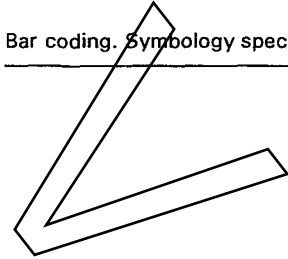


Streepjescodes.
Symbologie-specificaties.
"EAN/UPC"

Bar coding. Symbology specifications. "EAN/UPC"

1e druk, september 1995
UDC 681.3.04/.05



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Nederlands voorwoord

Voor de in deze norm vermelde andere normen bestaan in Nederland de volgende equivalenten:

<u>Vermelde norm:</u>	<u>Nederlandse norm:</u>	<u>Titel:</u>
prEN 1556	ontw.NEN-EN 1556	Streepjescodes. Terminologie
prEN 1635	ontw.NEN-EN 1635	Streepjescodes. Beproevingseisen voor symbolen
ISO/IEC 646:1991	-	-
ISO 1073-2:1976	NEN-ISO 1073-2:1979	Automatische gegevens verwerking. Alfabetische tekenverzameling voor optische herkenning. Deel 2: Tekenverzameling OCR-B. Vormen en afmetingen van de gedrukte tekens

voorproef

ICS 35.040

Descriptors: data processing, character recognition, optical recognition, graphic characters, alphanumeric character sets, bar codes, symbols, characteristics

English version

Bar coding - Symbology specifications - "EAN/UPC"

Codes à barres - Spécifications des symbologies
- "EAN/UPC"

Strichcodierung - Symbologiespezifikationen
"EAN/UPC"

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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 225 "Bar coding" of which the secretariat is held by NNI.

Organisations contributing to the development of the standard include:

- AIM Europe (Automatic Identification Manufacturers)
- EAN International (European Article Numbering Association)

NOTE: Not all of the symbologies which appear in this document are defined in European Standards; for information on current European Standards contact the CEN Central Secretariat or National Standards Organisations.

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of an identical text or by endorsement, at the latest by February 1996, and conflicting national standards shall be withdrawn at the latest by February 1996.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: 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. There is a number of methods of encoding information in bar code form, known as symbologies, and the rules defining the translation of characters into bar and space patterns and other essential features are known as the symbology specification. "EAN/UPC" is one such symbology.

Previously symbology specifications have been developed and published by a number of organisations resulting in certain instances in conflicting specifications for certain symbologies.

Manufacturers of bar code equipment and users of bar code technology require publicly available standard symbology specifications to which they can refer when developing equipment and application standards.

1 Scope

This standard

- specifies the requirements for the bar code symbology known as "EAN/UPC".
- specifies "EAN/UPC" symbology characteristics, data character encodation, symbol formats, dimensions, tolerances, and a reference decoding algorithm.

The standard is applicable to the "EAN/UPC" bar code symbology. The "EAN/UPC" bar code symbols are exclusively reserved for encoding identification numbers. The use of the symbology is restricted and subject to compliance with the EAN International (EAN) and Uniform Code Council (UCC) rules and registration procedures.

The administration of the numbering system by EAN and UCC ensures that identification codes assigned to particular items are unique worldwide and are defined in a consistent way.

The major benefit for the users of the standard is to refer to uniquely defined identification codes in their trading transactions. This is particularly useful in open environments.

2 Normative references

This European Standard 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 Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 1556	Bar coding - Terminology
prEN 1635	Bar coding - Test specifications for bar code symbols
ISO 646:1991	Information technology - ISO 7-bit coded character set for information interchange
ISO 1073-2:1976	Alphanumeric character sets for optical recognition - Part 2: Character set OCR-B - Shapes and dimensions of the printed image
"General EAN Specifications" (EAN International, Brussels, 1994)	

3 Definitions

For the purposes of this European Standard the following definitions and those of prEN 1556 apply:

- 3.1 add-on symbol:** A symbol used to encode information supplementary to that in the main symbol
- 3.2 auxiliary pattern:** A pattern of bars/spaces representing non-data components of the symbol - e.g. guard patterns and inter-character delineators
- 3.3 block:** A grouping of symbol segments
- 3.4 delineator:** An auxiliary pattern used to separate characters within an add-on symbol

3.5 even parity: A characteristic of the encodation of a symbol character whereby it contains an even number of dark modules

3.6 guard pattern: A pattern of bars/spaces corresponding to start or stop patterns in other symbologies, or serving to separate the two halves of a symbol

3.7 magnification factor: A constant multiplier of the nominal dimensions of an "EAN/UPC" symbol

3.8 numbering organisation: An agency affiliated to EAN and responsible for the administration of the EAN system and maintenance of a number bank within a defined territory

3.9 number set: A series of ten bar/space patterns of either even or odd parity encoding the digits 0 to 9

3.10 odd parity: A characteristic of the encodation of a symbol character whereby it contains an odd number of dark modules

3.11 symbol segment: In UPC Version D symbols, a grouping of symbol characters of specified length and parity pattern from which blocks are built up

