SLOVENSKI STANDARD
SIST EN 15016-1:2023

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Železniške naprave - Tehnična dokumentacija - 1. del: Osnovna načela

Railway applications - Technical documents - Part 1: General principles

Bahnanwendungen - Technische Dokumente - Teil 1: Allgemeine Grundsätze

Applications ferroviaires - Documents techniques - Partie 1 : Principes généraux

Ta slovenski standard je istoveten z: **EN 15016-1:2023**

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45.020	Železniška tehnika na splošno	Railway engineering in general

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EUROPEAN STANDARD

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English Version

Railway applications - Technical documents - Part 1: General principles

Applications ferroviaires - Documents techniques - Partie 1 : Principes généraux

Bahnanwendungen - Technische Dokumente - Teil 1: Allgemeine Grundsätze

This European Standard was approved by CEN on 9 July 2023.

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

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European foreword

This document (EN 15016-1:2023) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by February 2024, and conflicting national standards shall be withdrawn at the latest by February 2024.

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

This document supersedes EN 15016-1:2004.

In comparison with the previous edition, the following technical modifications have been made:

— The references to standards, the clause “Terms and definitions” have been updated.

— The clause “Symbols and abbreviated terms” and the clause “Preparation of technical documents other than drawings” have been added.

— Microcopying has been deleted.

— In Annex A references to the Data Model of Part 4 have been incorporated to show the relation between the fields of the title blocks of technical documents and the data fields for data exchange.

This document is part of the standard series “Railway applications — Technical documents” which consists of the following parts:

— EN 15016-1: General principles;

— EN 15016-2: Parts lists;

— EN 15016-3: Handling of modifications of technical documents;

— EN 15016-4: Data exchange.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

Introduction

In railway business, the customer very often requires, as part of a contract, technical documents in a certain form. In order to support co-operation and effective exchange of information between customers, suppliers and partners, it is necessary to have the document requirements precisely defined.

This document refers to EN, ISO or IEC standards dealing with technical documents. In cases where ISO or IEC standards are not sufficiently precise, this standard gives specific details. These additions to ISO and IEC standards facilitate the exploitation and administration.

These additions have been drawn up to accommodate:

— the large variety of users;

— ease of documents transfer;

— any specific series of documentation related to the railway material they define.

Special consideration has been given to those producing drawings by computer and their reproduction without loss of quality.

1 Scope

This document specifies the preparation, administration and reproduction of technical documents. It complies with the requirements of EN, ISO or IEC Standards for technical documents. This document is applicable to all technical documents for railway applications, irrespective of technology i.e. mechanical, pneumatic, hydraulic, electric, electronic etc.

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.

EN 17343:2020, *Railway applications - General terms and definitions*

EN 61355-1, *Classification and designation of documents for plants, systems and equipment - Part 1: Rules and classification tables (IEC 61355-1)*

EN 15380-1, *Railway applications - Designation system for railway vehicles - Part 1: General principles*

EN ISO 3098-1, *Technical product documentation - Lettering - Part 1: General requirements (ISO 3098-1)*

EN ISO 3098-2, *Technical product documentation - Lettering - Part 2: Latin alphabet, numberal and marks (ISO 3098-2)*

EN ISO 5455, *Technical drawings - Scales (ISO 5455)*

EN ISO 5457:1999, *Technical product documentation - Sizes and layout of drawing sheets (ISO 5457:1999)*

EN ISO 6433, *Technical product documentation - Part references (ISO 6433)*

EN ISO 10209:2022, *Technical product documentation — Vocabulary — Terms relating to technical drawings, product definition and related documentation (ISO 10209:2022)*

EN ISO 128-2:2022, *Technical product documentation (TPD) — General principles of representation — Part 2: Basic conventions for lines (ISO 128-2:2022)*

EN ISO 128-3, *Technical product documentation (TPD) - General principles of representation - Part 3: Views, sections and cuts (ISO 128-3)*

EN ISO 6428, *Technical drawings - Requirements for microcopying (ISO 6428)*

ISO 639-1, *Codes for the representation of names of languages — Part 1: Alpha-2 code*

ISO 80000-1, *Quantities and units — Part 1: General*

ISO 7200, *Technical product documentation — Data fields in title blocks and document headers*

ISO 16016, *Technical product documentation — Protection notices for restricting the use of documents and products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17343:2020 and EN ISO 10209:2022 apply.

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

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 Symbols and abbreviated terms

For the purposes of this document, the following abbreviation applies.

OEM original equipment manufacturer

5 Preparation of drawings

5.1 Layout

5.1.1 Composition

Any document shall be given an identification number.

A set of drawings describing an assembly, a product or an installation will normally by various means (drawing lists, document control lists etc.) be formed as an entity. Parts lists mainly list details of an assemblage or collective drawing at a certain level. All of these parts lists may be produced either on drawing forms or parts of drawings or as documents affiliated to the company's administrative system.

Each different part or different assembly shall have a separate identification number.

It is recommended that the parts list forms a separate document (see EN 15016-2). Alternatively, the parts list may be entered on the same sheet as the drawing above the title block.

5.1.2 Special cases

It is permissible to represent similar parts or assemblies on a drawing.

5.1.3 Applications

If required, the applications or the identification number of the document indicating the relations between the drawing and the applications should be noted in the title block of the drawing or parts list.

5.1.4 Multiple sheets

Multiple sheet drawings marked with the same registration or identification number shall be provided with a sequential sheet number. In addition, the total number of sheets shall be shown on sheet 1, for example:

“Sheet No. n/p”

where

n is the sheet number;

p is the total number of sheets

(see ISO 7200).

