

# 4 POSTNET Barcodes

## Overview

In Chapter 3, you learned that proper address information is important and that an incorrect address may mean that the piece will not be delivered or will create a negative response to your message.

In this chapter, you will learn about barcoding. Barcoding is also an important aspect of mailpiece design.

Because there are no MLOCR readability requirements for barcodes, you have more latitude in selecting colors, type styles, and the location for address printing if you barcode your mail.

To receive automation discounts, your letter-size mailings must be 100 percent delivery point barcoded. Nonbarcoded pieces enter the same mailstream as a nonautomation presorted mailing.

## Description and Benefits

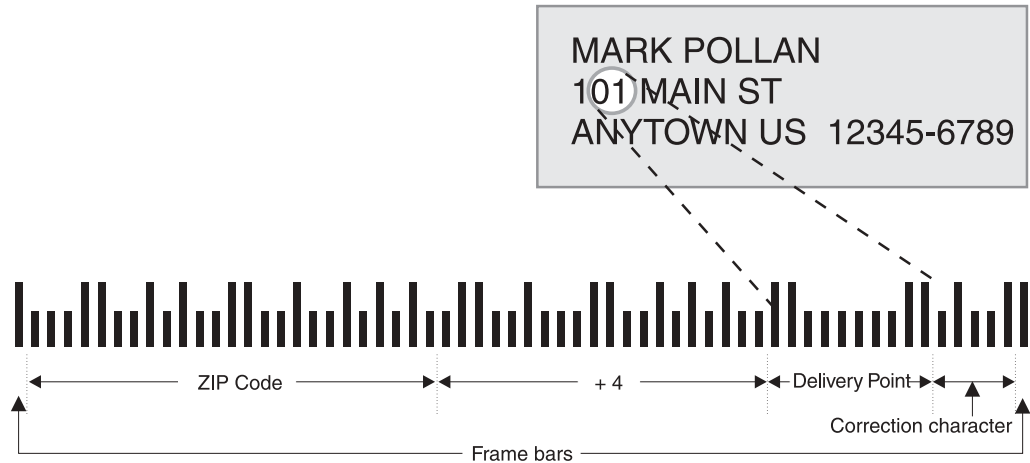
The POSTNET (POSTal Numeric Encoding Technique) barcode was developed by the Postal Service to encode ZIP Code information on letter mail for rapid and reliable sorting by BCSs. The POSTNET barcode can represent a five-digit ZIP Code (32 bars), a nine-digit ZIP+4 code (52 bars), or an eleven-digit delivery point code (62 bars).

## Delivery Point Barcode

The delivery point barcode (DPBC) was developed by the Postal Service to identify each of the 134 million delivery points in the United States. This barcode system significantly reduces the time it takes carriers to sort letter mail before delivery.

The DPBC is formed by adding 10 bars to an existing ZIP+4 barcode (see Exhibit 4-1). The 10 bars represent two additional digits (normally the last two digits of the street address, post office box, rural route number, or highway contract route number). DMM C840 contains address coding rules for the DPBC, including rules for handling address anomalies.

*Exhibit 4-1*  
**Delivery Point Barcode**  
*(not actual size)*



## POSTNET Format

### Description

The POSTNET barcode is always printed in a format that begins and ends with a frame bar (full or tall bar). To ensure POSTNET accuracy during mail processing, a correction character (five bars) must be included immediately before the rightmost frame bar of all POSTNET barcodes (see Exhibit 4-3).

The correction character is always the digit that, when added to the sum of the other digits in the barcode, results in a total that is a multiple of 10. For example, the sum of the ZIP+4 barcode 12345-6789 is 45. The next higher multiple of 10 is 50, so the correction character is 5 (50 minus 45).

