SLOVENSKI STANDARD
SIST ENV 12658:1999

01-januar-1999

Geografske informacije - Opis podatkov - Prenos

Geographic information - Data description - Transfer

Geoinformation - Datenbeschreibung - Übertragung

Information géographique - Description des données - Transfert

Ta slovenski standard je istoveten z: **ENV 12658:1998**

ICS:

07.040	Astronomija. Geodezija. Geografija	Astronomy. Geodesy. Geography
35.240.70	Uporabniške rešitve IT v znanosti	IT applications in science

SIST ENV 12658:1999 **en**

EUROPEAN PRESTANDARD
PRÉNORME EUROPÉENNE
EUROPÄISCHE VORNORM

ENV 12658

October 1998

ICS 07.040; 35.240.70

Descriptors: geographic information, data, data processing, data transfer, description

English version

Geographic information - Data description - Transfer

Information géographique - Description des données - Transfert

Geoinformation - Datenbeschreibung - Übertragung

This European Prestandard (ENV) was approved by CEN on 9 October 1998 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 287 "Geographic Information", the secretariat of which is held by AFNOR.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Prestandard refers to the transfer of geographic data and consists of the following clauses and annexes :

- clause 1 contains the scope of this European Prestandard ;
- clause 2 contains the normative references ;
- clause 3 contains the definitions of terms ;
- clause 4 contains an overview of this European Prestandard ;
- clause 5 concerns the creation of an application schema ;
- clause 6 defines the structure of the transfer content ;
- clause 7 defines the transfer schemas, the encoding rules and the implementations of transfer ;
- annex A contains the normative EXPRESS schema "application_encoding" ;
- annex B contains the normative EXPRESS schema "data_encoding" ;
- annex C contains the normative EXPRESS schema "file_transfer" ;
- annex D contains the normative EXPRESS schema "messaging" ;
- annex E contains the normative EXPRESS schema "external_files" ;
- annex F contains the normative short names for ENV ISO 10303-21:1994 encoding rules ;
- annex G contains a complete annotated example of a file transfer, as a guide for users ;
- annex H contains an application developers' guide for this European Prestandard ;
- annex I contains a bibliography.

The requirements imposed by this European Prestandard are contained in the numbered clauses, with their supporting detail in the normative Annexes A to F. These clauses and annexes provide the reference information for users of this European Prestandard. Annexes A to E contain schemas written in the EXPRESS language, whose names are given above. Whenever these schema names are used in the text of this European Prestandard, then they are enclosed in double quotes " ". Whenever entity names or attribute names from these schemas are used in the text, they are also enclosed in double quotes " ". Whenever keywords from the EXPRESS language are used, they are written in CAPITAL LETTERS.

Annex G gives an annotated example of a file transfer that conforms with this European Prestandard as an aid to understanding the overall structure imposed by this European Prestandard. This annex is suitable as a starting point for those who wish to understand the overall working of this European Prestandard, and uses information from all the clauses and normative annexes.

Annex H contains many small examples of the use of this European Prestandard, with explanatory comments. Many of the examples in Annex H are partial, each aiming to illustrate a specific point. This annex also includes two complete examples. This annex will be useful for developing software to use this European Prestandard, since it illustrates some of the situations that may arise.

Annex I provides informative detail only.

1 Scope

This European Prestandard specifies a method for the transfer of geographic data and their metadata. It defines the transfer schemas, implementation mechanisms and encoding rules for the transfer of geographic data. This European Prestandard supports transfer both for data defined by standardised schemas and for data defined by application specific schemas.

The implementation mechanisms are based on the formal data description language EXPRESS (ENV ISO 10303-11:1994) and are intended to cover file transfer and message handling communication services. The data are to be encoded in ENV ISO 10303-21:1994 clear text encoding. Decoding rules are not explicitly defined, since decoding is the reverse process of encoding.

The component parts of a transfer are described in detail in other European Prestandards for Geographic Information.