5.1.5 Avoiding duplicate indications

All indications relating to standards, dimensions, materials and unit mass of parts involved in the composition of an assembly should preferably be indicated on the parts lists of the parts concerned. If, for information purposes, a dimension has to be repeated on the assembly drawing, it is to be written in brackets.

This remark shall not apply to specifications.

For example: indivisible or welded assemblies can have specific dimension and tolerance at their own level even if the nominal dimension value is the same.

5.2 Characteristic features

5.2.1 General

For sizes and layout of preprinted drawing sheets EN ISO 5457 shall apply.

5.2.2 Drawing sheet or base

Drawing sheets used for the preparation or printing of drawings should have a mat surface. Drawing sheets from polyester for which ISO 9958-1 and ISO 9958-2 apply should have a minimum wideness of 50 µm. Drawing sheets from tracing paper according to ISO 9961 should have a minimum grammage of 90 g/m^2 and standardized (writing) paper according to EN ISO 216 should have a minimum grammage of 70 g/m^2.

Drawing sheets shall be chosen with a view to obtaining the best contrast between background and representation according to EN ISO 6428.

5.2.3 Drawing sheet sizes

The original drawings shall be made to a standardized drawing sheet size electing the smallest size permitting adequate legibility.

The standardized sizes of the original drawings and their reproductions shall be selected from EN ISO 5457.

5.2.4 Permanent layout features

5.2.4.1 Title block

A title block shall appear on all drawings. It shall contain the necessary headings for identification and use according to ISO 7200.

It is recommended to use the same title block on all sheets of the drawing. It is permitted to use a reduced title block on the sheets following sheet 1. This block shall, as a minimum, have the same identification zone. The compulsory part of the title block is defined in Annex A. Its location is independent of the direction of reading adopted for the drawing.

In the normal reading position, the title block is situated at the bottom right-hand corner of the frame, the drawing sheet being viewed:

— in the portrait (vertical) position for the A4 size;

— in the landscape (horizontal) position for the A3 to A0 sizes according to EN ISO 5457.

For the preparation of documents used in electrotechnology, see EN 61082-1.

5.2.4.2 Copyright and exploitation rights

The designation shall be in accordance with ISO 16016. Exploitation rights shall be indicated. The name of the legal owner or the name of the creator of the drawing shall be written in the title block. Information concerning also existing exploitation rights can be indicated inside or outside the drawing field, where appropriate.

5.2.4.3 Intellectual property

The designation shall be in accordance with ISO 16016. Protection rights should be indicated at an appropriate place inside or outside the drawing field of the drawing and/or in the parts lists.

5.3 Execution

5.3.1 Graphical representation of layout

5.3.1.1 Arrangement of the drawing sheet

The arrangement of the drawing sheet shall be in accordance with EN ISO 5457:1999, 4.1.

5.3.1.2 Presentation methods, symbols and scales

For the relative position of views, use should be made of the First Angle projection method (earlier known as European method of representation Method E) as given by EN ISO 128-3.

The simplified and symbolic representation specified by European or International Standards should be adopted in preference to text.

Scales according to EN ISO 5455 are recommended.

5.3.1.3 Leader line

Leader lines shall preferably be terminated by a dot or an arrow, placed on the part to be reference marked according to EN ISO 128-2.

5.3.1.4 Text on drawings

Text on drawings is not recommended, because it is language specific. If deemed to be unavoidable, it should be kept as brief as possible. With regard to lettering, see 5.3.3.

NOTE This will also be of assistance in multitranslation versions of the document if required.

5.3.2 Characteristics of lines

5.3.2.1 Optical density (contrast)

All lines, including those added in any revision of the drawing should have a contrast of at least 0,7 with respect to the drawing base (according to EN ISO 6428).

5.3.2.2 Wideness of lines, grading, choice

Line wideness should be chosen depending on the size of the drawing (the widest values of line to be used for the drawing of sizes A0 and A1, which are likely to be frequently reproduced in reduced size) and on the legibility of the drawing in the following range:

0,25 mm - 0,35 mm - 0,5 mm - 0,7 mm – 1 mm.

The ratios to be observed between the widths of narrow and wide lines of a reproduction are as follows:

— minimum ratio 1/2: 0,25/0,5 - 0,35/0,7;

— recommended ratio 1/2,8: 0,25/0,7 - 0,35/1,0.

In all cases, the choice of line wideness should take into account the scale, the nature of their execution and the legibility of the drawing and its reproduction. The line wideness should be the same for all views of a part drawn to the same scale.

5.3.2.3 Spacing between lines

For manual drawings the space between two lines should be at least equal to twice the wideness of the wider line and at least 0,7 mm. The spacing between the hatching lines should be the maximum compatible with accurate determination of the section. Contour-hatching should be used as often as possible. The gap between the “blackened” sectional areas of two thin adjacent parts should be at least 0,7 mm.

In general, EN ISO 6428 applies.

If this space cannot be kept for e.g. CAD drawings, the representation shall be according to EN ISO 128-2:2022, Table G.1, No G.1.

This is recommended if the labelling does not clearly indicate at which line the arrowhead is pointing in the case of double lining. If a particular indication needs to be clarified, an enlarged presentation is recommended.

5.3.3 Characteristics of lettering

The lettering to be used on drawings shall be vertical inscription lettering B (vertical lettering) recommended in the EN ISO 3098-1 and EN ISO 3098-2. Its contrast with the background shall be at least of 0,7, according to EN ISO 6428.

Italic lettering B (inclined lettering) should only be used for accentuating a text. Numbered items (tolerances, explanations, indications concerning conditions of machining of surfaces and of welds, etc.) shall be in upright lettering.

The lettering height shall be consistent per drawing items within one document and shall ensure readability also when printed out in scaled down formats like A3 and A4.

For examples of type and height of lettering to be used according to the different drawing items see Table 1.