

Publication 25, June 2003

2 Automation Design Standards

Overview

Making your mailpieces automation-compatible is important. Automated equipment can process mail more efficiently, allowing the Postal Service to maintain lower rates for those pieces.

Your automation-compatible mailpiece should:

- Meet the size and weight standards in this chapter.
- Be made of good quality white or light-colored paper.
- Contain no sharp or bulky items.
- Be sealed securely.
- Be readable by automation equipment.

Mailpiece Dimensions

Minimum and Maximum Sizes

Aspect ratio (length divided by height) must be between 1.3 and 2.5.

When letter-size mail is processed on automated equipment, it moves at high speeds through belts and rollers past an optical scanner and to the appropriate bin or stacker after it's sorted.

Although MLOCRs and BCSs can sort a variety of letter sizes, mailpieces that qualify for letter rates must be rectangular and within the minimum and maximum dimensions shown in Exhibit 2-1.

Exhibit 2-1

Letter-Size Mailpiece Dimensions

Dimension	Minimum	Maximum
Height	3-1/2 inches	6-1/8 inches
Length*	5 inches	11-1/2 inches
Thickness	0.007 inch	1/4 inch

* The length is the dimension parallel to the delivery address.

Letter-size mail that is less than $10\frac{1}{2}$ inches long processes better than longer-size pieces. MLOCRs read address information that is located up to $\frac{1}{2}$ inch from the right and left edges of the piece.

The following standards also apply to letter-size mail:

- Letter-size mail length is the dimension that parallels the delivery address. The top and bottom of the mailpiece also parallel the delivery address.
- Letter-size mail must be at least 0.009 inch thick if it is more than $4\frac{1}{4}$ inches high or more than 6 inches long.
- For best results, letter-size mail more than $10\frac{1}{2}$ inches long should have the address within $9\frac{3}{4}$ inches of the right edge of the mailpiece, with at least a $\frac{1}{2}$ -inch clear vertical space (margin) on each side (see Exhibit 3-1).
- Cards that measure more than $4\frac{1}{4}$ inches high, 6 inches long, or 0.016 inch thick are charged postage at the First-Class Mail letter rates.

Nonmailable Pieces

All pieces (letters and cards) not meeting the minimum size standards in Exhibit2-1 are nonmailable.

Nonmachinable Characteristics

Nonmachinable letter-size pieces are not automation-compatible, so they are not eligible for automation rates.

First-Class mail pieces that weigh 1 ounce or less are nonmachinable and subject to a nonmachinable surcharge if any one of the following is true:

- Height is greater than 6- $\frac{1}{8}$ inches.
- Length is greater than 11- $\frac{1}{2}$ inches.
- Thickness is greater than inch.

First-Class letter-size mail pieces weighing 1 ounce or less and Standard letter-size mail pieces weighing 3.3 ounces or less are considered nonmachinable and subject to a nonmachinable surcharge if they have one or more of the following characteristics:

- An aspect ratio (length divided by height) of less than 1.3 or more than 2.5.
- Are polybagged, polywrapped, or enclosed in any plastic material.
- Have clasps, strings, buttons, or similar closure devices.
- Contain items such as pens, pencils, or loose keys or coins that cause the thickness of the mailpiece to be uneven.
- Are too rigid (not bending easily when subjected to a transport belt tension of 40 pounds around an 11-inch diameter turn).

