SLOVENSKI STANDARD
SIST ENV 12646:2003

01-oktober-2003

Ļrtno kodiranje ï Specifikacije za preskuġanje skenerjev in dekodirnikov ļrtnih kod

Bar coding - Test specifications for bar code scanners and decoders

Strichcodierung - Testspezifikationen für Strichcode-Scanner und - Decoder

Ta slovenski standard je istoveten z: ENV 12646:1997

ICS:

35.180	Terminalska in druga periferna oprema IT	IT Terminal and other peripheral equipment

SIST ENV 12646:2003 **en**

EUROPEAN PRESTANDARD

PRÉNORME EUROPÉENNE

EUROPÄISCHE VORNORM

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Descriptors: data processing, character recognition, bar codes, scanners, decoders, definitions, test equipment, determination, performance evaluation

English version

Bar Coding - Test Specifications for Bar Code Scanners and Decoders

Strichcodierung - Testspezifikationen für Strichcode-Scanner und -Decoder

This European Prestandard (ENV) was approved by CEN on 1997-04-10 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 an European Standard (EN).

CEN members are required to announce the existance 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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 225 'Bar coding', the secretariat of which is held by NNI.

Organisations contributing to the development of the prestandard include:
* AIM Europe
* EAN International

This ENV is part of a series of standards related to quality aspects affecting bar code production and reading, not all of which had been completed at the time of publication. The other documents in the series are "Test Specifications Bar Code Symbols", "Test Specifications Bar Code Printers", "Test Specifications Bar Code Verifiers" and "Quality of Bar Code Printing Software". In turn these standards form part of a wider range of bar code standards covering Symbologies, Quality, Data Content and Applications.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of 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 and the United Kingdom.

Introduction

The technology of bar coding is based on the recognition of patterns encoded in bars and spaces of defined dimensions according to rules defining the translation of characters into such patterns, known as the symbology specification.

Bar code symbols can be produced with a wide variety of printing and other techniques, and the overall symbol can be at different uniformly scaled factors up or down to suit particular requirements.

There is a wide range of bar code reading equipment using various scanning techniques, which enable bar code symbols to be read under many different conditions.

Bar code symbols may be a) "linear" i.e. read in a single dimension, where the height of the bars provides redundancy of information, or b) "two dimensional", either in stacked rows to be read unidimensionally in sequence, or as a matrix of elements requiring two dimensional reading.

Bar code systems offer very high data security.

Bar code reading equipment must be capable of reliably converting the information represented as a bar code symbol into a form meaningful to the host computer system or otherwise to the user.

Manufacturers of bar code equipment, the producers of bar code symbols and the users of bar code technology, require publicly available standard test specifications for bar code reading equipment, to ensure the accuracy and consistency of performance of this equipment.

1 Scope

This European prestandard defines the test equipment and procedures to be used to determine the performance of bar code scanning and decoding equipment. It defines requirements in respect of linear scanning techniques. It deals with bar code scanning and decoding equipment both as integrated reading systems and as discrete units. It also defines in an annex electrical and laser safety requirements and requirements for protection from electromagnetic interference caused or suffered by the equipment.

Note: Two dimensional scanning and reading differ significantly in principle from linear scanning and reading and scanners and decoders for such symbols should therefore be covered either by a subsequent revision of this European prestandard or a separate document.

2 Normative References

This European prestandard incorporates by dated or undated reference provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed below. 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 publications referred to applies.

