts arise out of human individual and social conceptualisation of the world around them. Concept representations are artefacts constructed of symbols and often manifest in computer programs. Because they are artefacts, we can be precise about the functioning and capabilities of concept representations. It is more difficult to be clear about the yet poorly understood function of human conceptualisation.

3.7

concept system representation

formal representation (3.5) of a **system of concepts** (3.4)

NOTE Informally, we often talk of 'concept systems' when we mean 'concept system representations'. However, this leads to confusion when precise meanings are required. Concepts arise out of human individual and social conceptualisation of the world around them. Concept system representations are artefacts constructed of symbols and often manifest in computer programs. Because they are artefacts, we can be precise about the functioning and capabilities of concept systems representation. It is more difficult to be clear about the yet poorly understood function of human conceptualisation.

3.8

concept name

term (3.36) which uniquely designates a **concept** (3.1) within a **concept system** (3.4)

3.9

concept representation name

term (3.36) which uniquely designates a **concept representation** (3.7)

3.10

hierarchical relation

relation between two **concepts** (3.1) which may be either a **generic relation** (3.11) or a **partitive relation** (3.7)

[ISO 1087-1:2000]

3.11

generic relation

genus / species relation

subtype relation

relation between two **concepts** (3.1) where the **intention** (3.26) of one of the **concepts** (3.1) includes that of the other **concept** (3.1) and at least one additional **delimiting characteristic** (3.25)

[ISO 1087-1:2000]

NOTE 1 A generic relation exists between the concepts (3.1) 'word' and 'pronoun', 'vehicle' and 'car', 'person' and 'child'.

NOTE 2 All instances of a concept in the extension (3.27) of the second are included in the extension of the first.

3.12

individuation relation

relation between a **concept** (3.1) and the members of its **extension** (3.27)

NOTE It is a relation between **concept** (3.1) and **object** (3.3)

3.13

partitive relation

part / whole relation

relation between two **concepts** (3.1) where one of the **concepts** (3.1) constitutes the whole and the other **concept** (3.1) a part of that whole

[ISO 1087-1:2000]

NOTE A partitive relation exists between the concepts (3.1) 'week' and 'day', 'molecule' and 'atom'.

3.14**associative relation****pragmatic relation**

relation between two **concepts** (3.1) having a non-hierarchical thematic connection by virtue of experience

[ISO 1087-1:2000]

EXAMPLE An associative relation exists between the concepts (3.1) 'education' and 'teaching', 'baking' and 'oven'.

3.15**superordinate concept****broader concept**

concept (3.1) which is either a **generic concept** (3.17) or a **comprehensive concept** (3.19)

[ISO 1087-1:2000]

3.16**subordinate concept****narrower concept**

concept (3.1) which is either a **specific concept** (3.18) or a **partitive concept** (3.20)

[ISO 1087-1:2000]

3.17**generic concept**

concept (3.1) in a **generic relation** (3.11) having the narrower **intention** (3.26)

[ISO 1087-1:2000]

3.18**specific concept**

concept (3.1) in a **generic relation** (3.11) having the broader **intention** (3.26)

[ISO 1087-1:2000]

3.19**comprehensive concept**

concept (3.1) in a **partitive relation** (3.13) viewed as the whole

[ISO 1087-1:2000]

3.20**partitive concept**

concept (3.1) in a **partitive relation** (3.13) viewed as one of the parts making up the whole

[ISO 1087-1:2000]

3.21**relation type**

category of relations between the members of the **extension** (3.27) of one or more **concepts** (3.1)

3.22**representation of relation type****semantic link**

formal representation (3.5) of a directed **associative relation** (3.14) or **partitive relation** (3.13) between two **concepts** (3.1)

EXAMPLE has Location (with inverse is Location Of); is Cause Of (with inverse has Cause)

NOTE 1 This includes all relations except the generic relation (3.11).

NOTE 2 A semantic link always has an inverse, i.e. another semantic link with the opposite direction.

3.23

type of characteristics

category of **characteristics** (3.2) which serves as the criterion of subdivision when establishing **concept systems** (3.4)

[ISO 1087-1:2000]

EXAMPLE The type of characteristics colour embraces characteristics (3.2.) being red, blue, green, etc. The type of characteristics material embraces characteristics (3.2) made of wood, metal, etc.

3.24

essential characteristic

characteristic (3.2.) which is indispensable to understanding a **concept** (3.1)

[ISO 1087-1:2000]

3.25

delimiting characteristic

essential characteristic (3.24) used for distinguishing a **concept** (3.1) from related **concepts** (3.1)

[ISO 1087-1:2000]

EXAMPLE The delimiting characteristic support for the back may be used for distinguishing the **concepts** (3.1) 'stool' and 'chair'

3.26

intention

set of **characteristics** (3.2) which makes up the **concept** (3.1)

[ISO 1087-1:2000]

3.27

extension

totality of **objects** (3.3) to which a **concept** (3.1) corresponds

[ISO 1087-1:2000]

3.28

instance of a concept

member of the **extension** (3.27) of a **concept** (3.1)

3.29

definition

representation of a **concept** (3.1) by a descriptive statement which serves to differentiate it from related **concepts** (3.1)

[ISO 1087-1:2000]

3.30

intentional definition

definition (3.29) which describes the **intention** (3.26.) of a **concept** (3.1) by stating the **superordinate concept** (3.15) and the **delimiting characteristics** (3.25)

[ISO 1087-1:2000]

EXAMPLE an intentional definition for the concept (3.1) 'incandescent lamp': electric lamp in which a filament is heated by an electric current in such a way that it emits light.