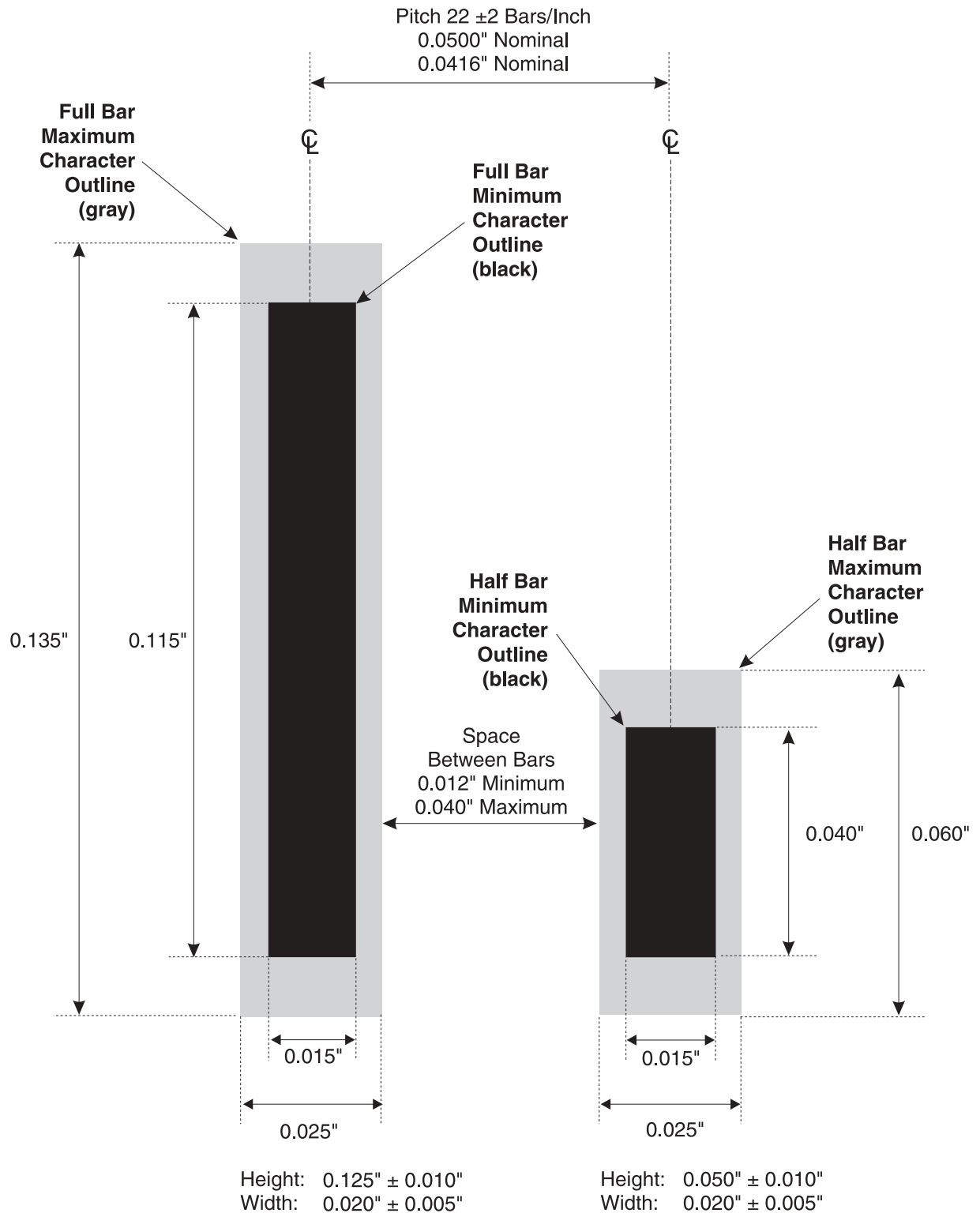
### Nine-Digit ZIP+4 Code (52 Bars)

The distance from the leading edge of the first (leftmost) bar to the leading edge of the fifty-second (rightmost) bar should be at least 2.125 inches. The distance from the leading edge of the first bar to the trailing edge of the fifty-second bar should not exceed 2.575 inches. ZIP+4 barcodes are used only with reply mail letter-size pieces.

### Eleven-Digit Delivery Point Code (62 Bars)

The distance from the leading edge of the first (leftmost) bar to the leading edge of the sixty-second (rightmost) bar should be at least 2.540 inches. The distance from the leading edge of the first bar to the trailing edge of the sixty-second bar should not exceed 3.075 inches (see Exhibit 4-2 for general specifications).

