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**Informationsteknik – Autoid-tekniker –  
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**AIDC technologies – Symbology specifications –  
Code 16K**

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## AIDC technologies - Symbology specifications - Code 16K

Code à barres - Spécifications des symbologies - Code  
16K

AutoID-Technologien - Symbologiespezifikationen - Code  
16K

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**EN 12323:2005 (E)**

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## **Foreword**

This document (EN 12323:2005) has been prepared by Technical Committee CEN/TC 225 "AIDC Technologies", the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by November 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.

This document supersedes EN 12323:1998.

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

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### **Introduction**

The technology of bar coding is based on the recognition of patterns encoded in bars and spaces of defined dimensions. There are 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 specifications. "Code 16K" is one such symbology.

Previously, symbology specifications have been developed and published by a number of different private organisations, resulting in certain instances in conflicting requirements 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 document:

- specifies the requirements for the multi row bar code symbology known as "Code 16K";
- specifies "Code 16K" symbology characteristics, data character encodation, dimensions, tolerances, decoding algorithms and user-defined application parameters;
- describes a subset of "Code 16K" assigned to EAN International.

## 2 Normative references

The following referenced documents are indispensable for the application 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 1556:1998, *Bar coding — Terminology*

EN ISO/IEC 15416, *Information technology — Automatic identification and data capture techniques — Bar code print quality test specification — Linear symbols (ISO/IEC 15416:2000)*

ISO/IEC 646:1991, *Information technology — ISO 7-bit coded character set for information interchange*

ISO/IEC 8859-1:1998, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 15424, *Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)*

EAN•UCC *General Specifications (EAN International, Brussels)*

## 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1556:1998 and the following apply.

### 3.1

#### **guard bar**

additional bar used to separate the trailing space of a start character from the leading space of the first symbol character in a row

### 3.2

#### **mode character**

symbol character in the first position after the start character in the first row of a symbol, used to define the initial code set and any implied special characters

### 3.3

#### **separator bar**

horizontal bar separating two rows of a symbol or abutting the top or bottom of the first or last row respectively

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### 4 Requirements

#### 4.1 Symbology characteristics

The characteristics of "Code 16K" are:

- a) encodable character set:
  - 1) all 128 ASCII characters, i.e. ASCII characters 0 to 127 inclusive, in accordance with ISO/IEC 646:1991;
  - 2) characters with ASCII values 128 to 255 in accordance with ISO 8859-1:1998 may also be encoded. See 4.3.4.4 d);
  - 3) 4 non data function characters;
  - 4) 3 code set selection characters;
  - 5) 7 shift characters;
  - 6) 8 start characters;
  - 7) 8 stop characters;
  - 8) 1 pad character;
- b) code type: continuous, multi row;
- c) elements per symbol character: 6, comprising 3 spaces and 3 bars, each of 1, 2, 3 or 4 modules in width;
- d) character self-checking: yes;
- e) row self-checking: yes;
- f) symbol width: 81X inclusive of minimum quiet zones;
- g) symbol height: variable (2 to 16 rows);
- h) bidirectional decoding: yes;
- i) number of symbol check characters: 2, mandatory (see Annex A);
- j) symbol character density: 11 modules per symbol character representing data (equivalent to 5,5 modules per data character in code set C);
- k) representative data capacity: 2 row symbol: 7 ASCII characters, 14 numeric characters;
- l) maximum data capacity 16 row symbol: 77 ASCII characters, 154 numeric characters;
- m) non-data overhead:
  - per row: 15 modules;
  - per symbol: 33 modules minimum, 81 modules maximum.



### 4.2 Symbol structure

Each "Code 16K" symbol consists of 2 to 16 rows. Each row shall comprise:

- a) leading quiet zone;
- b) start character;
- c) 1X guard bar (where X is the nominal width of a narrow bar or space);
- d) 5 symbol characters;
- e) 1 stop character;
- f) trailing quiet zone.

Figure 1 illustrates the row structure. Rows shall be separated from each other by a horizontal separator bar. The top and bottom of the symbol shall also have separator bars which shall extend to the ends of the quiet zones.

