

OBJECTIVE

Mailpieces that appeal to the widest variety of interests and tastes often employ diverse design and construction features. However, current Postal Service™ automated flat sorting equipment can have problems processing some mailpieces.

This publication suggests ways flat-size mailpieces can maintain their design diversity and still be effectively processed on the Automated Flat Sorting Machine (AFSM) 100, the primary flat sorting machine used by the Postal Service.

The Postal Service also uses the Upgraded Flat Sorting Machine (UFSM) 1000 to process heavier or larger flats. However, this publication offers design recommendations only for flats processed on the AFSM 100. For more information on the requirements for flats processed on the UFSM 1000, refer to the *Domestic Mail Manual (DMM) C820*.

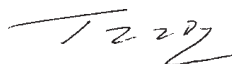
Moving flats through automated processing equipment involves acceleration and deceleration forces — rapid movements causing stress that flat-size pieces did not experience before deployment of the AFSM 100. Individuals involved in the design of flats should take into account the recommendations in this publication when designing and constructing their mailpieces.

Please consider these recommendations carefully and adopt them where possible to minimize damage to mailpieces and improve processing efficiencies. Working together, we have the opportunity to help hold costs steady and improve service through the automated processing of flat-size mail. Automated flats processing promotes operational efficiency, a key element in the *Transformation Plan*, the Postal Service's strategy for modernization.

A joint Postal Service-industry workgroup of the Mailers' Technical Advisory Committee (MTAC) developed this publication. The Postal Service wishes to thank those members of the workgroup from printing and publishing companies, mailing service providers, direct mail advertisers, and mailer associations. Their dedication and effort to improve mail service quality are tributes to their commitment to represent the best interests of all mailers.



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INTRODUCTION

The processing and technological capabilities of the AFSM 100 result in greater productivity than those of previous Postal Service automated flat processing equipment. With its superior efficiency, the AFSM 100 is expected to be the mainstay of Postal Service flats processing for years to come.



As with most new technology, the AFSM 100 continues to be refined to improve its performance. Although most flats prepared today under current mailing standards run successfully, certain design characteristics may increase the risk of mailpiece damage. The information presented in this publication can help to reduce damage to flats and to improve machine throughput.



This publication outlines numerous recommendations that will enhance the AFSM 100 automation-compatibility of your flat-size mail. Although you may not be able to employ all of these recommendations in the design and construction of your mailpieces, following any one of the recommendations or a combination of them will promote efficient processing on the AFSM 100.

Requirements for preparing flats are in the DMM, which is referenced throughout this publication. Recommendations in this publication do not supercede DMM regulations in any way. The recommendations provided in this publication are voluntary.

RECOMMENDATIONS FOR AFSM 100 FLATS

General Mailpiece Structure

A flat's dimensions, weight, thickness, and other physical attributes are key factors affecting its compatibility with the AFSM 100.

Dimensions

Regulation: See DMM C820.2.3.

Each flat-size piece must be rectangular and as follows:

	Minimum	Maximum
Height	5 inches	12 inches
Length	6 inches	15 inches

Recommendation: When possible, design flats at least 0.25 inch smaller than the maximum allowable dimension, and at least 0.25 inch larger than the minimum allowable dimension.

Reason: Flats designed or trimmed to approach the maximum or minimum dimensions of height and length can cause machine jams, misfeeds, or mailpiece damage.

Weight

Regulation: See DMM C820.2.4.

There are no minimum weight requirements; the maximum weight requirements are as follows:

	Maximum
First-Class Mail®	13 ounces
Periodicals	20 ounces
Standard Mail®	Less than 16 ounces
Bound Printed Matter	20 ounces

Recommendation: No recommendation.

Reason: The maximum weight limit established for each class of mail will allow the AFSM 100 to operate efficiently.

Thickness

Regulation: See DMM C820.2.3.