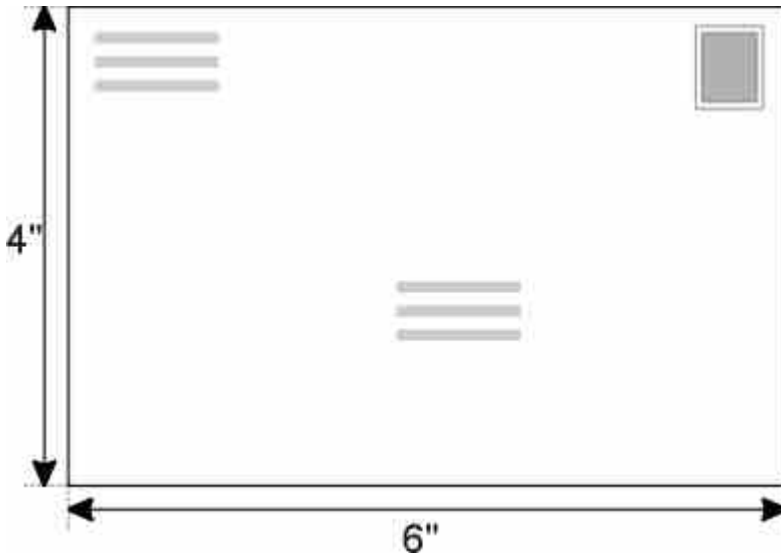
- For pieces more than either 4-1/4 inches high or 6 inches long, when the thickness is less than .009 inch.
- A delivery address that is parallel to the shorter dimension of the mailpiece.
- Self-mailers with folded edges perpendicular to the address, unless the piece is folded and secured according to C810.7.2.
- Booklet-type mailpieces with the bound edge (spine) along the shorter dimension of the piece or at the top, regardless of the use of tabs, seals, or other fasteners.

For letter-size mailpieces, the length is the dimension parallel to the address.

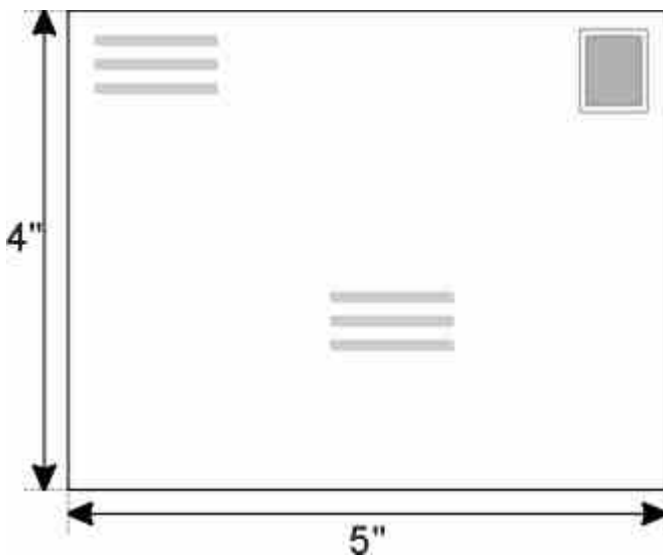
Exhibit 2-2

Aspect Ratio

(not drawn to scale)



Machinable Aspect Ratio: 1.5



Nonmachinable Aspect Ratio: 1.25
 Publication 25 Chapter 2.htm

Mailpiece Materials and Construction

Paper Weight

The following recommendations for paper and card stock refer to the minimum basis weight of the materials. Basis weight is defined as the weight (in pounds) of a ream (500 sheets) cut to a standard size for that grade.

For example, envelopes for automation-rate mailings should be constructed of paper weighing at least 16 pounds (minimum basis weight). The specific grade of 16-pound paper recommended for envelopes is defined as 500 sheets measuring 17 inches by 22 inches (17 inches by 22 inches by 500 sheets).

Recycled paper and card stock are compatible with postal automation if the materials satisfy the recommendations and the guidelines in this book.

Envelopes

Envelopes (the preferred container) and other letter-size containers sealed on all four edges must be made of paper with a minimum basis weight of 16 pounds (measured weight of 500 17-by-22-inch sheets). For business reply mail envelopes, the minimum basis weight is 20 pounds (see Chapter 6 and DMM section S922).

Folded Self-Mailers

The required minimum basis weight of paper for folded self-mailers varies with the construction of the mailpieces as follows:

- For self-mailers formed from a single sheet folded at the bottom with the open, top edge sealed with one tab or glue spot, the minimum basis weight is 28 pounds (weight of 500 17-by-22-inch sheets) or 70 pounds (weight of 500 25-by-38-inch sheets).
- For self-mailers formed from two or more sheets that are sealed with one tab or glue spot, the minimum basis weight is 24 pounds (weight of 500 17-by-22-inch sheets) or 60 pounds (500 25-by-38-inch sheets).
- For any self-mailer that is sealed with two tabs or two glue spots, the open edge can be at the top or bottom. The minimum basis weight is 20 pounds (weight of 500 17-by-22-inch sheets).