Exhibit 4-2  
**POSTNET Barcode Specifications**  
 (not drawn to scale)

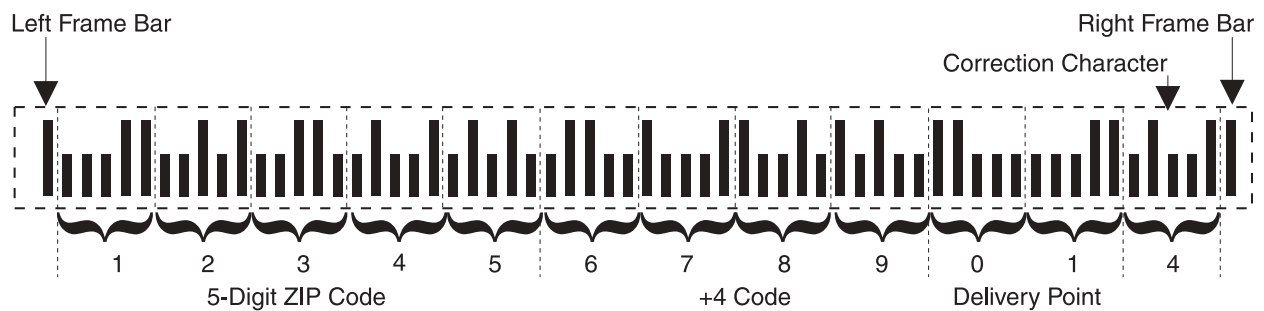


### Decoding POSTNET Barcodes

The first and last full bars in a barcode—the frame bars—do not count. Each digit (numeric value) of the ZIP Code or ZIP+4 is represented by five bars.

The last five bars in the barcode make up the correction character. All barcodes, when added together, must equal a multiple of 10. Exhibit 4-3 shows a barcode decoded using the POSTNET code.

*Exhibit 4-3*  
**Delivery Point POSTNET Format**  
*(not actual size)*













### Code Elements

The basic elements of the POSTNET barcode are binary digits, represented as full bars and half bars (or tall bars and short bars). A full bar represents “1” (one) and a half bar represents “0” (zero) (see Exhibit 4-4).

The geometry of the bars and their proper location on letter mail are covered in the following sections and exhibits.

*Exhibit 4-4*  
**Code Elements**

Numeric Value	Binary Code Value	Barcode Value
	7 4 2 1 0	74210
1	00011	
2	00101	
3	00110	
4	01001	
5	01010	
6	01100	
7	10001	
8	10010	
9	10100	
0	11000	

### Code Characters

Each code character is made up of five bars, which together represent a single numeric digit. Specific combinations of two full bars and three half bars represent the digits 0 through 9. Only the 10 combinations shown in Exhibit 4-4 are valid code characters—they represent all possible combinations of two full bars and three half bars.

These combinations are central to the error-recovery of POSTNET because the system interprets as an error the combination of five bars containing other than two full and three half bars.

### Bar Position Weights

Except for zero, the numeric value of each valid combination of five bars can be determined by adding the “weights” of the two positions occupied by the full bars (“1s”). From left to right, the bar positions are weighted 7, 4, 2, 1, and 0 (see Exhibit 4-4).

For example, the combination 01010 contains a full bar in the second position (weight 4) and in the fourth position (weight 1). Adding 4 and 1 yields 5 — the assigned value of this combination. The only exception is the combination 11000, which has a total weight of 11 but is assigned a value of zero.

## Bar Spacing (Pitch)

### Horizontal Spacing

The nominal horizontal spacing (pitch), defined as a bar and a space, must be limited to 22 bars ( $\pm 2$  bars) per inch when measured over any 1/2-inch portion of the barcode. The horizontal spacing at 24 bars per inch is 0.0416 inch and, at 20 bars per inch, is 0.050 inch. Between individual bars, there should be a clear space of at least 0.012 inch, but not more than 0.040 inch.

The dimensions described below should be maintained for eleven-digit POSTNET barcodes so that our BCSs can accommodate the tolerances encountered with different printing technologies.