2 Normative references

This European Prestandard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ENV 12009:1997, *Geographic Information - Reference Model.*

ENV 12160:1997, *Geographic Information - Data Description - Spatial schema.*

ENV 12656:1998, *Geographic Information - Data Description – Quality.*

ENV 12657:1998, *Geographic Information - Data Description – Metadata.*

prENV 12762:1998, *Geographic Information - Referencing – Direct position.*

prCR 12660:1998, *Geographic Information - Processing - Query and Update* ✗ spatial aspects

ENV ISO 10303-1:1995, *Industrial automation systems and integration - Product data representation and exchange - Part 1 : Overview and fundamental principles (ISO 10303-1:1994)*

ENV ISO 10303-11:1994, *Industrial automation systems and integration - Product data representation and exchange - Part 11 : Description methods - The EXPRESS language reference manual (ISO 10303-11:1994)*

ENV ISO 10303-21:1994, *Industrial automation systems and integration - Product data representation and exchange - Part 21 : Clear text encoding of the exchange structure (ISO/DIS 10303-21:1993)*

ISO 8859-1: 1987, *Information processing - 8-bit single-byte coded graphic character sets - Part 1 : Latin alphabet No. 1.*

ISO 8859-2:1987, *Information processing - 8-bit single-byte coded graphic character sets - Part 2 : Latin alphabet No. 2.*

ISO 8859-5:1988, *Information processing - 8-bit single-byte coded graphic character sets - Part 5 : Latin / Cyrillic alphabet.*

ISO 8859-7:1987, *Information processing - 8-bit single-byte coded graphic character sets - Part 7 : Latin / Greek alphabet.*

ISO/IEC 10646-1:1993, *Information technology - Universal multiple-octet coded character set (UCS) - Part 1 : Architecture and basic multilingual plane.*

3 Definitions

For the purposes of this European Prestandard, the following definitions apply :

NOTE The use of terms within quotation marks in this European Prestandard is used to denote entities and attributes within EXPRESS schemas, as explained in the Introduction to this European Prestandard. Therefore explanations of such terms are not included in this clause.

3.1
aggregated attribute
Collection of attributes treated as a unit

3.2
application schema
Conceptual schema for a specific field of interest within the field of geographic information

[ENV 12009]

3.3
attribute
Representation of an essential trait, quality or property of an object or entity

3.4
clear text encoding
Encoding of information that only uses 8-bit byte values corresponding to the set of characters G(02/00) to G(07/14) of ISO 8859-1

[ENV ISO 10303-21:1994]

3.5
data transfer
Movement of data between systems, which may comprise file transfer or message handling

3.6
data type
Domain of values.

[ENV ISO 10303-11:1994]

3.7
dataset
Identifiable collection of data

3.8
domain
Set of permissible values that an attribute may take

3.9
encoding rules
Rules defining possible data structures, data types and symbols which are used in the representation of data

3.10
entity
Class of information defined by common properties

[ENV ISO 10303-11:1994]

3.11
exchange structure
Computer-interpretable format used for storing, accessing, transferring and archiving data

[ENV ISO 10303-1:1994]

3.12
external file
File whose encoding is not defined by this European Prestandard

3.13
file transfer
Data transfer using files, through a data network or unconnected media

3.14
geographic data
Computer treatable form of geographic information

[ENV 12009]

3.15
geographic dataset
Identifiable collection of geographic data

[ENV 12656]

3.16
geographic information
Information concerning phenomena directly or indirectly associated with a location relative to the earth

[ENV 12009]

3.17
geometric primitive
Description, partial or total, of the spatial aspects of an object by means of coordinates and mathematical functions

[ENV 12160]

3.18
grid
Point distribution defining a regular pattern, derived from the corners of the tessellation of a specific frame or a limited part of it

[ENV 12160]

3.19
instance
Named value

[ENV ISO 10303-11:1994]

3.20
interface specification
Mechanism used in the EXPRESS language for relating two schemas written in that language to each other

(As used in ENV ISO 10303-11:1994)

3.21
message handling
Data transfer using messages through a data network

3.22
metadata
Data about a geographic dataset or geographic datasets

[ENV 12657]

3.23
metadata schema
Schema describing metadata

[ENV 12009]

3.24
object
Single phenomenon existing in the real world

[ENV 12160]

3.25
plain attribute
Attribute that has a domain that is defined as a simple data type

NOTE Simple data type is used in ENV ISO 10303-11:1994.

