



9.1.3 Bar Code Characteristics

When printing bar codes, there are various considerations to ensure the symbol is of sufficient quality to ensure consistent scanning.

Magnification

The magnification (size) of the bar code is determined by the X-dimension (one narrow module width) in relation to a nominal size.

The allowable magnification range depends on the symbol type and the intended scanning environment. Reliability of scanning is always enhanced by selecting a magnification higher than the minimum.

Your printer may recommend a magnification larger than the minimum allowable. This should not be taken as a reflection on the quality of your printer. To print an accurate and high quality bar code a number of factors, such as the printing process, ink quality, and substrate, must be taken into consideration.

The artwork designer must work closely with the printer to ensure that the space allowed for the bar code is sufficient. The designer will not be able to decide on the area required for the symbol prior to consultation with the printer.

Bar Code Size Gauges can be obtained from GS1 Australia to be used as a guide to show the sizes of various symbol types at different magnifications. The Size Gauges are not intended to be a precise measuring tool, but can be a handy tool during the artwork stage to determine the amount of space needed for the required/chosen magnification.

Bar Height

Once the magnification of the bar code has been determined, for EAN/UPC Bar Codes it is important to ensure that the height remains in proportion to the magnification, and does not drop below the minimum specified.

For ITF-14 and GS1-128 Bar Codes the magnification does not impact the height, rather the height is determined by the scanning environment.

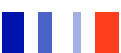
Please note that truncation (height reduction) on any symbol will reduce scanning reliability, and where space permits the full height should always be printed.

Quiet Zones

The Quiet Zones of the bar code are the solid, light areas before the first bar and after the last bar. These areas are extremely important as they allow the scanner to recognise the beginning and end of the bar code. Any obstruction or reduction in the Quiet Zones will most likely result in scanning difficulties.

The minimum size required for the Quiet Zones depends on the magnification of the bar code. It is recommended to allow slightly more than the minimum required Quiet Zones to allow for any possible ink spread or plate registration issues.

For EAN/UPC Bar codes a useful device to help maintain the Quiet Zone in some production processes is to include a less than (<) and/or greater than (>) character in the Human Readable Interpretation field, with its apex aligned with the edge of the Quiet Zone.





Colours

The colours and type of ink you choose for your bar codes is very important.

As a scanner reads a bar code using an infrared light source it sees the symbol differently to the human eye. As a result, some colour combinations and ink types are unsuitable for scanning because they do not provide sufficient contrast between the dark bars and the light background, or they provide a much too high reflectance value.

The most suitable and reliable colour combination is black bars on a white background. However, as a general rule, the background of the bar code can be a light, warm colour that does not contain any black (such as yellow or light orange), and the bar colour can be a dark, cool colour that has no, or low, red content (such as dark blue or dark green). It is also a recommendation to avoid high gloss inks as this can cause problems with the reflectance values.

Consult your printer or GS1 Australia if you are uncertain about colour choice/options.

The following colour chart shows a few examples of suitable and unsuitable colour combinations.



Figure 6 Colour Chart



9.1.4 Substrate

The substrate (the material the bar code is printed on) is very important. If unsuitable this can cause scanning difficulties. Different packaging materials reflect light differently, which can have an effect on the scanning ability of the bar code. This is especially evident on transparent and translucent packages where the background is not printed.

For printing bar codes it is recommended that you avoid the following:

- High gloss (highly specularly reflecting) substrates
- Transparent or semi-transparent backgrounds
- Transparent wrappers over the printed bar code

If necessary to print onto a highly reflective (flexible) substrate, we recommend the following:

- Increase the magnification of the bar code to between 105% and 120% (X-dimension 0.35mm - 0.40mm)
- Increase the amount of Bar Width Reduction

Make the background of the symbol as dense and less reflective as possible. To do this you may try the following:

- If you are not using wet inks, print two background layers. This may be two layers of the one colour, or you may use all light colours in the print run (e.g. white and yellow)
- Use a less viscous ink that will provide maximum coverage and density

9.1.5 Bar Widths and Print Quality

Always ensure that the print quality of the bar code is of a high standard. Ensure that the bars in the symbol are clearly defined, watch for voids or smudging, and avoid flecks in the background colour.

Maintaining acceptable print quality and consistent print gain (ink spread) requires regular ongoing checks.



9.1.6 Checklist for Generating and Printing Bar Codes

Below is a quick checklist of things to check during the bar code generation and printing processes. They represent common errors/problems seen by GS1 Australia.

- Ensure that the correct symbol is used for the relevant product, application, and scanning environment
- Check that the bar code will remain readable in the environment in which the product will be stored, handled, and distributed
- Ensure that the Check Digit is correct
- Check the size of the bar code, both the magnification and the bar height
- Ensure that there are adequate Quiet Zones, and that any optional Quiet Zone Indicators are correctly placed
- Check that the contrast between the bars and the background is adequate, and that the colours chosen will scan
- Make sure that the colour of the contents of the packaging will not unduly affect the contrast between the bars and spaces
- Check the position of the symbol on the final, formed product
- Ensure that no shrink-wrap, tape, or other printing will obscure the bar code on the finished product
- Ensure that no other bar codes will be visible or show through from the inside of the pack
- Carry out routine verification at all levels of packaging to ensure that the bar code complies with the required quality standard, and to identify any potential problems
- Check the print quality regularly throughout the print run by verifying the bar code quality
- Notify trading partners of the GTINs and the products they identify in good time
- Consider having GS1 Australia prepare a Bar Code Verification Report on the artwork for you prior to the final print to help detect any errors or areas for improvement