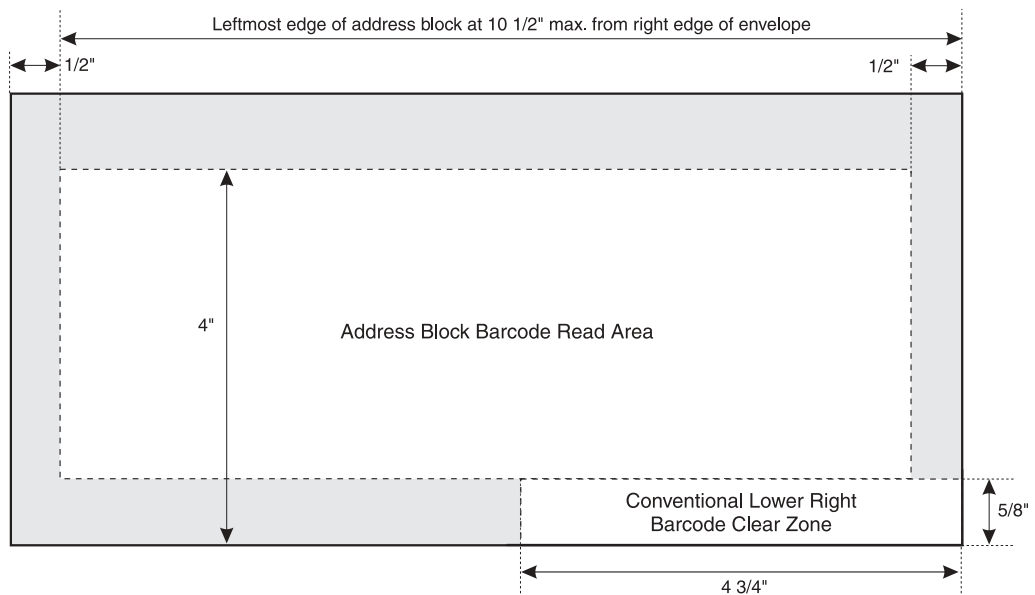
## Barcode Locations

### Placement

If you apply the POSTNET barcode to your outgoing letter mail, you may print the barcode in the lower right corner or as part of the address block (see Exhibit 4-5).

MLOCR-applied barcodes are always printed in the lower right corner of the mailpiece.

*Exhibit 4-5*  
**Barcode Placement Areas**  
(not drawn to scale)



### Address Block Barcoding

With this method, the barcode is not subject to the strict positioning requirements of the barcode clear zone. The address block barcoding option is the most desirable method. To print the POSTNET barcode as part of the address block, locate the barcode in one of the positions in Exhibit 4-6.

### Barcode Clearances

An address block barcode requires certain clearances relative to any printing and the edges of the window or address label. This clearance allows the barcode sorter to successfully locate the barcode. As shown in the diagram below, a clear space of 1/25" is required above and below the barcode and 1/8" is required to the left and the right of the barcode.

Below are examples of acceptable barcode placement in address blocks.

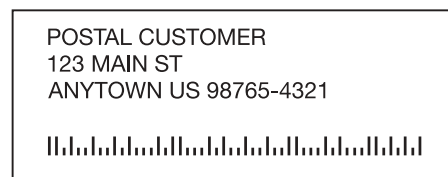
Exhibit 4-6

#### Address Block Barcode Placement Options (not drawn to scale)

Example A  
Above Address  
(Preferred)  
Example C



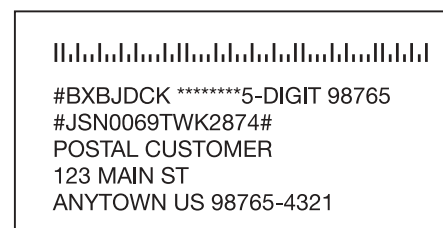
Example B  
Below Address  
(Acceptable)  
Example D



Below Optional Endorsement Line  
and/or Keyline Information  
(Preferred)



Above Optional Endorsement Line  
and/or Keyline Information  
(Acceptable)



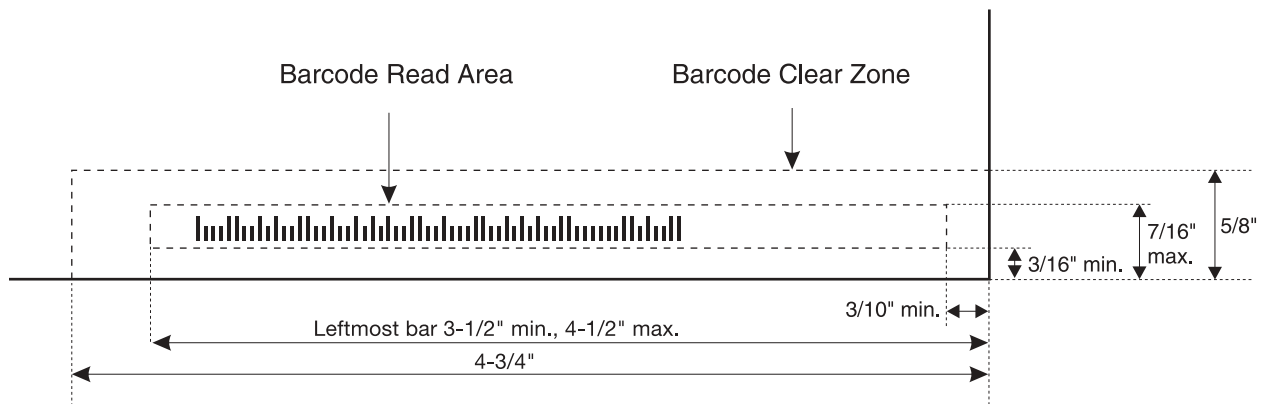
You may not apply the POSTNET barcode anywhere between the recipient line and the city, state, and ZIP Code line of the address (that is, do not place the barcode between any lines of the delivery address). Chapter 2 provides specifications for the clearance needed between address block barcodes and window edges, inserts, address labels, and other nonaddress printing.