The thickness requirements for AFSM 100-compatible flat-size pieces are as follows:

Minimum: 0.009 inch Maximum: 0.75 inch

Recommendation: When possible, avoid the minimum and maximum limits of thickness.

Reason: Thin flats tend to double-feed in the machine and cause misfeeds and misdeliveries. Thick flats approaching the maximum thickness tend to cause jams. Postal Service tests indicate an increased damage rate for pieces less than 0.04 inch and greater than 0.5 inch thick.

Uniformity of Thickness

Regulation: See DMM C820.7.0.

An AFSM 100-compatible flat-size mailpiece must be uniformly thick to meet DMM standards. Each flat must have a smooth and regular shape and be free of protrusions, creases, folds, tears, or other irregularities.

Recommendation: Avoid placing irregularly shaped items inside flat-size mail or placing multiple items repeatedly in the same location inside a flat. If you do place irregularly shaped items in a flat, secure them in place and surround them with packing to make the flat uniformly thick.

Reason: Irregularly shaped flats can jam the AFSM 100 and may cause damage to both the irregularly shaped flat and other flats being processed.

Flexibility

Regulation: See DMM C820.2.5 and DMM Exhibits 2.5a(1) and 2.5a(2).

An AFSM 100 flat must be flexible enough to bend between the two arcs of a flat mail machinability tester when positioned vertically, or if rigid, it must be small enough so that its longest edge fits between the two arcs without touching the lines.

Recommendation: Check to see if a flat bends easily by holding it in both hands (with the bound, folded, or final folded edge in one hand), and apply moderate pressure. Adding protective material (e.g., cardboard), however, may change its flexibility so that it is no longer AFSM 100 compatible. It is not recommended to include pens, keys, and other rigid items in automation-compatible flats. Items such as credit cards are acceptable when attached to the other contents.

Reason: A flat on the AFSM 100 must have sufficient flexibility to be processed.

Rigidity

Regulation: See DMM C820.2.5 and DMM Exhibit 2.5b.

Recommendation: No recommendation.

Reason: Very thin pieces, especially those with no cover or only a self-cover, tend to lack the mass and rigidity needed on the AFSM 100 and can double-feed when processed, while flats at the upper limits of weight tend to be too rigid. (Refer to the Summary on page 14 of this publication for how a Postal Service mailpiece design analyst (MDA) can assist with the design and testing of automation-compatible flats.)

Selvage (Overhang)

Regulation: See DMM C820.7.1 for selvage of flat-size envelopes and page 12 of this publication for the regulation and recommendation for selvage of polywrapped flats.

Recommendation: Minimize selvage on any side of a flat-size envelope to maintain the uniform thickness of the flat but still allow slight movement within the flat. Do not pack contents too tightly or too loosely.

Reason: A flat-size envelope can be torn open by the sudden movements of the AFSM 100 if the contents inside do not fit properly.

Contents

Regulation: See DMM C820.7.3.

Envelopes may be used as containers for articles if the package can reasonably be expected to be processed and delivered without damage to the contents or other mail.

Recommendation: Avoid placing inserts with hard, sharp corners or pointed objects in envelopes. Sharp or pointed contents should be properly padded when mailed.

Reason: Contents with sharp corners or pointed objects can tear or puncture an envelope as it moves at high speed through the AFSM 100.

Mailing Wrappers

Regulation: See DMM C820.7.3.

The contents of flats prepared in wrappers must be sufficiently secure to stay in place during processing. Mailing wrappers are envelopes, sleeves, partial wrappers, or polywrap used to enclose mailpieces.

Recommendation: Avoid sleeves and partial wrappers; consider envelopes or polywrapping as alternatives. If wrappers are used, consider attaching them to the flat with spot glue or stitching.

Reason: During AFSM 100 processing, a full paper sleeve or a partial wrapper (belly band) can become separated from the rest of the mailpiece.

Loose Inserts

Regulation: No requirement.