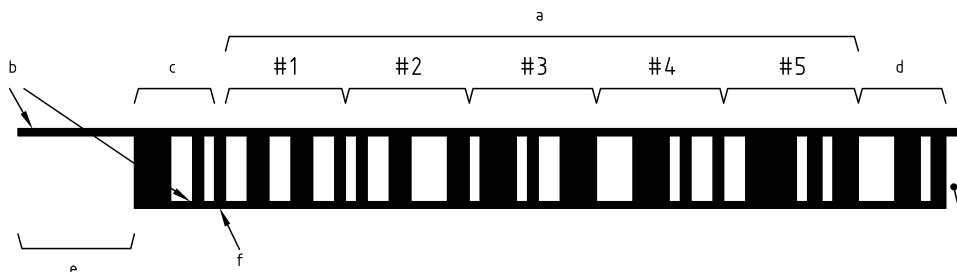


Figure 1 – "Code 16K" row structure

Figure 2 shows the structure of a full 16-row symbol. The symbol characters are ordered from the leftmost character of the first (top) row, through each row left to right to the rightmost character in the last (bottom) row. The first symbol character is the "mode" character S. The last two characters are the check characters C1 and C2. The remaining symbol characters encode the data for the symbol.

S	D1	D2	D3	D4
D5	D6	D7	D8	D9
D10	D11	D12	D13	D14
D15	D16	D17	D18	D19
D20	D21	D22	D23	D24
D25	D26	D27	D28	D29
D30	D31	D32	D33	D34
D35	D36	D37	D38	D39
D40	D41	D42	D43	D44
D45	D46	D47	D48	D49
D50	D51	D52	D53	D54
D55	D56	D57	D58	D59
D60	D61	D62	D63	D64
D65	D66	D67	D68	D69
D70	D71	D72	D73	D74
D75	D76	D77	C1	C2

Figure 2 – "Code 16K" symbol structure

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Figure 3 illustrates a complete symbol encoding the data “ab0123456789” in “Code 16K”.



**Figure 3 – “Code 16k” symbol encoding “ab0123456789”**

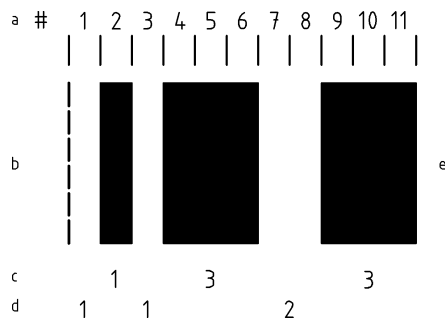
**4.3 Character assignments**

**4.3.1 Symbol character encodation**

There are 107 "Code 16K" symbol characters. Each symbol character consists of eleven 1X-wide modules. Each symbol character consists of three space elements alternating with three bar elements, starting with a space. Each bar or space element may consist of 1 to 4 modules.

Table 1 defines all the "Code 16K" character assignments. In the column headed 'Symbol Character Structure' the numeric value represent the widths of the elements in modules or multiples of the X dimension.

Symbol character parity is defined by the sum of the bar modules in any symbol character. In "Code 16K" this sum shall always be odd (odd parity). This odd parity feature enables character self-checking to be carried out. Figure 4 illustrates the symbol character value 33.



**Figure 4 – Symbol character value 33**

**4.3.2 Data character encodation**

"Code 16K" has three unique data character sets, shown in Table 1 as code sets A, B and C. The symbol character bar and space patterns shown are equivalent to the data characters listed in the columns for code A, B or C. The choice of data character set depends on the mode character (starting symbol character), or the use of code set A, code set B or code set C characters or the shift characters. The code set can be redefined within the symbol by the use of code set or shift characters.

The same data may be represented by different "Code 16K" symbol characters, through the use of different combinations of mode, code set or shift characters. Annex F contains guidelines to generate the smallest symbol for given data. An application need not specify the code set to be used.

Each symbol character is assigned a numeric value listed in Table 1. This value is used in calculating the check characters C1 and C2. It may also be used to provide a conversion to and from ASCII decimal values when encoding in code sets A and B (see Annex G).

### **4.3.3 Code sets**

#### **4.3.3.1 Code set A**

Code set A includes all of the standard upper case alphanumeric characters together with the control characters (i.e. characters with ASCII values from 00 to 95 inclusive), and eleven special characters.

#### **4.3.3.2 Code set B**

Code set B includes all of the standard upper case alphanumeric characters together with the lower case alphabetic characters (i.e. characters with ASCII values from 32 to 127 inclusive), and eleven special characters.

#### **4.3.3.3 Code set C**

Code set C includes the set of 100 digit pairs from 00 to 99 inclusive, as well as seven special characters. This allows numeric data to be encoded, two data digits per symbol character, at effectively twice the density of standard data.