

## 6.2 General placement principles

The following general principles for barcode placement shall be considered for any package type, whether it is scanned at the point-of-sale or elsewhere in the supply chain. Trade items intended to be scanned at a point-of-sale must be marked with an EAN-13, UPC-A, EAN-8, UPC-E, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded or GS1 DataBar Expanded Stacked barcode. The barcodes that are scanned elsewhere are the EAN-13, UPC-A, ITF-14, GS1 DataBar and GS1-128 barcodes

EAN-8 and UPC-E barcodes are intended for use on very small trade items sold at the point-of-sale.

### 6.2.1 Number of symbols

Barcodes representing different Global Trade Item Numbers (GTINs) must never be visible on any one item. Although a minimum of one symbol is required, two symbols representing the same GTIN are recommended on trade items for scanning in warehousing or general distribution scanning environments (see section [6.7](#)). Two or more symbols representing the same GTIN are recommended on large, heavy, or bulky items for point-of-sale (see section [6.4.9](#)) and are permissible on random wraps intended for point-of-sale (see section [6.3.3.7](#)). Two symbols, EAN/UPC encoding GTIN and another encoding GTIN plus attributes may be required during migration periods to new data carriers (see section [4.16](#)).

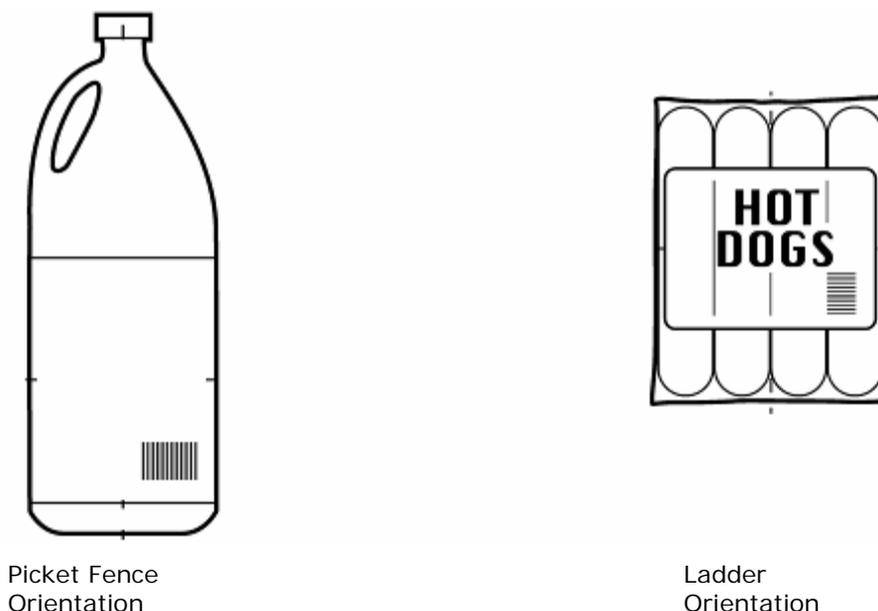
### 6.2.2 Scanning environment

Before considering the package type, determine whether the item will be scanned in a point-of-sale or a general distribution scanning environment. If the item is scanned at a point-of-sale only, the barcode placement guidelines in sections [6.3](#), [6.4](#), and [6.5](#), and [6.5.5](#) apply. However, if the item is scanned in both a point-of-sale and general distribution scanning environment or in a general distribution scanning environment only, the requirements (see section [6.7](#)) take precedence.

### 6.2.3 Orientation

Barcode orientation is determined primarily by the print process and any curvature of the item. If the printing process and curvature allow, the preferred placement is picket fence orientation, in which the bars of the barcode are perpendicular to the surface on which the package stands in its normal display position. For human readable interpretation rules see section [4.15](#). Empirical data has demonstrated that it makes no difference to the scanning process one way or the other. Rules for positioning barcodes on curved surfaces are given in section [6.2.3.2](#).