Exhibit 2-3, taken from Quick Service Guide 811, shows the proper placement of tabs or glue spots on folded self-mailers. Tabs, wafer seals, tape, or glue may be used to seal folded self-mailers. Tabs and other seals placed at the top of folded self-mailers should be positioned so that they do not cover the return address, postage, or rate markings.

Exhibit 2-3

Folded Self-Mailers
(not drawn to scale)



Specifications for Automation-Compatible Letter-Size Mailpieces

Double Postcard

Tabs 1 (middle)
 Folded Edge Top or Bottom
 Sheets Single
 Basis Weight 75 lb.



Folded Self-Mailer (Invitation Fold)

Tab Address Label
 Folds Top and Bottom
 Sheets Multiple or Single
 Basis Weight 20 lb.



Folded Self-Mailer

Tabs 2 (start ≤ 1 inch from edges)
 Folded Edge Top or Bottom
 Sheets Single
 Basis Weight 20 lb.



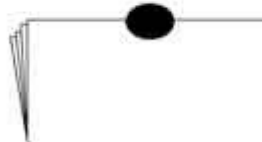
Folded Self-Mailer (Continuous Glue Strip)

Open Edge Top
 Folded Edge Bottom
 Sheets Single
 Basis Weight 20 lb.



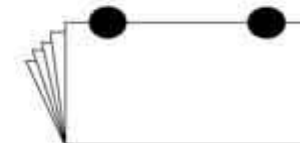
Folded Self-Mailer

Tabs 1 (middle)
 Folded Edge Bottom
 Sheets Multiple
 Basis Weight 24 lb.



Booklet

Tabs 2 (start ≤ 1 inch from edges)
 Spine Bottom
 Sheets Multiple with Cover
 Basis Weight 20 lb. (Cover)



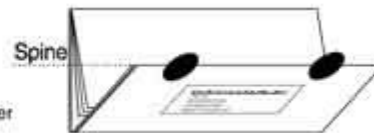
Folded Self-Mailer

Tabs 1 (middle)
 Folded Edge Bottom
 Sheets Single
 Basis Weight 28 lb.



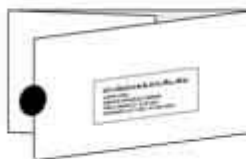
Folded Booklet

Tabs 2 (start ≤ 1 inch from edges)
 Spine Top
 Folded Edge Bottom
 Sheets Multiple with Cover
 Basis Weight 20 lb. (Cover)



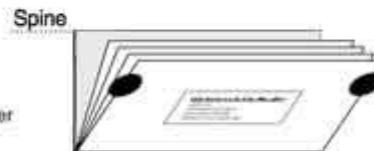
Folded Self-Mailer¹

Tabs 1 (middle)
 Folded Edge Right
 Sheets Single
 Basis Weight 75 lb.



Folded Booklet

Tabs 2 (start ≤ 1 inch from top edge)
 Spine Top
 Folded Edge Bottom
 Sheets Multiple with Cover
 Basis Weight 20 lb. (Cover)



¹Pieces 7 inches or longer must be sealed on the top and bottom; the middle tab is optional (CB10.7).

Booklet

Tabs 2 (start ≤ 1 inch from top and bottom edges)
 Spine Right (open edge left)
 Sheets Multiple with Cover
 Basis Weight 24 lb. (Cover)



Tabs and other seals placed in the barcode clear zone on nonbarcoded pieces (see Chapter 3) should be made of uncoated white or light-colored paper that satisfies the background reflectance specifications in Chapter 3. These specifications ensure successful barcode printing and reading by an MLOCR. For optimal processing, folded self-mailers should be constructed with the fold at the bottom and the tab(s) or glue spot(s) at the top.