### Conventional Lower Right Corner

Delivery point barcodes printed in the lower right corner of letter mail must be positioned to meet the specifications shown in Exhibit 4-7. The first (leftmost) bar of the barcode should appear between 3-1/2 inches and 4-1/2 inches from the right edge of the mailpiece.

Exhibit 4-7

#### Lower Right Corner Barcode (not drawn to scale)



## Barcode Layout

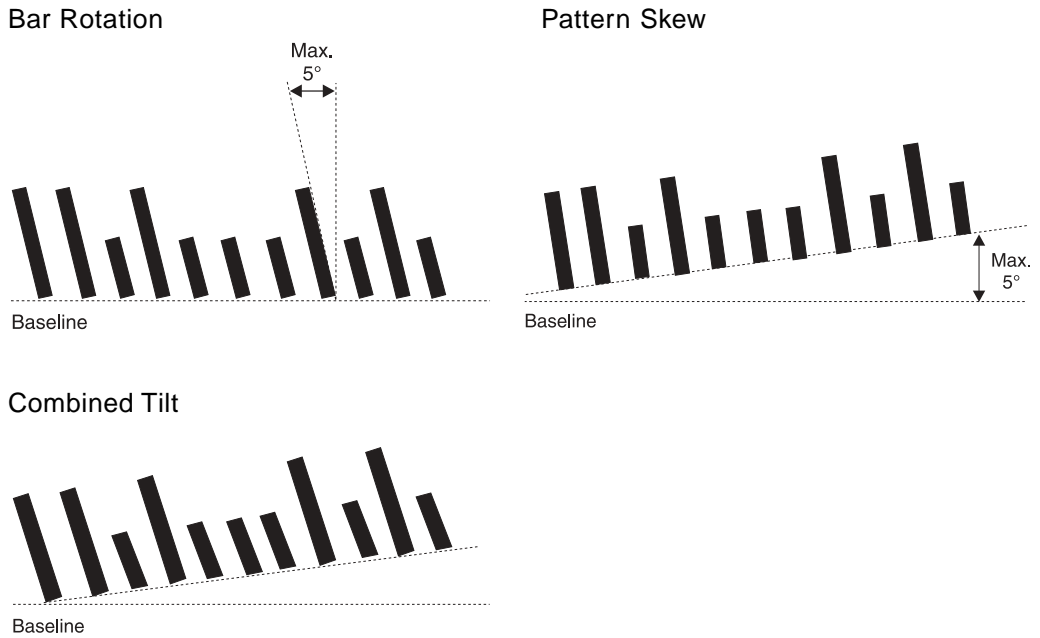
### Bar Tilt

Two types of tilt can occur when printing POSTNET barcodes on a mailpiece (see Exhibit 4-8):

- Bar rotation, in which the individual bars are tilted (not perpendicular) with respect to the baseline of the barcode.
- Pattern skew (or slant), in which the entire barcode is tilted with respect to the bottom edge of the mailpiece.

Both types of tilt can occur simultaneously. Because BCSs read barcode bars individually, these sorters cannot determine which type of tilt is present. Consequently, total bar tilt should be measured with respect to a perpendicular from the bottom edge of the mailpiece. The combined effects of pattern skew and bar rotation must be limited to a maximum tilt of 5 degrees.