Recommendation: Place loose inserts so that they do not easily separate from the host piece during normal sortation and delivery. “Blow” loose inserts well into the spine of a perfect-bound flat. For loose inserts placed in a saddle-stitched or unbound flat, consider stitching or gluing them into the spine. Another option is inserting flats with loose inserts in envelopes or polywrap.

Reason: Inserts that fall out of flats while being processed on the AFSM 100 can become jammed in the machine and fail to reach their intended audience.

Bound, Unbound, and Folded Flats

Whether bound, unbound, or folded, the DMM states that all automation-compatible flats must have sufficient physical integrity to be processed without damage.

Bound Flats

Regulation: See DMM C200.3.1.

To be a bound flat (publication), pages must be securely held together by two or more staples, spiral binding, glue, stitching, or other permanent fastening. Any flat that does not meet the definition of a bound flat is considered an unbound flat.

Recommendation: Consider perfect binding for heavy or thick flats (e.g., more than 9 ounces, more than 0.5 inch thick, or more than 200 pages).

Reason: Perfect-bound pieces experience fewer problems with cover damage than saddle-stitched flats. Perfect binding may not be an option, however, due to industry capacity limitations or cost.

Unbound and Folded Flats

Regulation: See DMM C200.3.1 and DMM C820.2.2.

Unbound flats include folded multisheet and single-sheet publications and those in which pages are loose and collated (“nested”) or held together by a single staple. An AFSM 100 flat-size mailpiece with a final fold must be designed so that the address is in view when the final folded edge is at the bottom of the piece and any intermediate bound or folded edge is to the right.

Recommendation: Fold unbound flats firmly. If unbound or folded flats cannot maintain crisp folds, consider enclosing them in an envelope or polywrap.

Reason: Unbound or folded flats, such as tabloid-size newspapers, should retain their folded shape; remain flat; and not “blow open,” bow, or sag to avoid possible tearing during processing.

Saddle Stitching (Staples)

Saddle stitching is often used as a binding method for booklet-type flats or similar mailpieces.

Number of Stitches

Regulation: No requirement for most flat-size mail, except as specified in the DMM for certain classes of mail (e.g., Periodicals, Bound Printed Matter).

Recommendation: Consider three stitches to increase integrity on heavier and thicker flats (larger than digest-size or weighing between 6 and 9 ounces). For pieces weighing more than 9 ounces or having more than 200 pages, consider using perfect binding (gluing).

Reason: Using more stitches as a binding method on larger booklet-type flats helps reduce the incidences of mailpiece damage.

Size of Stitches

Regulation: No requirement.

Recommendation: Use 0.625-inch stitching (instead of 0.5-inch stitching) or consider using heavier stitching wire on thicker flats.

Reason: Any increase in the length or weight of the stitching can help minimize possible cover damage on thicker mailpieces.

Tension of Stitches

Regulation: See DMM C820.5.2.

Stitches must be tightly and securely inserted and closed.

Recommendation: Ensure that stitches are flat and tight, but do not break into or through the cover stock.

Reason: Stitches that are too tight can damage the cover and increase the likelihood of the cover being separated from the contents during processing.

Placement of Stitches

Regulation: See DMM C820.5.2.

Stitches may be placed in the fold or spine of a magazine, booklet, or similar mailpiece if they are parallel with the bound edge.

Recommendation: Insert stitches straight into the spine or fold, parallel with the bound edge.

Reason: Improperly inserted stitches do not provide adequate binding strength for AFSM 100 processing. If unparallel to the spine, the stitches can jam the equipment.

Quality of Stitches

Regulation: See DMM C820.5.2.

Stitches must not protrude from the mailpiece.

Recommendation: Ensure that stitches are flat against the fold. The crown of the stitch should not be rounded, and the stitch legs should be straight. Lifting a flat by its cover and looking for tearing or other damage to the cover's spine is a good way to determine if the binding is improper or inadequate.

Reason: Protruding stitches can cause damage to or interfere with the automated equipment.

