

## Hints for Laying out Tags with Code 128 Linear Bar Codes

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### Comments and "Rules" for bar codes:

1. Comment: A "digit" equals any number placeholder (0-9)  
An "alpha" equals any alphabet character placeholder (A-Z)  
A "character" equals any placeholder ( for examples - 3, 4, 5, B, M, P, #, ?, -).
2. Maintain good "black-to-white" contrast (function of laser marker and tag coating).
3. Maintain the widest "X-dimension" possible ("X-dimension" = smallest bar or space width = function of scale factor).
4. Maintain adequate "clear zone" (also called "quiet zone") white area at both ends of the bar code. (minimum of 10X the narrow bar/space width, 15X much is better, function of tag layout).
5. "All digits" (all numbers) will result in a better ( less dense) bar code than "digits and alphas" or "characters".
6. If a user insists upon having one or more alphabetic characters in an otherwise numeric bar code, try to arrange the alpha(s) always at the beginning or at the end of the code so that only one "mode-switch character" will be necessary in the bar code. (e.g. – Fig. 4 would be improved as "M1156133096" instead of "11561M33096". It is also best to keep strings of digits even.
7. The user should always use the same number of digits or characters, always in identical format, for all bar codes within one facility.
8. Code 128 is the preferred industrial (steel mill) bar code symbology, because it is, by definition, less dense and contains a check digit.
9. An even number of characters is preferred for Code 128. In some cases, an odd number of characters will require more space than an even number (for example – a 9 character bar code can require more width than for 10 characters), because of the extra "mode switch character" used in the code makeup. See the difference between Figures 1 and 2 below.
10. Maximize bar code height wherever possible, in order to maximize the probability of obtaining a GOOD READ with a misaligned tag / scan line.

### Customer wants:

In the tag example figures on the following page, this Spanish customer wants to download a 5 digit HEAT ("COLADA" in Spanish) number (NNNNN), a QUALITY character (H, M or –) , and a one digit STRAND digit (1, 2 or 3), and a 4 digit weight (NNNN). The customer desires to print a man-readable C#HHHHH-Q-S with a separate man-readable WWW KGS. The customer desires to encode HHHHHQS in the barcode. Optionally the customer may want to append the weight data to the bar code data. The InfoTag® printer can handle adding the additional man-readable characters such as "C#", "- " and "KGS" to the downloaded "pure data" in order to enhance the man-readable data fields. These characters are not desirable however in the bar code data.

### InfoSight recommends:

For this application, to maximize the read probability for the bar code, InfoSight makes the following recommendations:

1. Use Code 128 for a low-density bar code.
2. Make the bar code data “all digits” (all numbers). Use digits (0-9) for the quality characters, not characters (“H, M or -”).
3. Keep the bar code data at 8 digits or smaller if possible (NNNNNNNN)
4. Make the bar code an even number of digits long by the addition of a leading zero (0HHHHHQS = 8 digits).
5. Keep the bar code data and format small enough to enable the bar code to “fit” on the tag. Adding the weight data to the bar code in this example is not recommended.

Respect all of the above “rules” regarding density, clear zones, code density, etc. – so that the bar code “fits” in the allotted tag area *and* has a high probable read rate.

### Example Figures



Figure 1- **Recommended bar code** - HHHHH- numeric Q – S  
 Note the bar code is coarse, the scale factor is 3, and there is adequate clear zone at both ends.  
 Note also that the bar code data is “all numbers” and it does not contain the “C#” or “-” characters.



Figure 2- **Better recommended bar code** - EVEN NUMBER - 0HHHHH- numeric Q – S  
 Note this bar code *has a leading zero to make an even number of digits*.  
 The bar code is coarse, the scale factor is 3, and there is

**improved clear zone at both ends.**

Note also that this bar code is “all numbers” and it does not contain the “C#” or “-” characters.  
 This bar code is clearly a very coarse code, easier to read in the industrial environment.  
 Note that this bar code has more digits in it, but is shorter than the Figure 1 bar code.



Figure 3 - **Not recommended bar code** - HHHHH- alpha Q-S  
 Note the bar code is fine, the scale factor is 2 (s.f. = 3 won't fit), however the clear zones are ample.  
 This code could be improved if the Quality Code “M” was a “digit” and/or was at the beginning or end of the bar code, but even then, this code would not be recommended.



Figure 3- **Not recommended bar code** – HHHHH-alpha Q-S- WWW  
 Note the bar code resolution is fine, the scale factor is 2 (s.f. = 3 won't fit), clear zones are small.  
 This code could be improved if the Quality Code “M” was a “digit” and/or was at the beginning or end of the bar code, but even then, this code would not be recommended.