
**Information technology — Automatic
identification and data capture
techniques — Bar code symbology
specifications — Code 39**

*Technologies de l'information — Techniques automatiques d'identification
et de capture des données — Spécifications des symbologies des codes à
barres — Code 39*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC 16388:1999](https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999)

<https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999>



Contents

1 Scope 1

2 Normative references 1

3 Definitions 1

4 Requirements 1

4.1 Symbology characteristics 1

4.2 Symbol structure 2

4.3 Character encodation 2

4.3.1 Symbol character encodation 2

4.3.2 Start and stop characters..... 4

4.3.3 Optional symbol check character 4

4.4 Dimensions..... 4

4.5 Reference decode algorithm 4

4.6 Application-defined parameters..... 6

4.6.1 Symbology and dimensional characteristics..... 6

4.6.2 Optical specifications..... 6

4.6.3 Test specifications..... 6

Annex A (informative) Additional features..... 8

Annex B (informative) Guidelines for the use of Code 39..... 11

Annex C (informative) Symbology identifier..... 12

Annex D (informative) Example of application-defined parameters 13

iteh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/5655282c-b715-46c0-8b22-39f56f46c27/iso-iec-16388-1999>

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 16388 was prepared by BSI and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Annexes A to D of this International Standard are for information only.

ITEH STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999>

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. Code 39 is one such symbology.

Previously, symbology specifications have been developed and published by a number of organizations, 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/IEC 16388:1999](https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999)

<https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999>

Information technology — Automatic identification and data capture techniques — Bar code symbology specifications — Code 39

1 Scope

This International Standard specifies the requirements for the bar code symbology known as Code 39; it specifies Code 39 symbology characteristics, data character encodation, dimensions, tolerances, decoding algorithms and application-defined parameters.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 646:1983, *Information technology — ISO 7-bit coded character set for information interchange*.

ISO 7064:1983, *Data processing — Check character systems*.

ISO/IEC 15416, *Automatic identification and data capture techniques — Bar code print quality test specification — Linear symbols*.

[ISO/IEC 16388:1999](https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-)

<https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22->

ISO/IEC 15424, *Automatic identification and data capture techniques — Data carrier/symbology identifiers*.

EN 1556:1997, *Bar Coding — Terminology*.

3 Definitions

For the purposes of this International Standard, the definitions given in EN 1556 apply.

4 Requirements

4.1 Symbology characteristics

The characteristics of Code 39 are:

- a) Encodable character set:
 - 1) Full alphanumeric A to Z and 0 to 9 (ASCII characters 65 to 90 and 48 to 57 inclusive, in accordance with ISO 646);
 - 2) special characters: space \$ % + - . / (ASCII characters 32, 36, 37, 43, 45, 46 and 47 respectively, in accordance with ISO 646);
 - 3) start/stop character;
- b) Code type: discrete;

- c) Elements per symbol character: 9, of which 3 wide and 6 narrow, comprising 5 bars and 4 spaces;
- d) Character self-checking: yes;
- e) Data string length encodable: variable;
- f) Bidirectionally decodable: yes;
- g) Symbol check character: one, optional (see annex A);
- h) Symbol character density: 13 to 16 modules per symbol character, inclusive of minimum intercharacter gap, depending on wide/narrow ratio;
- i) Non-data overhead: equivalent to 2 symbol characters.

4.2 Symbol structure

As illustrated in Figure 1, Code 39 symbols shall comprise:

- a) leading quiet zone;
- b) start character;
- c) one or more symbol characters representing data (including symbol check character, if present);
- d) stop character;
- e) trailing quiet zone.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

A space, the intercharacter gap, shall separate characters within the symbol.

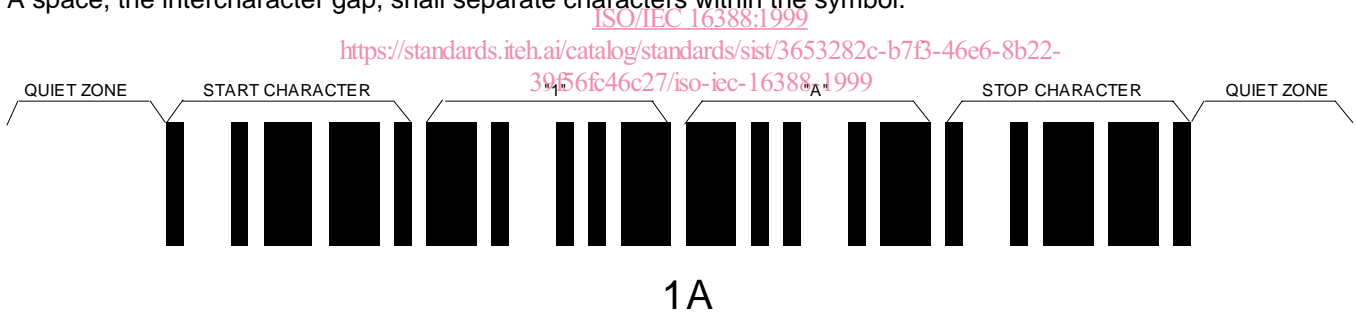


Figure 1 — Code 39 symbol

4.3 Character encodation

4.3.1 Symbol character encodation

Table 1 defines all the Code 39 character assignments.