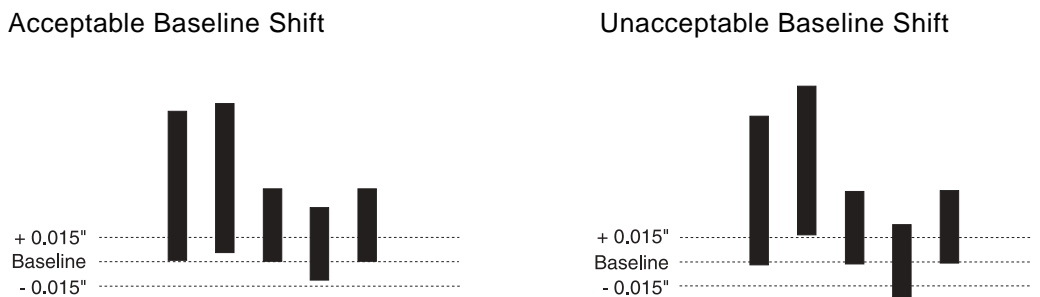
*Exhibit 4-8*  
**Bar Tilt**  
 (not drawn to scale)



**Baseline Shift**

The vertical position of adjacent bars must not vary more than 0.015 inch from bar to bar when measured from the baseline (bottom) of the barcode (see Exhibit 4-9).

*Exhibit 4-9*  
**Barcode Baseline Shift**  
 (not drawn to scale)



## Barcode Printing

### Background Reflectance

The area of the mailpiece where the barcode is to be placed (address block or lower right corner) should be uniform in color and produce a minimum reflectance of 50 percent in the red portion and 45 percent in the green portion of the optical spectrum, when measured with a USPS envelope reflectance meter or its equivalent.

Although a white background is preferred, pastels and other light colors are acceptable. The mailpiece should not be fluorescent or phosphorescent because the glow can cause malfunctions during mail processing.

### Print Reflectance Difference

The BCS responds to the difference between light reflected from the printed barcode and the background. This difference is defined as print reflectance difference (PRD). A PRD of at least 30 percent in the red and the green portions of the optical spectrum is necessary for reading POSTNET barcodes. Like print contrast ratio (PCR), PRD can be measured with a USPS envelope reflectance meter or its equivalent (see Appendix A).

As with MLOCRs, BCSs respond best when the barcode is printed in black ink on a white background. Other color combinations are acceptable if the minimum PRD of 30 percent exists for the printed barcode. Refer questionable color combinations to your mailpiece design analyst for testing.

### Overinking

Overinking, which causes any bar to exceed its maximum dimensions, can prevent the BCS from successfully interpreting the barcode (see Exhibit 4-10). Consequently, make sure that ink coverage does not cause any bar to exceed the height or width limitations.

*Exhibit 4-10*

**Overinking (Extraneous Ink)**  
*(not actual size)*

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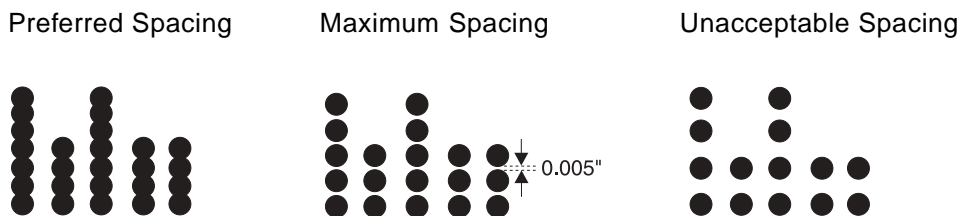
## Voids

A void, which reduces any bar to less than its minimum dimensions, can prevent the BCS from successfully interpreting the barcode. In Exhibit 4-11, a malfunctioning dot matrix printer created the voids. Ideally, dot matrix printing should yield dots that touch or overlap. If the dots are not touching, the space between the dots should not exceed 0.005 inch.

*Exhibit 4-11*

### **Voids**

*(not drawn to scale)*



## Extraneous Matter

Background patterns, envelope insert “show-through,” and any other printing within the clear areas surrounding the barcode (lower right corner and address block areas shown in Exhibit 4-5) should be limited to a maximum PCR of 15 percent in the red and the green portions of the optical spectrum. A PCR exceeding 15 percent can interfere with barcode recognition.

## Barcode Software and Hardware Certification

To help mailers evaluate the quality of their barcode-producing equipment, the Postal Service offers optional testing and certification to manufacturers of barcoding software and hardware. Certifying the barcoding equipment ensures that it can produce dimensionally correct barcodes that meet postal specifications.

Certification does not ensure that the barcodes produced from that equipment will meet the requirements for automation rates because many other variables (such as ink color and quality, paper color and contrast, and equipment operation and maintenance) affect the quality of the printed barcodes.

Manufacturers who want their products tested and mailers who want information on available certified products should contact the National Customer Support Center at 1-800-238-3150 or [www.usps.com/ncsc](http://www.usps.com/ncsc).