3.26
quality
Totality of characteristics of a product that bear on its ability to satisfy stated and implied needs

[EN ISO 8402]

3.27
quality schema
Conceptual schema for the quality aspects of geographic data

[ENV 12009]

3.28
query
Operation to select and retrieve data from a database without changing their contents

[CR 12660]

3.29
raster band
2-dimensional geometric primitive which is a limited rectangular part of a specific 2-dimensional frame

[ENV 12160]

3.30
sequential file
File that can only be accessed in a sequential manner

[ENV ISO 10303-21:1994]

3.31
spatial schema
Conceptual schema for the spatial (geometric and topological) aspects of geographic data

[ENV 12009]

3.32
topological primitive
Description, partial or total, of the topological aspects of an object

[ENV 12160]

3.33
transfer schema
Conceptual schema for rules and operators for transferring geographic data and metadata

[ENV 12009]

4 Overview

4.1 Relationships of family of European Prestandards used in data transfer

This European Prestandard is part of the family of European Prestandards for geographic information that are each published separately and together provide for the description, structure, implementation, application and transfer of data. The content of this European Prestandard is mostly self-explanatory and the requirements for structuring and organising data are defined in the "file_transfer" and "messaging" schemas (clause 7).

4.2 Data transfer

This European Prestandard defines an overall structure of geographic data and their metadata to be transferred. Data transfer may be done by file transfer or message handling.

NOTE 1 For file transfer using a network, the network connection exists while the transfer is in progress and is then closed. File transfer between the source and the destination can be controlled by a third party, who initiated the transfer request. Real time data transfer and bulk data transfer are the most important types of file transfer. File transfer can also be carried out on unconnected media such as optical disk, magnetic tape or diskette. This can often happen with very large amounts of data.

The contents of a data transfer may consist of :

- metadata ;
- application schema description ;
- geographic data, collected in datasets ;
- quality data.

NOTE 2 Updates are treated in the same way as any other data transfer. They are not discussed as a separate case in this European Prestandard. Update data can be transferred if modelled in the application schema.

Figure 1 shows the framework for preparing data for transfer, and also an overview of the related clauses of this European Prestandard.

The application schema allows suppliers to define geographic entities using standardised entities defined in other European Prestandards for geographic information. In particular, the geographic entities are described in the application schema with reference to the spatial schema and to the quality schema. The application data shall be in conformance with the entities defined in the application schema. They form an application dataset.

NOTE 3 For example, if the application schema defines that a "tree" only has one attribute which is "date_of_planting", then in the application data each "tree" can only have an attribute that is "date_of_planting" and nothing else.