EN 796	Bar Coding - Symbology Identifiers
EN 797	Bar Coding - Symbology Specification - "EAN/UPC"
EN 798	Bar Coding - Symbology Specification - "Codabar"
EN 799	Bar Coding - Symbology Specification - "Code 128"
EN 800	Bar Coding - Symbology Specification - "Code 39"
EN 801	Bar Coding - Symbology Specification - "Interleaved 2 of 5"
prEN 1556	Bar Coding - Terminology
prEN 1635	Bar Coding - Test Specifications - Bar Code Symbols
EN 50081-1	Electromagnetic compatibility; Generic emission standard; part 1: residential, commercial and light industry
EN 50081-2	Electromagnetic compatibility; Generic emission standard; part 2: industrial environment
EN 50082-1	Electromagnetic compatibility; Generic immunity standard; part 1: residential, commercial and light industry
EN 50082-2	Electromagnetic compatibility; Generic immunity standard; part 2: industrial environment
EN 55022	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
EN 60825-1	Safety of laser products; part 1: equipment classification, requirements and user's guide.
EN 60950	Safety of information technology equipment, including electrical business equipment
IEC 68-2-6	Environmental testing - Part 2: Tests. Test FC: vibration (sinusoidal).
IEC 68-2-17	Basic environmental testing procedures - Part 2: Tests. Test Q: Sealing
IEC 68-2-27	Environmental testing - Part 2: Tests. Test Ea and guidance: Shock.
IEC 68-2-29	Basic environmental testing procedures - Part 2: Tests. Test Eb and guidance: Bump.
IEC 68-2-32	Basic environmental testing procedures - Part 2: Tests. Test Ed: Free fall.
IEC 1010-1	Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements

ISO 2859-1 Sampling Procedures for Inspection by Attributes; Part 1: sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection

3 Definitions

For the purpose of this European Prestandard the definitions in prEN 1556 and the following apply.

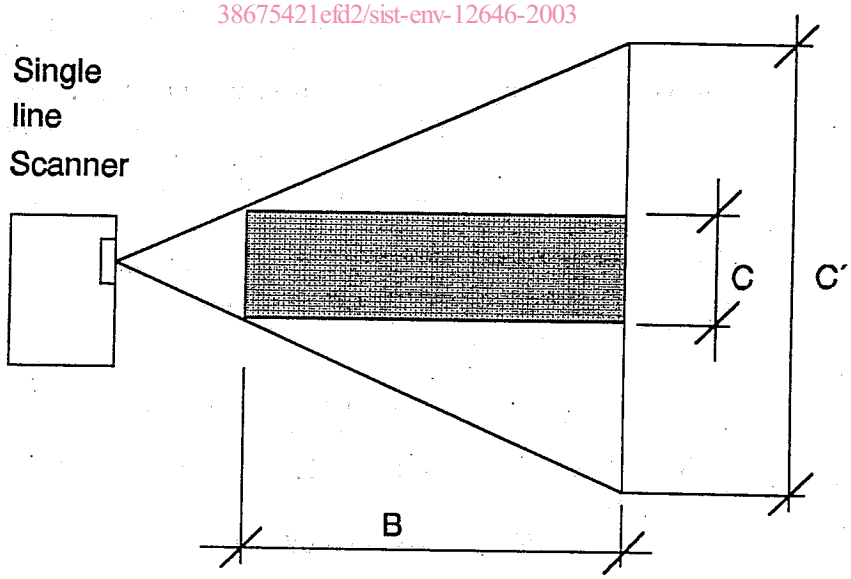
3.1 code orientation: Relationship of the bar code with reference to the reading field of the scanner. Typical code orientations are Ladder and Picket Fence. See orientation.

3.2 contact scanner: A particular type of fixed beam scanner in which the scanning action takes place with the scanner on actual or near contact with the symbol. E.g. wand or light pen.

3.3 contrast: The difference in reflectance between the light and dark elements of a bar code symbol, measured at a specific wavelength. Usually measured as Symbol Contrast, i.e. the difference between the highest light and the lowest dark reflectance values in a symbol. A minimum symbol contrast value is required by scanners, as listed in their specifications.

3.4 effective field of view: The whole area in front of the exit window of a non-contact scanner in which symbols can be read with a defined depth of field.

3.5 effective reading zone: The whole area in front of the exit window of a non-contact scanner in which symbols can be read with the full depth of field in compliance with defined reading specifications. See BxC in fig. 1. See also reading zone.



Reading diagram

Figure 1: Example of effective reading zone

3.6 exit window: The window or aperture from which the reading beam emerges. The datum point for the reading diagram.