Booklets

The required minimum basis weight of paper for covers on booklet-type mailings is 20 pounds (weight of 500 17-by-22-inch sheets). See DMM C810. Booklets must be constructed to meet these requirements:

- The bound edge or spine must be at the bottom edge of each booklet, parallel to the lines of the delivery address.
- The open edge of each booklet must be at the top and secured with at least two tabs. One tab must be placed within 1 inch of the left edge, and the other tab must be placed within 1 inch of the right edge. Instead of tabs, wafer seals or tape may be used. Tabs or closures may be affixed to the top edge or to the right and left edges within 1 inch of the top edge.

Exhibit 2-3 shows the proper placement of tabs on booklets.

Cards

Thickness, stiffness, and tear strength are the most important compatibility characteristics for cards. The minimum thickness is 0.007 inch. The minimum required basis weight for card stock is 75 pounds or greater, with none less than 71.25 pounds (measured weight of 500 25-by-38-inch sheets).

The grain of cards should be oriented parallel to the long dimension of the card. Long-grain cards are less likely to jam postal automated equipment than are cards with the grain parallel to the short dimension of the card.

Cards at automation rates must be 0.009 inch thick if more than 4-1/4 inches high or 6 inches long, or both.

When preparing postcards with perforations, it is recommended that the perf-to-bridge ratio be 1:1. A typical perforation is from 0.1 inch to 0.2 inch. Vertical perforations in the center area of the card are not recommended.

Cards Claimed at First-Class Mail Card Rates

In order to be eligible for the First-Class Mail card rates, cards must be of uniform thickness and made of unfolded and uncreased paper or card stock of approximately the quality and weight of a Postal Service stamped card.

Cards (that is, each stamped card or postcard or each half of a double stamped card or postcard) claimed at a card rate must be:

- Rectangular.
- No less than 3¹/₂ inches high, 5 inches long, and 0.007 inch thick.
- No more than 4¹/₄ inches high, 6 inches long, and 0.016 inch thick.

- Cards prepared with a message area on the address side must meet specifications in DMM C100.2.6.

Cards exceeding the maximum dimensions for card can be sent at First-Class or Standard mail letter rates.

Double Postcards

Reply or double postcards must be secured with at least one tab, wafer seal, tape strip, or glue spot placed at the center of the open edge. The open edge may be at the top or bottom of the mailpiece.

For more information on formats of the reply portion, see Chapter 5.

Mailpiece Flexibility

In addition to size, shape, and material used to create your letter mailpieces, flexibility and rigidity are also important. The contents of your mail must be reasonably flexible to ensure proper transport through our automated system.

Our processing equipment moves letter mail at a speed of up to 40,000 pieces an hour through a series of belts, rollers, and conveyor wheels. Each mailpiece must be able to maneuver successfully through this equipment.

At the same time, if your mail is too flimsy, it might catch in the metal joints of the processing equipment. Extremely flimsy and thin mailpieces also tend to stick together or adhere to other pieces easily, causing missorts and possible misdelivery of the mail.

Because pens, pencils, keys, large coins, and other rigid items can damage mail and mail processing equipment, they should never be included in letter mail, and they are prohibited in letter-size mail submitted at an automation rate.

Items such as credit cards and small coins firmly affixed to the contents of a mailpiece are usually acceptable if the mailpiece and its contents can bend easily around an 11-inch-diameter drum.

Magnets and other magnetized materials should be tested and approved for automation-based discounts by the Postal Service.

Refer any question about the dimensions, materials, construction, or contents of your mailpiece to your mailpiece design analyst, account representative, or postal business center before you produce the mailing.

Incompatible Materials and Sealing Methods

Coverings

Certain materials are incompatible with postal automation because they cannot be transported at high speeds through mail processing equipment or they do not allow quality printing of a barcode on the mailpiece for optimal scanning. These materials include polywrap, shrinkwrap, spun-bonded olefin, and other plastic-like coverings. Certain types of coated papers should also be avoided if the coating is so glossy that it can prevent a postal-applied barcode from drying within 1 second. Consult a mailpiece design analyst about nonpaper coverings before you produce your mailpieces.