Cover Design and Materials

The quality of cover material is critical to its resilience during processing. Cover material should be able to move through the AFSM 100 without tearing or being separated from its contents.

Basis Weight

Regulation: No requirement.

Recommendation: Use a cover made of paper with a higher basis weight than the paper used for the body of a flat-size mailpiece, except for very thin flats. Consider the grade of cover stock and the coating when determining durability, especially on heavier saddle-stitched flats. Also, consider using cover stock between 50 and 80 pounds, especially on flats weighing more than 6 ounces.

Reason: Cover stock that is not durable or heavy enough increases the likelihood that the cover will separate from the contents during processing.

Cover Folds

Regulation: No requirement.

Recommendation: Do not break the paper fibers when folding. Check the outside of cover folds for “whitening,” which is evidence of damage.

Reason: Excessive compression can weaken the spine of the cover material and increase the chance for cover damage during processing.

Lacquer

Regulation: No requirement.

Recommendation: Check a flat’s cover for low friction with the body of the mailpiece by twisting the cover slightly. If it slides easily against the body, reconsider the cover design or material. Minimize or avoid aqueous lacquer, lacquer, ultraviolet coating, or other high-gloss coating on covers if possible, especially on thin flats. If a cover is heavily lacquered and the piece is more than 6 ounces, consider using perfect binding.

Reason: Cover materials with a low coefficient of friction (e.g., lacquer, high gloss) can twist during processing, increasing vulnerability to damage. Thin flats with a lacquer cover can stick together under the tension of the AFSM 100 feeder paddle and misfeed, causing missorts and resulting in delivery delays.

Tabs

Regulation: See DMM C820.6.0.

Flats prepared with a short cover that is more than 3/4 inch from each edge must be secured with at least two tabs, wafer seals, or glue spots placed within 1 inch of the top and bottom edges of the cover.

Recommendation: Tabbing is another option to consider for heavier flats (more than 6 ounces) with low friction between the cover and the contents. Tabs, wafer seals, cellophane tape, or permanent glue (continuous or spot) are acceptable options. If you tab flats, staples must not be substituted for tabs or wafer seals on pieces in automation rate mailings (see DMM C820.5.2).

Reason: Tabbing helps prevent covers from being damaged during processing.

Gatefold Covers

Regulation: No requirement.

Recommendation: Consider using a heavier weight paper for the cover with a gatefold, such as 75 pound basis-weight cover stock; tabbing the mailpiece; or enclosing the flat in an envelope, mailing wrapper, or polywrap.

Reason: Flats with a gatefold cover can have problems because they can “blow open” during processing on the AFSM 100 and can become prone to damage.

Polywrapped Flats

A list of polywrap products approved by the Postal Service for use on the AFSM 100 appears on the Postal Service Web site <http://ribbs.usps.gov>.

Wrap

Regulation: See DMM C820.4.2.

For AFSM 100 flats, wrap direction is only around the longer axis of the flat (the longer axis is the imaginary straight line passing along the center of the mailpiece and parallel to the longer edge).

Recommendation: Avoid wrapping the polywrap so tight that it stiffens, bends, or bows the mailpiece.

Reason: Improperly wrapped flats cause machine jams and can damage both the original piece and other flats. Bent flats may not meet AFSM 100 standards.

Selvage (Overhang)

Regulation: See DMM C820.4.3.

When the mailpiece contents are totally positioned at the bottom of the polywrap, the overhang (selvage) must not be more than 0.5 inch at the top of the mailpiece (for purposes of the polywrap standards only, the top is one of the two physically longer edges, regardless of address orientation and whether the flat is bound or unbound); and when the contents are totally positioned to the left or right side, the overhang must not be more than 1.5 inches on the opposite side.

Recommendation: Keep overhang to a minimum, but do not wrap the mailpiece so tightly that it prevents it from lying flat.