3.7 first read rate: The percentage representing the number of good reads per 100 attempts to read a particular symbol. The first read rate applies only to scanners in which the scan attempt results in a single pass of the scanning spot through the symbol. See Read Rate.

3.8 focal distance: The distance from the scanner exit window to the point of the highest resolution of the scanning equipment.

3.9 good read: The result of a successful scan where the data decoded corresponds exactly to that encoded in the bar code symbol.

3.10 hand held bar code reader: A hand held device used to read bar code symbols.

3.11 maximum reading distance: The distance from the face of the reading device to the end of the depth of field. See R in figure 6.

3.12 minimum reading distance: The distance from the face of the reading device to the beginning of the depth of field. See A in figure 6.

3.13 orientation: Positioning with respect to a specific direction or plane. Bar code symbols can be positioned so as to be scanned horizontally (vertical bars: 'picket fence' orientation) or vertically (horizontal bars: 'ladder' orientation). Ladder orientation, for the purposes of this prestandard is when the movement direction of the bar code symbol relative to the scanning beam is parallel to the height of the bars. Picket fence orientation, for the purposes of this prestandard is when the movement direction of the bar code symbol relative to the scanning beam is perpendicular to the height of the bars. Note that these definitions differ from the common usage which refers to orientation of the bar code symbol relative to the observer. See figure 2 and figure 3.

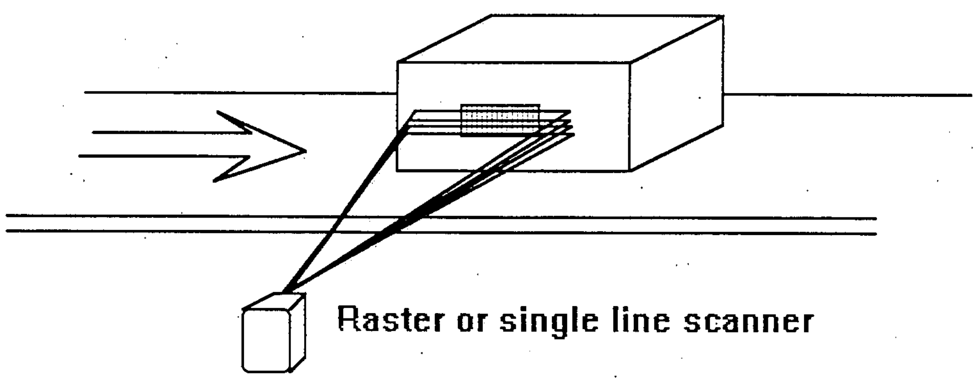
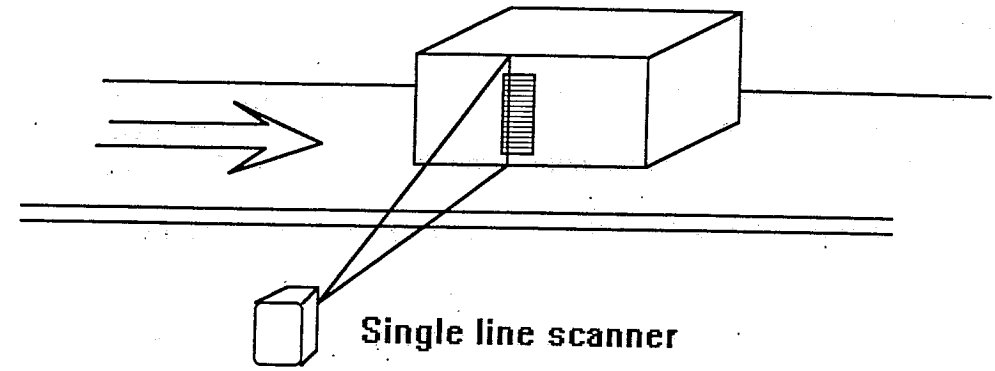


