



SLOVENSKI STANDARD

SIST ENV 1649:2003

01-oktober-2003

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Bar coding - Operational aspects affecting the reading of bar code symbols

Strichcodierung - Einflußgrößen auf die Lesung von Strichcodes

Code a barres - Aspects de mise en oeuvre affectant la lecture des symboles codés a barres

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ICS:

35.040	Nabori znakov in kodiranje informacij	Character sets and information coding
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EUROPEAN PRESTANDARD

ENV 1649

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September 1995

ICS 35.040

Descriptors: bar codes, legibility, specifications, character sets, optical recognition, implementation

English version

Bar coding - Operational aspects affecting the reading of bar code symbols

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Contents

Foreword	3
Introduction	3
1 Scope	4
2 Normative references	4
3 Definitions	4
4 Requirements	4
4.1 Closed or open system	5
4.2 Pre-existing standards	5
4.3 Data to be encoded	5
4.3.1 Type of data	5
4.3.2 Data string length	5
4.3.3 Data check characters	5
4.4 Symbology selection	6
4.4.1 Number of symbologies to be used	6
4.4.2 Symbol security	7
4.4.3 Symbol X dimensions	7
4.4.4 Wide to narrow ratio	7
4.4.5 Aspect ratio of symbols	7
4.4.6 Other factors influencing symbol specification	7
4.5 Optical parameters	8
4.5.1 Scanner light source	8
4.5.2 Symbol production	8
4.5.3 Matching the symbol and the reader	8
4.5.4 Quiet zones	9
4.6 Symbol quality	9
4.7 Symbol application	9
4.8 Labels	9
4.8.1 Transport applications	9
4.8.2 Non-transport applications	9
4.9 Positioning of the symbol	10
4.10 Environmental conditions	10
4.10.1 Symbol abrasion	10
4.10.2 Other factors	10
4.10.3 Scanning methods	10
4.11 Health and safety considerations	10
4.12 Global environmental considerations	11
Annex A (informative) Symbology character sets	12
A.1 EN 797 "Bar coding - Symbology specifications - "EAN/UPC""	12
A.2 EN 798 "Bar coding - Symbology specifications - "Codabar""	12
A.3 EN 799 "Bar coding - Symbology specifications - "Code 128""	12
A.4 EN 800 "Bar coding - Symbology specifications - "Code 39""	12
A.5 EN 801 "Bar coding - Symbology specifications - "Interleaved 2 of 5""	12
Annex B (informative) Symbology features	13



Foreword

This European Prestandard has been prepared by the CEN Technical Committee CEN/TC225 "Bar coding" of which the secretariat is held by NNI.

The prestandard was approved in accordance with the CEN/CENELEC rules on 1995-04-27.

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

Introduction

The technology of bar coding is based upon the originators of the bar code marking and those wishing to make use of the bar codes to automatically capture data relating to the marked entity, working to a common application standard.

By means of such publicly available standards, the producers of symbols and those wishing to read the symbols are aware of the requirements which must be met by any symbol production and symbol reading equipment which they specify for their respective systems.

The standard also provides the manufacturers of both bar code marking and bar code reading equipment with the requirements with which that equipment must comply, for that application.

The standard provides the means by which bodies which are making application standards for industries, can ensure that all relevant technical requirements are addressed during the standards making process. <https://standards.iteh.ai/catalog/standards/sist/b166931e-97d2-4ee1-bca4-0ba816029cbb/sist-env-1649-2003>

1 Scope

This European Prestandard

- specifies the operational aspects affecting the reading of bar code symbols which must be considered in the preparation of application standards.
- defines the subjects which must be addressed by application standards if they are to provide practical guidance to the user industries for whose use they are developed.

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.

EN 796		Bar Coding - Symbology identifiers
EN 797		Bar Coding - Symbology specifications - "EAN/UPC"
EN 798		Bar Coding - Symbology specifications - "Codabar"
EN 799		Bar Coding - Symbology specifications - "Code 128"
EN 800		Bar Coding - Symbology specifications - "Code 39"
EN 801		Bar Coding - Symbology specifications - "Interleaved 2 of 5"
EN 1556		Bar Coding - Terminology
EN 1571		Bar Coding - Data identifiers
EN 1573		Bar Coding - Multi industry transport label
EN 1635		Bar Coding - Test specifications for bar code symbols
EN 60825		Radiation safety of laser products - Equipment classification requirements and users guide
ISO 646	1983	Information technology - ISO 7-bit coded character set for information interchange
ISO 7064	1983	Data processing - Check character systems
ISO 8859-1	1987	Information processing - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1
General EAN Specifications (EAN International, Brussels, 1994)		

3 Definitions

For the purposes of this standard the definitions in EN 1556 Bar coding - Terminology apply.

4 Requirements

A bar code application standard shall address and, where necessary, define the technical requirements for the following.

4.1 Closed or open system

In bar coding the terms 'closed system' and 'open system' each has a particular meaning, these are defined as follows. A closed system is an application which is intended for use by a closed group of users, typically within a single organisation or subject to a specific agreement. Existing closed systems may only be used subject to bilateral agreement between the participants.

An open system is an application in which independent parties may freely participate and in which bilateral agreements are not necessary.

The standard maker shall determine if the system to which the application standard applies, is a closed or an open system.

4.2 Pre-existing standards

Before commencing the making of a new standard, careful consideration should be given to the potential of adopting an existing standard. Many currently used standards are readily adaptable to specific industry uses whilst remaining totally compatible with their existing uses. Broadening the scope of existing international, multi industry standards, provides for the ready interchangeability of bar code marked items internationally and between industry sectors and is, therefore, the preferred option. It should be noted that the proliferation of standards is a waste of resources and is contrary to the principles of standardisation.