3.12 variable parity encodation: The process of encoding additional information in a series of symbol characters by using particular combinations of odd and even parity characters to encode digits or for checking purposes

3.13 version: A combination of one or more blocks, the structure of which has been defined in the General EAN and UCC Specifications

3.14 zero-suppression: The process of removing zeroes from specified positions in a "UPC-A" data string in order to encode it in "UPC-E" format

4 Requirements

4.1 Symbology characteristics

The characteristics of "EAN/UPC" are:

- a) Encodable character set: numeric (0 to 9) i.e. ASCII characters 48 - 57 inclusive, in accordance with ISO 646;
- b) Code type: continuous;
- c) Elements per symbol character: 4, comprising 2 bars and 2 spaces, each of 1, 2, 3 or 4 modules in width (guard patterns and auxiliary patterns have differing numbers of elements);
- d) Character self-checking: yes;
- e) Data string length encodable: fixed (various lengths from 2 to 13 characters depending on specific symbol type);
- f) Omni-directionally decodable: yes;
- g) Symbol check character: one, mandatory (see A.1);
- h) Symbol character density: 7 modules per symbol character;
- i) Non-data overhead: equivalent to 11 modules for "EAN-13", "EAN-8" and "UPC-A" symbols, 9 for "UPC-E" symbols; varies for other types.

4.2 Symbol structure

An "EAN/UPC" symbol shall consist of a main symbol which shall be:

- an "EAN-13", "UPC-A" or "UPC-E" symbol, which may be accompanied by an add-on symbol;
- an "EAN-8" symbol.

The Version D symbol structure, described in Annex B, may be used in special applications subject to the proviso in Annex B.

"EAN/UPC" symbol types are described in 4.4 below.

"EAN/UPC" main symbols shall comprise:

- a) leading quiet zone;
- b) auxiliary patterns and symbol characters representing data and check digits, as described in 4.4.1 to 4.4.4;
- c) trailing quiet zone.

"EAN/UPC" add-on symbols shall comprise:

- a) leading quiet zone (which shall overlap trailing quiet zone of main symbol);
- b) auxiliary patterns and symbol characters representing data as described in 4.4.5;
- c) trailing quiet zone.

4.3 Character encodation

4.3.1 Symbol character encodation

Symbol characters shall encode digit values in 7-module characters selected from different number sets known as A, B and C, as in Table 1:

Table 1: Number sets A, B and C

Digit value	Representation in Set A				Representation in Set B				Representation in Set C			
	S	B	S	B	S	B	S	B	B	S	B	S
0	3	2	1	1	1	1	2	3	3	2	1	1
1	2	2	2	1	1	2	2	2	2	2	2	1
2	2	1	2	2	2	2	1	2	2	1	2	2
3	1	4	1	1	1	1	4	1	1	4	1	1
4	1	1	3	2	2	3	1	1	1	1	3	2
5	1	2	3	1	1	3	2	1	1	2	3	1
6	1	1	4	1	4	1	1	1	1	1	1	4
7	1	3	1	2	2	1	3	1	1	3	1	2
8	1	2	1	3	3	1	2	1	1	2	1	3
9	3	1	2	1	2	1	3	1	3	1	1	2

NOTE: S denotes a space (light), B denotes a bar (dark), and the figures indicate the width of each element in modules.

Annex F illustrates this graphically. The sum of the bar modules in any symbol character shall determine its parity. Symbol characters in number set A are odd parity characters. Symbol characters in number sets B and C are even parity characters. Number set C characters are mirror images of number set B characters.

Symbol characters in number sets A and B always begin on the left with a light module and end on the right with a dark module. Symbol characters in number set C begin on the left with a dark module and end on the right with a light module.

Data characters shall normally be represented by a symbol character. However in certain specific instances defined below (see 4.4.1, 4.4.4, 4.4.5) the combination of number sets in a symbol may itself represent either data or a check value. This technique shall be referred to as variable parity encodation.

4.3.2 Auxiliary pattern encodation

Auxiliary patterns shall be composed as shown in Table 2.

Table 2: Auxiliary patterns

Auxiliary pattern	Number of modules	Module set					
		S	B	S	B	S	B
Normal guard pattern	3		1	1	1		
Centre pattern	5	1	1	1	1	1	
Special guard pattern	6	1	1	1	1	1	1
Add-on guard pattern	4		1	1	2		
Add-on delineator	2	1	1				

NOTE: S denotes a space (light) element, B denotes a bar (dark) element, and the figures indicate the width of each element in modules.

Annex F illustrates these graphically.

The normal guard pattern corresponds to the start and stop patterns in other symbologies and the special guard pattern is used as a stop pattern in "UPC-E" symbols.

4.4 Symbol formats

4.4.1 "EAN-13" symbols

The "EAN-13" symbol shall be made up as follows, reading from left to right:

- a normal guard pattern;
- 6 symbol characters from number sets A and B;
- a centre guard pattern;
- 6 symbol characters from number set C;
- a normal guard pattern.

The final symbol character shall encode the check character calculated in accordance with A.1.

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