Figure 2: Picket fence orientation



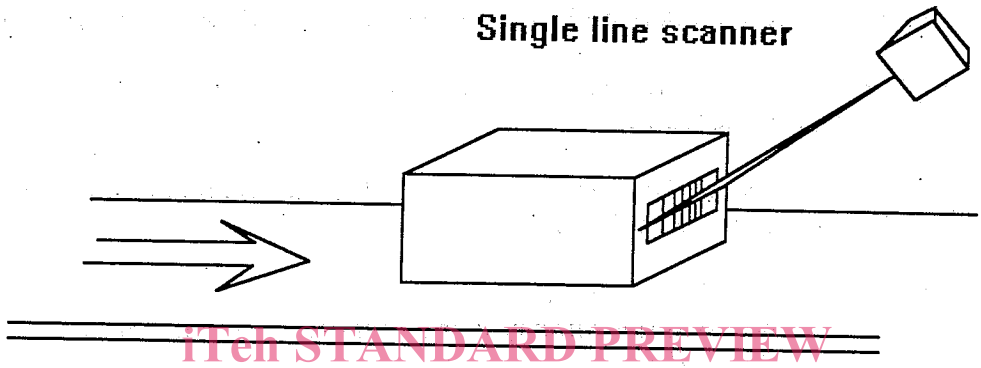


Figure 3: Ladder orientation

3.14 oversquare: Used to describe bar code symbols with an aspect ratio greater than one.

3.15 raster: The process of projecting a laser beam to create multiple, nearly parallel, scan lines instead of a single line.

3.16 raster distance: The distance between the two most widely spaced adjacent scan lines on a plane at a defined distance from the scanner exit window. See E in figure 7.

3.17 raster width: The distance between the two outermost scan lines on a plane at a defined distance from the scanner exit window. This covers a reading field which depends on the construction of the scanner and on the reading distance. See D in figure 7.

3.18 reading angles: Three different reading angles pitch, skew and tilt are defined. See figure 4.

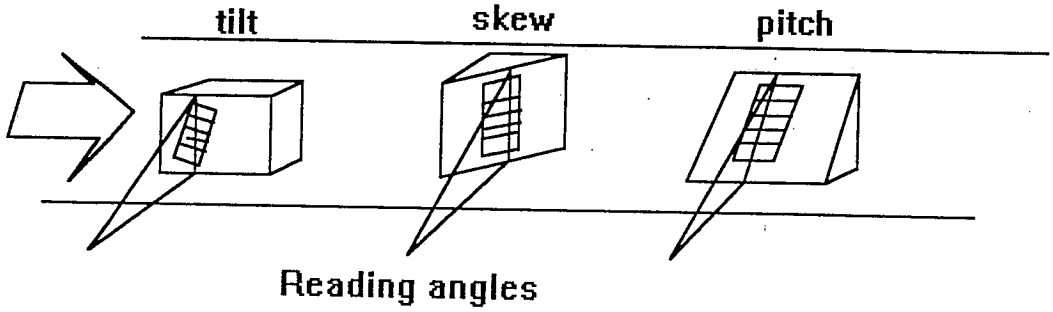


Figure 4: Reading angles

3.19 reading diagram: The graphical representation of the reading zone(s) for different X dimensions (or other parameters) of the bar code symbol.

The reading diagram is of great assistance in providing a complete overview of the performance of a bar code scanner/reader. It is essential in the case of moving beam scanners/readers. The parameters of the reading diagram are:

- The reading diagram is measured from the exit window of the reader
- The field of view is measured on the y axis
- The reading distance is measured on the x axis
- The X dimension (in mm)
- Definition of the skew, tilt and pitch angle and the symbol contrast value, ambient light levels, and code type.