Reason: Excessive polywrap selvage can get caught in the machinery, but flats too tightly wrapped may bow and not feed properly into the AFSM 100.

Seam

Regulation: See DMM C820.4.2.

The seam must be parallel to the flat's longer axis (i.e., longer edge or length). If the seam is placed on the addressed side of the mailpiece, the seam must not cover any part of the address or barcode areas.

Recommendation: When possible, place seams on the nonaddressed side of the mailpiece. Ensure seams are sealed sufficiently to prevent splitting.

Reason: Obscuring the delivery address or barcode will delay delivery of the mailpiece. Split seams can jam equipment causing delays.

Delivery Address

Regulation: See DMM C820.4.2.

Polywrap covering the address must be smooth to avoid interfering with address or barcode readability.

Recommendation: When possible, place address labels on the outside of polywrap, making sure excessive glue does not bleed from under the label and cause pieces to stick together. At the same time, make sure the glue keeps the labels affixed throughout processing and delivery.

Reason: An unobstructed view of the delivery address increases the ability of the optical character reader (OCR) on the AFSM 100 to read the delivery address and sort flats accurately.

Bundling (Packaging)

Regulation: No requirement.

Recommendation: Do not melt the original polywrap or remelt the seams of individual pieces when using shrinkwrap or film to package bundles of polywrapped mailpieces. Do not wrap individual flats with shrinkwrap film.

Reason: Polywrapped flats bundled together with shrinkwrap are sometimes re-melted, causing pieces to stick together and not process properly.

SUMMARY

Working closely with the mailing community, the Postal Service has been successful in processing almost all letter-size mail through high-speed automated sortation equipment. As a consequence, productivity for letter-size mail processing has increased and operating costs have decreased. Because of flat-size mail's greater diversity of design, size, and construction, the challenge with flat-size mail is more difficult but can be met.

By using the information and recommendations in this publication, you can have flat-size mail that is highly automation-compatible, much easier to prepare, and more efficient to process and deliver.

Mailpiece Design Analyst

Contact your local Postal Service mailpiece design analyst (MDA) for more information on the design and construction of flats. These Postal Service employees provide advice about the acceptability of mail for automated rates. MDAs can also provide you with technical assistance on:

- Reviewing artwork before printing.
- Testing paper and mailpieces for acceptable thickness, background color, flexibility, rigidity, and barcode print tolerances.
- Analyzing optical character reader (OCR) readability and automation-compatibility of prospective or actual mail.

To search online for an MDA in your area, go to: http://pe.usps.gov/mpdesign/mpdfr_mda_intro.htm.

For More Information

To create the best possible automation-compatible flats, ask for a copy of the 18-minute video on this subject, *“Recommendations for Designing Flat-Size Mail: Automation-Compatibility Recommendations for the AFSM 100.”*

You may also want to get a copy of Publication 177, *Guidelines for Optimizing Readability of Flat-Size Mail*, its companion 16-minute video, and Poster 182, both with the same title as Pub 177.

Your business mail entry unit or local MDA can assist you with obtaining all of these items. Pubs 177 and 178 are available on the Postal Service Web site at: <http://www.usps.com/publications/pubs/welcome.htm>.

DEFINITIONS

Aqueous Lacquer — Water-based, clear coating, usually glossy, applied to a printed piece. (Also see lacquer.)

Automated Flat Sorting Machine (AFSM 100) — An automated and computerized flat sorting machine with three automatic feeders that can process more than 17,000 flats per hour into 120 different sort separations.

Automation-compatible Flats — Flat-size mail that can be processed at high speeds by automated mail processing equipment, such as an AFSM 100 or a UFSM 1000. The mail must be of the correct size, shape, and material.

Automation Rate — Reduced postage rate offered to mailers who prepare barcoded automation-compatible mail in accordance with all DMM standards.

Basis Weigh — Weight in pounds of a ream (500 sheets) of paper cut to a standard size for that grade of paper.