3.31**extensional definition**

description of a concept (3.1) by enumerating all of its **subordinate concepts** (3.16) under one criterion of subdivision

[ISO 1087-1:2000]

EXAMPLE extentional definitions are:

Family 18 in the Periodic Table

helium, neon, argon, krypton, xenon and radon

noble gas

helium, neon, argon, krypton, xenon, or radon.

3.32**sanctioned characteristic****representation of type of characteristic**

formal representation (3.5) of a **type of characteristics** (3.23) whose **domain** (3.40) is the **concept representation** (3.6) in question

NOTE A representation of a type of characteristic could be made up of a combination of a semantic link (3.22) and a characterising category (3.33), and intended to be used in domain constraints (3.42).

EXAMPLE Cause of inflammation: the set of bacteria, virus, parasite, autoimmune, chemical, physical, unknown, formally expressed e.g. "CauseOfInflammation canBe (semantic link) set {bacteria, virus, parasite, autoimmune, chemical, physical, unknown}" (Characterising category)

3.33**characterising category****range****value domain**

set of **concepts** (3.1) which are allowed by a **domain constraint** (3.42) to specialise a concept in a particular **domain** (3.40)

NOTE The **characterising category** is usually described by a **superordinate** concept (3.15).

EXAMPLE Cause of inflammation: the set of bacteria, virus, parasite, autoimmune, chemical, physical, unknown, formally expressed e.g. "Cause Of Inflammation can Be (semantic link) set {bacteria, virus, parasite, autoimmune, chemical, physical, unknown}" (characterising category)

3.34**designation****designator**

representation of a **concept** (3.1) by a sign which denotes it

[ISO 1087-1:2000]

NOTE In **terminology** (3.37) work three types of designations are distinguished: symbols, **appellations** (3.35) and **terms** (3.36).

3.35**appellation****name**

verbal **designation** (3.34) of an individual **concept** (3.1)

[ISO 1087-1:2000]

3.36

term

verbal **designation** (3.34) of a **general concept** (3.41) in a specific **subject field** (3.40)

[ISO 1087-1:2000]

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

3.37

terminology 1

set of **designations** (3.34) belonging to one special language

[ISO 1087-1:2000]

3.38

terminology 2

terminology science

science studying the structure, formation, development, usage and management of **terminologies** (3.37) in various **subject fields** (3.40)

[ISO 1087-1:2000]

3.39

nomenclature

terminology (3.37) structured systematically according to pre-established naming rules

[ISO 1087-1:2000]

NOTE Nomenclatures have been elaborated in various fields, such as biology, medicine, physics and chemistry.

3.40

subject field

domain

field of special knowledge

[ISO 1087-1:2000]

NOTE The borderlines of a subject field are defined from a purpose-related point of view.

3.41

general concept

concept (3.1) which corresponds to two or more **objects** (3.3.) which form a group by reason of common properties

[ISO 1087-1:2000]

NOTE Examples of general concepts are 'planet', 'tower'.

3.42

domain constraint

range constraint

sanction

rule prescribing the set of **representations of type of characteristics** (3.32) that are valid to specialise a **concept** (3.1) in a certain domain

NOTE The rule describes the set of **representations of type of characteristics** (3.32) by combining the **semantic link** (3.22) and the **characterising categories** (3.33) it links to, possibly based on a full enumeration of **concepts** (3.1).

EXAMPLE The domain constraint "Fracture possibly has Location Skeletal Structure" describes that the concept "Fracture" can be specialised according to location (through semantic link "has Location") where the link points to a member of the characterising category "Skeletal Structure" in this precise domain.

3.43

domain concept model

set of **domain constraints** (3.42) for representing **concepts systems** (3.4) in a precise **domain** (3.40)

3.44

categorial structure

reference terminology model

minimal set of **domain constraints** (3.42) for representing **concepts systems** (3.4) in a precise **domain** (3.40) to achieve a precise goal

EXAMPLE A precise goal can be controlled vocabularies, classifications, nomenclatures, terminologies and thesauri, with or without coding schemes.

4 Categorial structure description

To describe a **categorial structure** (3.44), the following information shall be provided:

- a) **generic concepts** (3.17) that organise the **concepts** (3.1) subdividing the **concept system** (3.4) in the **domain** (3.40)
- b) precise goal of the **categorial structure** (3.44)
- c) list of type of characteristics (3.32) authorised by domain constraints (3.42)
- d) list of minimal **domain constraints** (3.42) required by the goal of the **categorial structure** (3.44).

EXAMPLE In a surgical procedures terminological concept system:

- a) the **generic concepts** (3.17) could be: surgical deed, human anatomy, interventional equipment and pathology
- b) the precise goal could be controlled vocabulary production or comparison
- c) a representation of type of **characteristic** (3.23) could be for the **type of characteristic** (3.23) "location of lesion", expressed by the **semantic link** (3.22) "hasLocation" in combination with a member of the characterising category related to the super ordinate concept "human anatomy", which is a specialisation of a generic concept {organ systems, organs, suborgans, body parts or anatomical regions}
- d) for the generic **concept** (3.17) "surgical deed" the given list of **type of characteristics** (3.23) authorised by **domain constraints** (3.42) for the **semantic link** (3.22) "hasSite" is made by the members of the three **characterising categories** (3.33) related to the super ordinate concepts of human anatomy, pathology and interventional equipment.

NOTE An **extensional definition** (3.31) of a **characterising category** (3.33) (required in Item c) is usually more appropriate than an **intentional definition** (3.30).

5 Conformance of a categorial structure to the document

A **categorial structure** (3.44) claiming conformance to the present document shall provide the information described by items a, b, and d in Clause 4 of the present document.

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