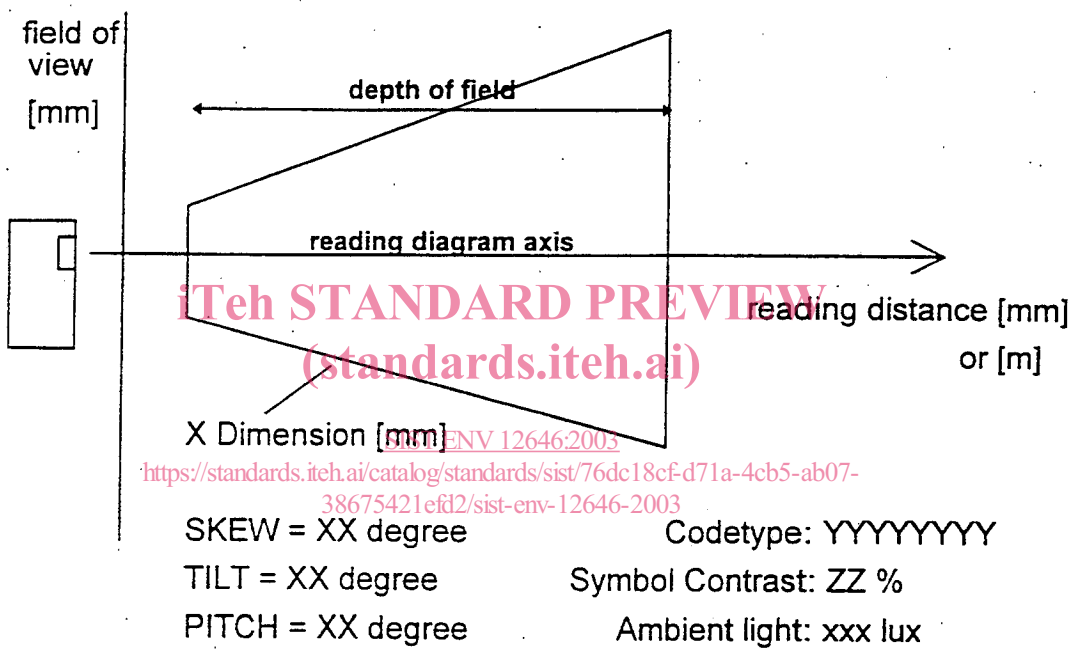
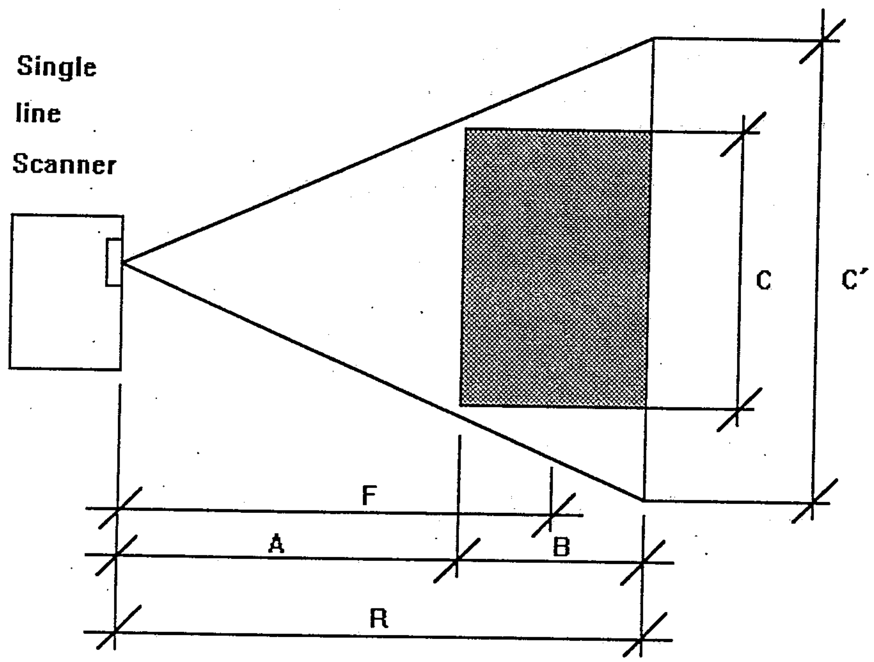


Figure 5: Generalised reading diagram with parameters



Reading diagram

Dual axis scanner	
Parameter	Term
A	Minimum reading distance
B	Depth of field
C´	Field of view
C	Effective field of view
R	Maximum reading distance
F	Focal distance
BxC	Effective reading zone

Figure 6: Reading diagram for dual axis scanner