Table 1 — Code 39 character assignments

Char.	Encodation Pattern	B	S	B	S	B	S	B	S	B	ASCII value
0		0	0	0	1	1	0	1	0	0	48
1		1	0	0	1	0	0	0	0	1	49
2		0	0	1	1	0	0	0	0	1	50
3		1	0	1	1	0	0	0	0	0	51
4		0	0	0	1	1	0	0	0	1	52
5		1	0	0	1	1	0	0	0	0	53
6		0	0	1	1	1	0	0	0	0	54
7		0	0	0	1	0	0	1	0	1	55
8		1	0	0	1	0	0	1	0	0	56
9		0	0	1	1	0	0	1	0	0	57
A		1	0	0	0	0	1	0	0	1	65
B		0	0	1	0	0	1	0	0	1	66
C		1	0	1	0	0	1	0	0	0	67
D		0	0	0	0	1	1	0	0	1	68
E		1	0	0	0	1	1	0	0	0	69
F		0	0	1	0	1	1	0	0	0	70
G		0	0	0	0	0	1	1	0	1	71
H		1	0	0	0	0	1	1	0	0	72
I		0	0	1	0	0	1	1	0	0	73
J		0	0	0	0	1	1	0	0	0	74
K		1	0	0	0	0	0	0	1	1	75
L		0	0	1	0	0	0	0	1	1	76
M		1	0	1	0	0	0	0	1	0	77
N		0	0	0	0	1	0	0	1	1	78
O		1	0	0	0	1	0	0	1	0	79
P		0	0	1	0	1	0	0	1	0	80
Q		0	0	0	0	0	0	1	1	1	81
R		1	0	0	0	0	0	1	1	0	82
S		0	0	1	0	0	0	1	1	0	83
T		0	0	0	0	1	0	1	1	0	84
U		1	1	0	0	0	0	0	0	1	85
V		0	1	1	0	0	0	0	0	1	86
W		1	1	1	0	0	0	0	0	0	87
X		0	1	0	0	1	0	0	0	1	88
Y		1	1	0	0	1	0	0	0	0	89
Z		0	1	1	0	1	0	0	0	0	90
hyphen		0	1	0	0	0	0	1	0	1	45
period		1	1	0	0	0	0	1	0	0	46
space		0	1	1	0	0	0	1	0	0	32
\$		0	1	0	1	0	1	0	0	0	36
/		0	1	0	1	0	0	0	1	0	47
+		0	1	0	0	0	1	0	1	0	43
%		0	0	0	1	0	1	0	1	0	37
S/S or *		0	1	0	0	1	0	1	0	0	none

NOTE 1: S/S denotes the start and stop character, also represented as *

NOTE 2: In the columns headed B and S, 0 represents a narrow element and 1 a wide element.

4.3.2 Start and stop characters

The Code 39 start and stop character is usually depicted in human-readable form by a * (asterisk). This character shall not form part of the data encoded elsewhere in the symbol and shall not be transmitted by the decoder.

4.3.3 Optional symbol check character

Annex A defines the check character position and calculation.

4.4 Dimensions

Code 39 symbology shall use the following nominal dimensions:

- a) width of narrow element (X): the X dimension of Code 39 symbols may be defined by the application specification in accordance with the needs of the application in question. See 4.6.1;
- b) wide/narrow ratio (N): 2,0:1 to 3,0:1;
- c) width of intercharacter gap (I):
 - 1) minimum: equal to X ;
 - 2) maximum:
 - for $X < 0,287$ mm: $5,3X$;
 - for $X \geq 0,287$ mm: 1,52 mm or $3X$, whichever is greater;
- d) minimum width of quiet zone: $10X$;
- e) recommended minimum bar code height for manual scanning: 5,0 mm or 15 % of symbol width excluding quiet zones, whichever is greater.

NOTE The width, W (in millimetres), of a Code 39 symbol, including quiet zones, can be calculated from the following expression:

$$W = (C+2)(3N+6)X + (C+1)I + 2Q$$

where:

- C is the number of data characters (including symbol check character if used);
- N is the wide/narrow ratio;
- X is the width of a narrow element in millimetres;
- I is the width of the intercharacter gap in millimetres;
- Q is the width of the quiet zone in millimetres.

4.5 Reference decode algorithm

Bar code reading systems are designed to read imperfect symbols to the extent that practical algorithms permit. This section describes the reference decode algorithm used in the computation of the decodability value described in ISO/IEC 15416.

- a) confirm presence of a leading quiet zone.
- b) for each symbol character (including start and stop characters):
 - 1) measure the total width of 5 bars and 4 spaces; call this S .

- 2) compute a threshold value, $T = S/8$.
 - 3) compare each element width for that character with the value T . If element width is greater than T , assume element is wide; if not, assume element is narrow.
 - 4) determine if pattern of wide and narrow elements matches a valid character from the allowable set.
- c) the first symbol character read must be a start/stop character, from which the scan direction can be deduced.
 - d) continue character reading until a valid start/stop character is encountered.
 - e) confirm presence of a trailing quiet zone.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO/IEC 16388:1999](https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999)

<https://standards.iteh.ai/catalog/standards/sist/3653282c-b7f3-46e6-8b22-39f56fc46c27/iso-iec-16388-1999>