Dark Fibers and Patterns

Paper containing dark fibers or background patterns is not recommended because it can cause interference during MLOCR and BCS processing. The dark patterns can be mistaken for part of the address or barcode information.

If you use such paper, make sure that the contrast ratio between the fibers (or pattern) and the background does not exceed 15 percent in the red and the green portions of the optical spectrum (see Chapter 3).

Halftone Screens

If the material on which the delivery address is to appear is printed in a halftone screen, the halftone must contain at least 200 lines per inch, or it must be printed with at least a 20 percent screen (see DMM C830).

Paper Types

Envelope paper and paper material on other letter-size mailpieces—such as folded self-mailers—must have sufficient opacity (enough density) to prevent any printing on the inside of the mailpieces from showing through in the MLOCR read area or in the barcode clear zone.

Avoid using textured paper—paper with other than a smooth surface—if the texture adversely affects print quality (that is, causes broken characters or smudged spaces). Because fluorescent paper can confuse the postage detector on postal facer-canceler machines, it's not suitable paper for automation mailings.

Closures

Because closures can jam equipment and damage mail during processing, don't use clasps, staples, string, buttons, or similar protrusions for closing letter-size automation pieces. And make sure that the pieces' edges are not notched, scalloped, or curved.

Window Envelopes and Inserts

Address/Window Clearance

To ensure successful automated processing, design your window envelopes and their inserts so that the entire address and postal barcode (when included) appear in the window area during the full movement of the insert.

For MLOCR processing, at least $\frac{1}{8}$ inch of clearance ($\frac{1}{4}$ inch of clearance is preferred) must be maintained between the address and the edges of the window when the insert is moved to its full limits inside the envelope (see Exhibits 2-4 and 2-5).

MLOCRs need this clear space to distinguish the address from the edge of the window or shadows cast near the address by the edge of the window. Nonaddress information must not show in the window clearance area.

Address/Window Clearance

(Not drawn to scale)

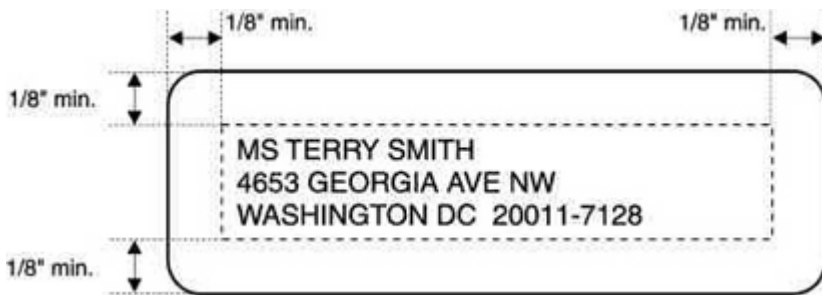
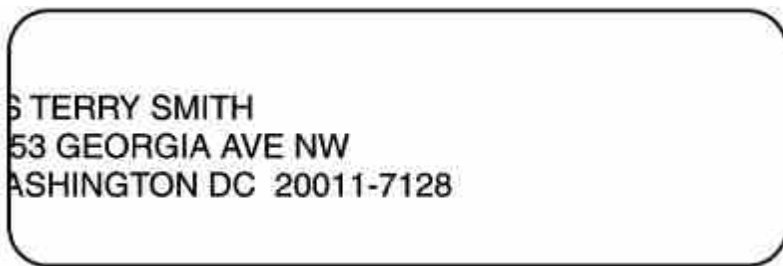


Exhibit 2-5

Excessive Address Insert Shift

(Not drawn to scale)



Vertical Address Insert Shift Test

To test the vertical insert shift of the address within a window, do the following:

- Check that a clear space of at least $\frac{1}{8}$ inch is maintained between the top of the recipient line in the address and the top edge of the window without tapping the mailpiece (see Exhibit 2-4).
- Tap the mailpiece on a flat horizontal surface on its bottom edge to jog the insert as far down into the envelope as it can go.
- Check that a clear space of at least $\frac{1}{8}$ inch is still maintained between the bottom of the post office, state, and ZIP Code line of the address and the bottom edge of the window.