Figure 6.2.3-1. Barcode orientation



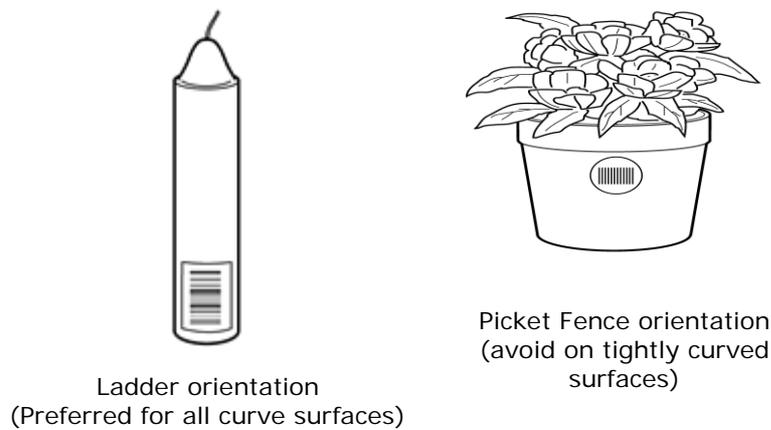
### 6.2.3.1 Printing direction

Barcode orientation is often determined by the printing process. Some printing processes give much higher quality results if the bars of the symbol run in the direction of the print, also known as the web direction. The printing company should always be consulted.

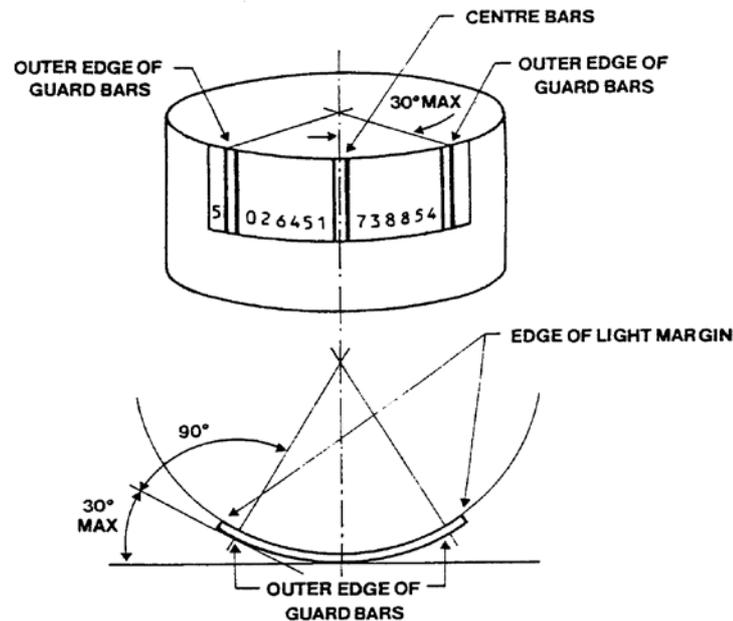
### 6.2.3.2 Trade items with curved surfaces

When a barcode is printed onto a curved surface it is sometimes possible for the extremes of the symbol to disappear around the curve, so that both ends cannot be visible to the scanner at the same time. This is more likely to occur the bigger the symbol and the tighter the curve of the packaging. In these situations, bars must be printed using certain combinations of the X-dimension and diameter of the curved surface (e.g., in ladder orientation on a can, in picket fence orientation on a cylindrical packet of biscuits). This helps ensure that the curve results in an apparent loss of height of the bars rather than the more serious apparent loss of complete bars.

**Figure 6.2.3.2-1.** Barcode placement on curved surfaces



The angle between the tangent to the centre of the curved symbol and the tangent to the extremity of the curved symbol (outer edge of the guard bars for symbols in the EAN/UPC symbology) must be less than 30 degrees. If this angle is more than 30 degrees, the symbol must be oriented such that the bars are perpendicular to the generating lines of the surface of the item.