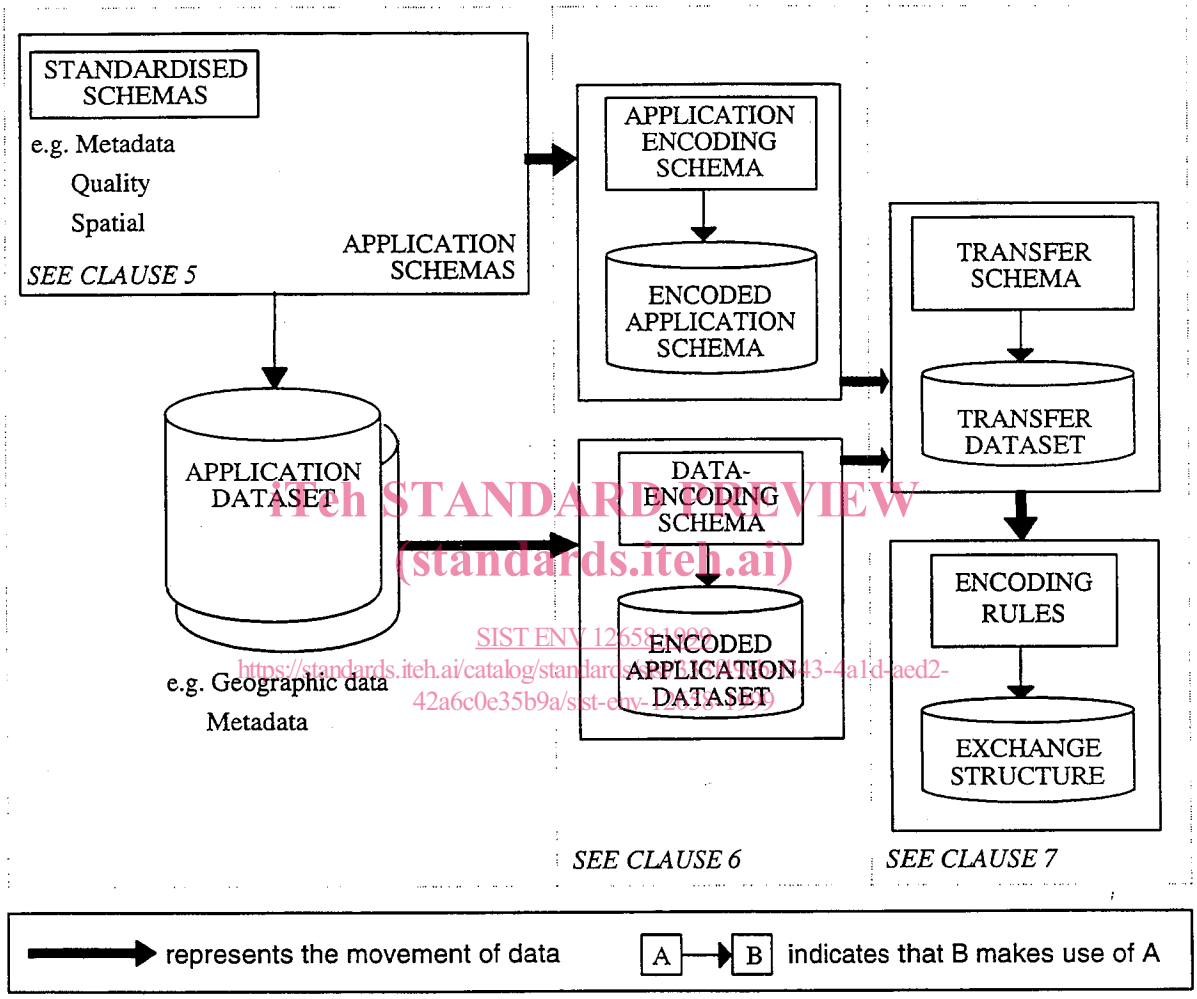

Figure 1 - Diagram of preparation of data for transfer

The application schema shall be translated into an encoded application schema in accordance with the schema "application_encoding" (as defined in clause 6). The related application dataset shall be translated into an encoded dataset, together with the encoded application schema, in accordance with the schema "data_encoding" (also defined in clause 6).

NOTE 4 The use of the schema "data_encoding" differs from the approach usually taken in the use of ENV ISO 10303-11:1994 and ENV ISO 10303-21:1994. This schema has been written for two main reasons. Firstly it provides a greater degree of independence from the national language of the supplier, and secondly it ensures that different data transfers will be similar in appearance to each other, by controlling the instances that can appear in an exchange structure.

The data transfer may contain one or more datasets. The exchange structure of a data transfer (file transfer or message handling) shall be produced by applying the encoding rules defined in this European Prestandard (as defined in clause 7).

For file transfer, additional rules shall be applied. If metadata are to be transferred, the metadata set shall be collected eventually together with encoded geographic data to form a "file_dataset". Several "file_dataset"s may be collected in a "transfer_set" in accordance with the schema "file_transfer".

For message handling, a "message_set" contains a "message_dataset".

4.3 Role of EXPRESS language

This European Prestandard uses the EXPRESS language (as defined in ENV ISO 10303-11:1994) as its formal description technique.

NOTE 1 The EXPRESS language has been designed to enable partitions within the field of data transfer, and schemas are the tools to allow this partitioning. The primary intent of the EXPRESS language is to define entities. An entity is described by means of its attributes, which in turn are defined by values in a domain. Attributes have names, which explain their significance, and have as their domain a simple data type (e.g., a string), or another entity.