Horizontal Address Insert Shift Test

To test the horizontal insert shift of the address and window, do the following:

- Tap the mailpiece separately on its left and right edges to jog the insert as far to the left and right as it can go (see Exhibit 2-5).
- As each side is tapped, check that a clear space of at least $\frac{1}{8}$ inch is still maintained between the left and right edges of the address and the left and right window edges.

Barcode/Window Clearance

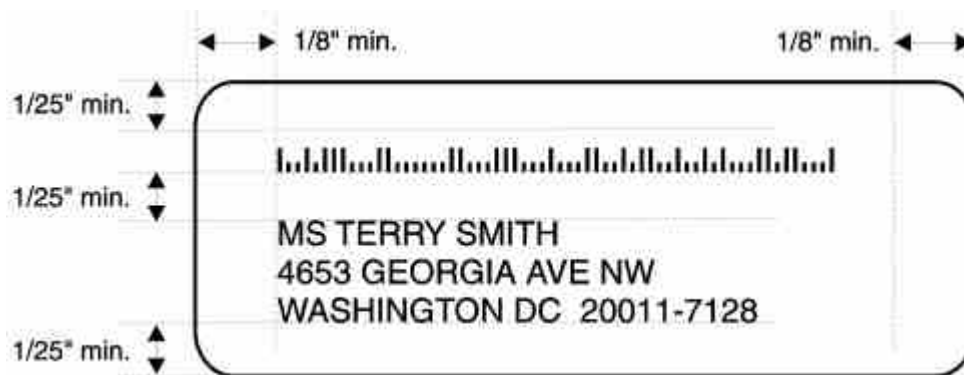
As with addresses, POSTNET barcodes printed on inserts—including POSTNET barcodes printed as the top or bottom line of the delivery address block—must maintain the following minimum clearances (see Exhibits 2-4 and 26):

- At least $\frac{1}{8}$ inch from the left and right edges of the barcode and the edges of the window when the insert is moved in those directions.
- At least $\frac{1}{25}$ inch from the top and bottom edges of the window opening when the insert is moved in those directions. This $\frac{1}{25}$ -inch minimum clearance is also needed between the top and bottom of the barcode and any other printing.

Exhibit 2-6

Barcode/Window Clearance

(not drawn to scale)



Refer to Exhibit 4-5 for additional address block barcode placement options.

Vertical Barcode Insert Shift Test

To test the vertical insert shift of the barcode and window, do the following:

- If the barcode is the top line of the address block, check that a clear space of at least $\frac{1}{25}$ inch is maintained between the top of the barcode and the top edge of the window without tapping the mailpiece (see Exhibit 2-6).
- Tap the mailpiece on a flat horizontal surface on its bottom edge to jog the insert as far down into the envelope as it can go. Check that a clear space of at least $\frac{1}{25}$ inch is still maintained between the last line of the address and the bottom edge of window.
- If the barcode is the bottom line of the address block, check that a clear space of at least $\frac{1}{25}$ inch is still maintained between the bottom of the barcode and the bottom edge of the window after tapping.

Horizontal Barcode Insert Shift Test

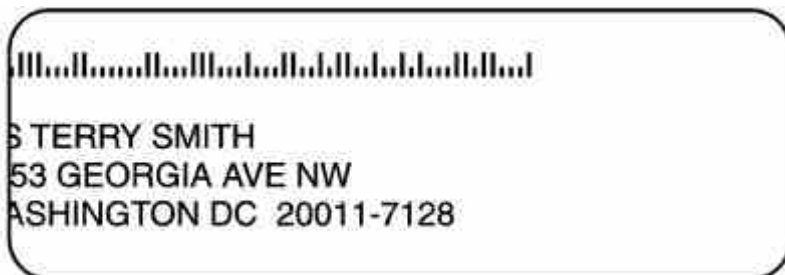
To test the horizontal insert shift of the barcode and window, do the following:

- Tap the mailpiece separately on its left and right edges to jog the insert as far to the left and right as it can go.
- As each side is tapped, check that a clear space of at least $\frac{1}{8}$ inch is still maintained between the left and right edges of the barcode and left and right window edges (see Exhibit 2-7).