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4.3 Data to be encoded

4.3.1 Type of data

The choice of symbology will be influenced by the type of data to be encoded, this can be:

- numeric;
- alphanumeric;
- ASCII.

This particular requirement shall be referred to as the encodable character set of the symbology. There are symbologies standardised by CEN, which meet all of these requirements. For a given application, the character set used may be a limited part of the total character set available.

NOTE: The character sets encodable by symbologies that have been standardised by CEN are contained in Annex A.

4.3.2 Data string length

The data string length to be encoded will influence the length of linear bar code symbols. The specification of long data strings and the resultant long symbols may be the cause of symbols being difficult to scan with a high degree of reliability and ease. It will also limit the choice of bar code printing and reading systems available to users. In particular, the ability of decoders to handle long data strings decoded from symbols, may limit user choice.

4.3.3 Data check characters

For applications where key entry is used, or where data security is critical, data check characters as distinct from symbol check characters, should be used. The system of data check characters used will depend upon the application, a suitable algorithm may be selected from those described in ISO 7064:1983.

4.4 Symbology selection

When selecting a symbology or symbologies for any particular application every aspect of the application should be considered. The symbology which is specified for use in an application standard, should be one of those symbologies which has been standardised by CEN. The following factors shall be taken into consideration during the selection of a symbology for an application.

NOTE: Annex B compares the features of the symbologies standardised by CEN.

- "Codabar" symbology (EN 798);
This symbology shall not be specified for new applications.
- "EAN/UPC" symbology (EN 797);
This symbology shall be used only in accordance with the EAN General Specifications.
- "Interleaved 2 of 5" symbology (EN 801), protection against short scans
In "Interleaved 2 of 5" symbols, the bar patterns of the start and stop patterns may be found as the respective end and beginning of certain encoded symbol characters within the symbol. There is therefore no guarantee that a partial scan of the symbol will not produce a valid read for an embedded symbol having fewer characters. Ideally two additional measures should be taken to minimise the risk of such partial reads:
 - a) **fixed length symbols**
In any application standard the number of characters encoded in an "Interleaved 2 of 5" symbol should be fixed for that application and reading or data processing equipment should be programmed only to accept messages of that defined length.
 - b) **bearer bars**
The purpose of bearer bars is to reduce the probability of a valid but erroneous short read of the symbol where a scanning beam enters and/or leaves the symbol at the top or bottom. Bearer bars should be added unless technical constraints prevent it.

Bearer bars should be placed perpendicular to the bars in the symbol, abutting the top and the bottom of the symbol bars respectively over the full length of the symbol. They may be above and below the quiet zones and may also be extended to form a frame around the symbol inclusive of the minimum quiet zones.

4.4.1 Number of symbologies to be used

The number of symbologies to be specified for use by an application standard, shall be carefully considered. The use of autodiscrimination in an application where a number of different symbologies are in use, can increase the risk of reading errors with the resultant corruption of the database. The number of symbologies employed in an application, should therefore be limited to the minimum required to operate that application efficiently.

If the use of more than one symbology is unavoidable, then the following rules shall be applied:

- a) segregate the use of the different symbologies, to different parts of the application and set decoders to decode only that symbology;
- b) use EN 796 to ensure that the system can be programmed to recognise the symbology from which the data originated;

- c) apply other checks to the data decoded such as format, string length, data check character and symbol check character validations, to ensure that the integrity of the data decoded, is maximised.

4.4.2 Symbol security

In order to ensure the integrity of data decoded from symbols, provision shall be made for the use of a symbol check character in symbologies where these are not a compulsory feature of the symbology.

Systems considerations set out in the CEN symbology standards shall be applied where appropriate, to maximise the security of the reading and decoding of symbols.

4.4.3 Symbol X dimensions

The range of X dimensions to be employed in symbols shall be specified by an application standard. Consideration should be given to ensuring that the range of X dimensions specified is compatible with:

- a) the print resolution of appropriate bar code printing equipment;
- b) the optical resolution of appropriate scanning equipment.

4.4.4 Wide to narrow ratio

Where an application specification specifies the use of a two width symbology, acceptable ratios of wide to narrow elements shall be specified. CEN symbology standards for two width symbologies, specify ratios in the range 2,0:1 to 3,0:1. The application standard may specify a single ratio or a range of ratios within the 2,0:1 to 3,0:1 limits, it shall never be less than that set out in the European (pre)standard for that symbology.

NOTE: The smaller ratios may not be suitable where the X dimension is small: refer to the symbology standards for precise details.

4.4.5 Aspect ratio of symbols

The application specification may specify the overall space requirements for symbols on items, packaging or labels. Where it does so, the standard shall ensure that the height to width ratio of the symbol will not be reduced to less than the minimum specified by the European Standard for that symbology.

4.4.6 Other factors influencing symbol specification

Other factors which should be considered when specifying the symbols which are to be used for a particular application include:

- a) the types of scanner which will be used in the application;
- b) where conveyor mounted scanners are used, conveyor speed and orientation of the symbol relative to the scanners shall be considered when specifying:
 - 1) the symbol dimension;
 - 2) the symbol length;
 - 3) the bar height of the symbol.
- c) special conditions relating to the environment in which symbols are to be scanned should be considered. Conditions such as direct sunlight, long range reading, surfaces which are wet, frosted or unusually lit, may require special substrates or printing methods and careful consideration of symbol size to ensure good scanning performance.
- d) substrates (including metals) or printing techniques which may cause wide variations of print quality may limit the choice of symbols which are suitable for that application.