

# GS1-128 barcode

## Fact Sheet

The GS1-128 barcode is used to encode a GTIN-14, a GTIN-13 or a GTIN-12, and in addition can also encode attribute data using Application Identifiers (AIs). The GS1-128 barcode is only intended for scanning in a General Distribution Scanning environment.

When encoding a GTIN-13 or GTIN-12 in a GS1-128 barcode, one or two filler zero(s) respectively must be added in front of the GTIN.

**Figure 1: GTIN-13 with a filler zero encoded in a GS1-128 barcode**



**Note:** Figure is not to scale. Measurements are in millimetres.

### Concatenation

Concatenation (stringing data elements together) is an effective means for presenting multiple element strings in a single GS1-128 barcode and is used to conserve label space and optimise scanning operations when permitted by the application standard.

### Maximum Length

The length of the GS1-128 barcode must never exceed 165mm in length, including the Quiet Zones.

When concatenating data strings, the maximum number of characters in the GS1-128 barcode must not exceed 48 characters. This includes Function 1 Symbol Character (FNC1) when used as a field separator but excludes auxiliary characters (see table below) and the Symbol Check Character (Modulo 103).

**Table 1: GS1-128 auxiliary characters**

Auxiliary Characters		
Start A	Code A	Shift
Start B	Code B	Stop
Start C	Code C	FNC1
<p><b>Note:</b> When counting the number of characters in a GS1-128 symbol, the FNC1 is only included when used as a field separator.</p>		

## Magnification (X-dimension)

The size of the GS1-128 barcode depends on:

- the X-dimension (module width) chosen
- the number of characters encoded
- the number of non-numeric characters in the data

For GS1-128 barcodes that are to be scanned in a General Distribution (automated) Scanning environment, the X-dimension range is 0.495mm to 1.02mm (magnifications between 48.7% and 100%).

For other scanning environments, the X-dimension range is 0.25mm to 0.495mm (magnifications between 25% and 48.7%).

Mathematically, when W is width, 11 is the number of modules per symbol character, N is the number of symbol characters encoded (excluding the Start and Stop Characters and Symbol Check Character), 66 is the auxiliary characters and X is X-dimension (module width), which at 100% magnification is 1.02mm.

$$W = (11N + 66) X \text{ (including Quiet Zones)}$$

## Height of Bars

For scanning in a General Distribution (automated) Scanning environment, the minimum bar height for a GS1-128 barcode is 32mm.

For all other scanning environments, the bar height should be printed as high as possible. In no cases shall the bar height be less than 13mm. While 13mm is the minimum height for GS1-128 barcodes not being scanned in an automated scanning environment, every effort should be made to increase the bar height to as close to 32mm as possible.

## Human Readable Interpretation (HRI)

The HRI should be placed below the barcode, must show all digits encoded in the barcode and be grouped together wherever physically possible.

A clearly legible font such as OCR-B or Sans serif font types such as Arial are preferred. Bold, italics, light or narrow versions of a font SHOULD NOT be used. The font size SHOULD be at least 2mm in height.

Parentheses shall surround AIs in HRI but are not encoded in the GS1-128 barcode.

**Table 2: GS1-128 barcode dimensions**

Magnification	X-dimension	Width	Bar Height	Quiet Zones
25%	0.25	34.04	13.00	2.54
30%	0.30	40.84	13.00	3.05
35%	0.36	47.65	13.00	3.56
40%	0.41	54.46	13.00	4.06
45%	0.46	61.26	13.00	4.57
50%	0.51	68.07	32.00	5.08
55%	0.56	74.88	32.00	5.59
60%	0.61	81.68	32.00	6.10
65%	0.66	88.49	32.00	6.60
70%	0.71	95.30	32.00	7.11
75%	0.76	102.11	32.00	7.62
80%	0.81	108.91	32.00	8.13
85%	0.86	115.72	32.00	8.64
90%	0.91	122.53	32.00	9.14
95%	0.97	129.33	32.00	9.65
100%	1.02	136.14	32.00	10.16

**Notes:**

- Width = width of barcode excluding Quiet Zones.
- It is recommended to always allow slightly more than the minimum required Quiet Zone to allow for any possible ink spread or registration issues.
- All measurements are in millimetres, correct to two decimal places