Exhibit 2-7

Excessive Barcode Insert Shift

(not drawn to scale)



Insert Material

Like envelope paper, insert material must have sufficient opacity to prevent any printing on the inside of the mailpiece from showing through in the MLOCR read area or in the barcode clear zone (see Chapter 3).

Window Coverings

Open or covered windows may be used for addresses and address block barcodes. Windows must always be covered in automation-rate mailings of pieces that weigh more than 3 ounces.

Material for covered windows must be clear or transparent (low-gloss polyclear materials are best) and securely attached on all edges. Cellophane, glassine, and polystyrene are acceptable materials.

All window coverings must be stretched tight and be free of wrinkles, streaks, fogging, colors, and other conditions that can obscure the address or barcode during processing. All address and barcode information, as read through the window, must satisfy the following minimum reflectance and contrast guidelines:

- A print contrast ratio (PCR) equal to or more than 40 percent in the red and green portions of the optical spectrum is necessary for an MLOCR to recognize address information (see Chapter 3).
- A print reflectance difference (PRD) equal to or more than 30 percent in the red and the green portions of the optical spectrum is necessary for a BCS to recognize POSTNET barcodes (see Chapter 4).

Because glassine is somewhat opaque (less transparent) compared with other window-covering materials, addresses read through glassine must produce a slightly higher PCR of 45 percent. The minimum PRD for barcodes read through glassine is 30 percent—the same minimum required for other window-covering material.

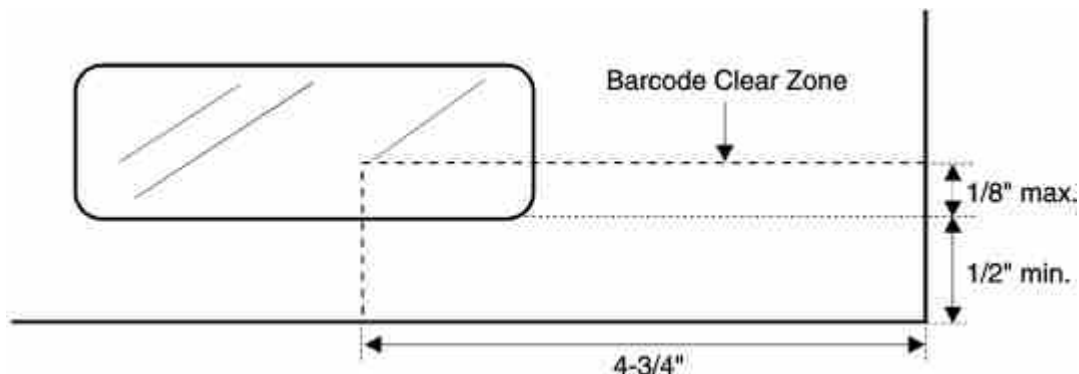
Window Clear Space

Address windows should be no lower than $\frac{1}{2}$ inch from the bottom edge of the envelope and may extend $\frac{1}{8}$ inch into the barcode clear zone (see Exhibit 2-8).

Exhibit 2-8

Window Clear Space

(not drawn to scale)



***FASTforward*SM**

In mailings of First-Class Mail, any envelope whose window intrudes into the barcode clear zone is not eligible for MLOCR *FASTforward* processing to meet the move update standard. Check with your local mailpiece design analyst or business mail entry unit for more guidelines.

Address Labels and Stickers

General Standard

Address labels and certain types of stickers placed on the outside of letter mail pieces must be applied using methods and materials that keep the labels or stickers from being damaged or removed during high-speed processing.

Address labels should not contain extraneous printing or designs that interfere with the ability of postal barcode scanners to read the barcode and address information.

Address labels must be placed in the BCS or MLOCR read areas, as appropriate. For information on these areas, see Chapter 3.