**Figure 6.2.3.2-2.** Relationship between symbol and curvature


Figures [6.2.3.2-3](#) and [6.2.3.2-4](#) show the relationship between acceptable X-dimensions (narrow element width) for units of different diameters and the minimum diameters for different X-dimensions for barcodes printed in the picket fence orientation. Please refer to section [5.10](#) for the minimum, target, and maximum X-dimension for the symbol, based on the scanning environment.

**Figure 6.2.3.2-3.** Relationship between diameter and the X-dimension

Diameter of container		Maximum Value of X-dimension			
		EAN-13 or UPC-A barcode		EAN-8 barcode	
mm	inches	mm	inches	mm	inches
30 or below	1.18 or below	*	*	*	*
35	1.38	*	*	(0.274)	(0.0108)
40	1.57	*	*	(0.314)	(0.0124)
45	1.77	*	*	0.353	0.0139
50	1.97	(0.274)	(0.0108)	0.389	0.0153
55	2.16	(0.304)	(0.0120)	0.429	0.0169
60	2.36	0.330	0.0130	0.469	0.0185
65	2.56	0.356	0.0140	0.508	0.0200
70	2.75	0.386	0.0152	0.549	0.0216
75	2.95	0.413	0.0163	0.587	0.0232
80	3.25	0.446	0.0174	0.627	0.0247
85	3.35	0.469	0.0185	0.660	0.0260
90	3.54	0.495	0.0195	0.660	0.0260
95	3.74	0.525	0.0207	0.660	0.0260
100	3.94	0.551	0.0217	0.660	0.0260
105	4.13	0.578	0.0228	N/A	N/A
110	4.33	0.607	0.0239	N/A	N/A
115	4.53	0.634	0.0250	N/A	N/A
120 or above	4.72	0.660	0.0260	N/A	N/A



**Note:** An asterisk (\*) indicates that the package diameter is too small to permit a picket fence orientation barcode, and the symbol must be rotated 90 degrees to a ladder orientation (see section [5.10](#)) The barcode is printed perpendicular to the generating lines of the surface of the container.

 **Note:** *Italics* indicate X-dimensions that are permissible, but are not recommended on curved surfaces.

 **Note:** EAN-8 barcodes are reserved for very small items (see section [2.1](#)).

**Figure 6.2.3.2-4.** Relationship between the X-dimension and diameter

X-dimension		Minimum diameter of container					
		EAN-13 or UPC-A barcode		EAN-8 barcode		UPC-E barcode	
mm	inches	mm	inches	mm	inches	mm	inches
0.264	0.0104	48	1.89	34	1.33	26	1.01
0.300	0.0118	55	2.14	38	1.51	29	1.51
0.350	0.0138	64	2.50	45	1.76	34	1.53
0.400	0.0157	73	2.86	51	2.02	39	1.54
0.450	0.0177	82	3.21	58	2.27	44	1.73
0.500	0.0197	91	3.57	64	2.52	49	1.92
0.550	0.0217	100	3.93	70	2.77	54	2.11
0.600	0.0236	109	4.29	77	3.02	59	2.31
0.650	0.0256	118	4.64	83	3.27	63	2.50
0.660	0.0260	120	4.72	85	3.35	64	2.54

### 6.2.3.3 Avoiding scanning obstacles

Anything that will obscure or damage a barcode will reduce scanning performance and SHALL be avoided. For example:

- Never position the barcode on the item in an area with inadequate space. Do not let the other graphics encroach on the space for the barcode.
- Never place barcodes, including Quiet Zones, on perforations, die-cuts, seams, ridges, edges, tight curves, folds, flaps, overlaps, and rough textures.
- Never put staples through a barcode or its Quiet Zones.
- Never fold a symbol around a corner.
- Never place a symbol under a package flap.
- Barcodes used for production control purposes SHOULD be obstructed wherever possible before entering general distribution (see section [4.16](#).)