Bind — To fasten sheets of paper with wire, thread, glue, or by other means.

Blow-in Card — Promotional card not bound into a publication. One common use of blow-in cards is to generate subscriptions for magazines.

Coated Paper — Clay-coated printing paper with a smooth finish.

Digest-Size — Small-size periodicals, measuring less than 6 inches by 9 inches, often with a trim size of 5.25 inches by 7.25 inches.

Domestic Mail Manual (DMM) — The United States Postal Service[®] manual that contains the basic standards governing domestic mail services, descriptions of the mail classes and services and conditions governing their uses, and standards for rate eligibility and mail preparation.

Friction — Force that resists relative motion between two bodies in contact with each other (e.g., a publication's cover and its first and last pages).

Gatefold (Covers) — Oversized cover sheet that is bound and scored so one or both sides fold into the gutter (towards its center) and opens into a multipage spread.

Gloss (High Gloss) — Transparent coating applied to a printed piece that reflects light and adds shine, luster, and brightness to a surface.

Insert — A piece printed and prepared separately and then placed into a publication for mailing.

Lacquer — Clear coating, usually glossy, applied to a printed piece for protection or special effect. (Also see aqueous lacquer.)

Mailers' Technical Advisory Committee (MTAC) — Group of mailing industry representatives and Postal Service[™] officials that provides technical information, advice, and recommendations about postal services, programs, regulations, and requirements. The members represent associations of large and small commercial mailing organizations, related mailing services, and various industry groups.

Nonmachinable — A mailpiece that cannot be sorted on automated mail processing equipment because of size, shape, content, or address legibility and that must be processed manually.

Optical Character Reader (OCR) — Hardware and software that allow a computer to read printed or written information, such as a delivery address.

Periodical Publication — Printed matter (a magazine, newspaper, or other publication) that is issued on a regular, stated basis.

Periodicals — Class of mail consisting of magazines, newspapers, or other publications formed of printed sheets that are issued at least four times a year at regular, specified intervals (frequency) from a known office of publication. Periodicals must have a legitimate list of subscribers or requesters.

Perfect Bound — Type of binding that glues the edge of sheets to a cover. Perfect binding results in a square spine.

Polywrap — Transparent packaging material used to seal mail; for automation-compatible flats, usually polyolefin film, most often polypropylene or low-density polyethylene based. Only film with a certificate of conformance by the manufacturer and that has been certified by an MDA as approved polywrap, prior to the first mailing, can be used on AFSM 100 flats.

Saddle Stitch — Form of binding for publications (e.g., magazines and catalogs) that uses staple-shaped wires through the middle seam of the sheets where they fold, also called saddle wire.

Self-cover — A cover using the same paper as the text.

Salvage — Edges of an enclosed mailpiece (e.g., envelope, polybag) that extend beyond the dimensions of the contents.

Shrinkwrap — Plastic covering that is placed around mail, usually bundles of multiple pieces (rather than individual pieces), and then heat-sealed to enclose the bundle tightly. Shrinkwrap typically does not meet the minimum polywrap requirements that have been approved for the Postal Service AFSM 100.

Spine — Binding edge of a book or publication (hardcover or softcover) that connects the two covers. Also called a backbone.

Stock — Paper or other material to be printed.

Tabloid — Format used mainly by newspapers but also by many commercial trade magazines. A commercial tabloid is typically 10.75 inches by 14.5 inches and newspaper tabloids are generally 11 inches by 15 inches or smaller.

Upgraded Flat Sorting Machine (UFSM 1000) — An automated flat mail sorting machine. The UFSM 1000 is designed to handle heavier and larger flats than the AFSM 100.

UV Coating — Protective, transparent liquid laminate, bonded and cured with ultraviolet light, applied to a printed piece to minimize chipping, scratching, and other damage.

Whitening — A white line along the fold of a cover indicating that paper fibers have broken and the cover stock has weakened often due to excessive compression of the folded edge.