Stickers must not be placed in the MLOCR read area.

Permanent Labels

Permanent labels and stickers (not designed to be removed and reused) should be applied with a permanent adhesive or glue. Dextrin-based (recyclable) adhesives are recommended.

Pressure-sensitive peel-off labels and stickers intended to be permanent on letter mail must have a minimum peel-adhesion value of 8 ounces per inch. (This value is determined by the force required to remove, at a 90-degree angle, the label or sticker from a stainless steel surface.)

Manufacturers and suppliers of pressure-sensitive labels and stickers can provide you with information about the peel-adhesion values of their products.

Removable Labels

Labels and stickers to be removed from a backing or liner on letter mail and reused (such as "sandwich labels") must meet the following guidelines:

- When applied to a stainless steel surface, the adhesive on the backing or liner, which is permanently attached to the mailpiece, must have a minimum peel-adhesion value of 8 ounces per inch.
- When applied to the face of the backing or liner, the adhesive on the removable label must have a minimum peel-adhesion value of 2 ounces per inch.

- When reapplied to a stainless steel surface, the adhesive on the removable label must have a minimum peel-adhesion value of 8 ounces per inch.

Barcode Clearance

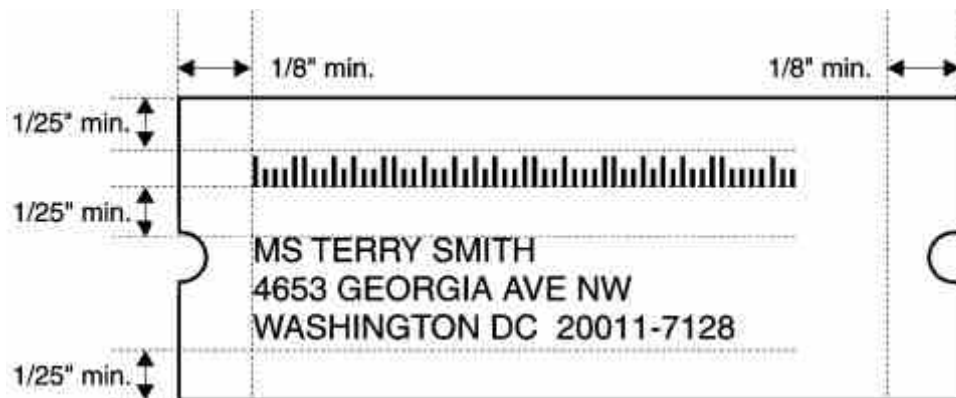
The following minimum clearances for the POSTNET barcode, when applied to address labels, are the same as the clearances required for barcoded inserts in window envelopes (see Exhibit 2-9):

- At least $\frac{1}{8}$ inch between the left and right of the barcode and the left and right edges of the label or other printing.
- At least $\frac{1}{25}$ inch between the top and bottom of the barcode and the top and bottom edges of the label or other printing.

Exhibit 2-9

Address Label

(not drawn to scale)



Testing

A mailer who wants to have mailpieces tested for characteristics like flexibility, glossy or coated paper, and nonpaper material must submit at least 50 sample pieces and a written request. The mailer should give them to the postmaster or business mail entry manager at the post office at which the pieces are to be mailed at least 6 weeks before the mailing date.

The Postal Service looks at all the aspects of processing letters on the automated equipment. This system approach includes the operator's ability to efficiently remove the mail from the customer's trays, process it through the equipment, and efficiently sweep it from the output stackers.

The request must describe the mailpiece's contents and construction, the number of pieces being produced, and the level of presort. If necessary, the business mail entry manager will forward the test to USPS Engineering. The manager of business mail entry or Engineering will advise the mailer by letter of its findings.

If the mailpiece is approved, the approval letter will include a unique number that identifies the piece tested and serves as evidence that the piece meets the relevant standards. A copy of the letter must be attached to each postage statement submitted for mailings of the approved piece. If requested by the Postal Service, the mailer must show that any pieces presented for mailing are the same as those tested and approved.