The EXPRESS schemas of this European Prestandard refer to EXPRESS schemas defined in other European Prestandards for geographic information. The EXPRESS schemas of this European Prestandard are normative and are given in Annexes A to E.

Suppliers shall use the EXPRESS language when creating an application schema (as defined in clause 6), to describe the information to be transferred. This schema shall be sent to the user to permit interpretation of the data.

NOTE 2 A supplier can choose not to use the EXPRESS language to describe their data within the source system. However, to complete a data transfer, an application schema written in EXPRESS is required. The use of EXPRESS ensures an unambiguous statement of relationships between entities being transferred.

4.4 Role of ENV ISO 10303-21:1994

This European Prestandard allows data representing geographic information, whose semantics are described in an application schema using the EXPRESS language, to be transferred between one computer system and another. The exchange structure (as defined in clause 7) is encoded using ENV ENV ISO 10303-21:1994.

ENV ISO 10303-21:1994 defines an exchange structure for data whose semantics have been described in an EXPRESS schema. The exchange structure uses a clear text encoding and is implemented as a sequential file. ENV ISO 10303-21:1994 defines the encoding rules to be used to create the exchange structure for instances of entities described in EXPRESS schemas. This European Prestandard uses these encoding rules.

5 Application schema

5.1 General

An application schema is a formal description of a particular field of interest within the field of geographic information. For data transfer to take place, the supplier and user both need to understand the nature of the objects being represented and their relationships. The application schema is the way in which the objects and relationships are rigorously described. This rigorous description is used to govern both the appearance of the data and its description, within the data transfer.

NOTE 1 This European Prestandard does not define any application schemas. It defines the rules for creating an application schema for transferring geographic data. This approach of not defining application schemas, but instead providing rules for suppliers to define their own application schemas, is deliberate. It is taken since users of European Prestandards for geographic information have different requirements of their geographic applications and of the geographic data managed by applications.

Although the application schema is not standardised, the method of its description is standardised. This European Prestandard defines constraints on the use of the EXPRESS language. Application schemas may import basic entities defined in other European Prestandards for geographic information.

This clause gives rules on how to use the EXPRESS language to construct an application schema. For this European Prestandard the application schema shall be written to conform to ENV ISO 10303-11:1994, and to the additional rules that appear in this clause.

NOTE 2 The application schema describes in more detail the data_definition_metadata schema and classification_metadata schema defined in ENV 12657.

5.2 Use of EXPRESS language

5.2.1 General

The EXPRESS language elements used in an application schema shall be drawn from the following list of EXPRESS language elements, which are listed together with the clause of ENV ISO 10303-11:1994 where they are described. If any other parts of the EXPRESS language are used to construct an application schema, then they cannot be transferred to the user. Application schemas for transfer shall therefore not use any other parts of the EXPRESS language.

EXPRESS element	ENV ISO 10303-11:1994 clause
Data types	8
Simple data types	8.1
Real data type	8.1.2
Integer data type	8.1.3
Logical data type	8.1.4
Boolean data type	8.1.5
String data type	8.1.6
Binary data type	8.1.7
Aggregation data types	8.2
Array data type	8.2.1
List data type	8.2.2
Bag data type	8.2.3
Set data type	8.2.4
Defined data type	8.3.2
Enumeration data type	8.4.1
Select data type	8.4.2
Domain rule	9.1
Entity declaration	9.2
Attribute	9.2.1.1
Derived attribute	9.2.1.2
Inverse attribute	9.2.1.3
Uniqueness rule	9.2.2.1
Domain rule	9.2.2.2
Subtype	9.2.3
Supertype	9.2.3
Schema declaration	9.3
Constant declaration	9.4
Function declaration	9.5.1
Procedure declaration	9.5.2
Rule declaration	9.6
Reference interface specification	11.2

In accordance with ENV ISO 10303-11:1994, identifiers are case-insensitive, they start with a letter, and they are made up of letters, "_" and digits only. A user-defined identifier shall not be a standard EXPRESS keyword.