

Library of Congress Preservation Directorate

Specification Number 300-351 – 16

Specifications for Microfilm Box, Single Reel

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1. Composition and Chemical Requirements

1.1 Fiber

The stock must be made from rag or other high alpha-cellulose content pulp, minimum of 87%. It must not contain any post consumer waste recycled pulp.

1.2 Lignin

The stock must give a negative reading for lignin as determined by the phloroglucinol test when tested according to TAPPI T 401, Appendix F, and shall have a Kappa number of 5 or less when tested according to TAPPI T 236.

1.3 Impurities

The stock must be free of metal particles, waxes, plasticizers, residual bleach, peroxide, sulfur (which will be less than 0.0008% reducible sulfur as determined by TAPPI T 406), and other components that could lead to the degradation of the box itself, or the artifacts stored therein.

1.4 Metallic Impurities

Iron must not exceed 150 ppm and copper shall not exceed 6 ppm when tested according to TAPPI T 266.

1.5 Optical Brighteners

The stock must be free of optical brightening agents.

1.6 pH

The stock must have a pH value within a range of 8.0 - 9.5 as determined by TAPPI T 509, cold extraction (modified by slurring sample pulp before measurement).

1.7 Alkaline Reserve

The stock must contain an alkaline reserve with a minimum of 2% and a maximum of 5% calculated as CaCO₃ when tested according to TAPPI T 553 (modified by slurring sample pulp before measurement).

1.8 Sizing

Only neutral or alkaline sizing shall be used. No alum rosin or rosin sizing should be used, as determined by TAPPI T 408.

2. Physical and Performance Requirements

2.1 Thickness and Basis Weight

The stock must meet the following minimum requirements for basis weight as determined by TAPPI T 410.

2.1.1 40 pt. Board

The minimum basis weight should be 550 lbs/ 3,000 ft²

2.2 Color

The color of the stock should be tan, unless otherwise specified on the purchase order. The color must not be so dark that it obscures color-dependent test evaluations, e.g., spot stain tests.

2.3 Color Bleeding

The color must show no bleeding when soaked in distilled water for 48 hours while held under suitable weight in contact with white bond paper. The color must not rub off.

2.4 Color Retention

The color of the stock must not change more than 5 points of brightness as measured by directional reflectance at 457 nm (TAPPI T 452), when exposed 24 hours to a Xenon arc lamp in an Atlas Weatherometer under the following conditions: Irradiance Level: 1.0 watts/m² at 420 nm. Inner filter: Borosilicate glass. Outer filter: clear soda lime glass. Black panel temperature: 50°C. Wet bulb depression: 8.5°C.

2.5 Photographic Activity Test

The stock, and any adhesives used, must pass the Photographic Activity Test (P.A.T.), meeting the criteria stipulated in sections 5.3, 6.3, and 7.2 of ISO 18916. Vendors may wish to confirm that their products pass the P.A.T. before submitting them to the Library of Congress for evaluation. The vendor may wish to send samples to the Image Permanence Institute (Rochester Institute of Technology/IPI, 70 Lomb Memorial Drive, Rochester, NY 14623-5604; Tel: 585-475-5199), or other testing laboratory, to determine conformance prior to submission.

2.6 Surfaces

The surfaces of the stock must be free of fingerprints, dirt, bubbles, knots, shives and other imperfections.

2.7 Creases and Folds

The stock must not fray, crack or split when folded and/or creased.

2.8 Stiffness

The stock must meet the following minimum requirements for stiffness. Test will be conducted according to TAPPI T 489, after conditioning by TAPPI method T 402.

2.8.1 40 pt. Board

The minimum internal stiffness must be not less than 2,800 Taber units in the machine direction and 800 in the cross direction.

2.9 Adhesive

If an adhesive is required, it must not soften or run. The adhesive must not cause the stock to become transparent or alter the color of the stock. The adhesive must not yellow, discolor, or fail (causing delamination) over time. The adhesive should not contain sulfur, iron, copper or other ingredients that may be detrimental to photographic materials, and is required to pass the P.A.T. The adhesive should not contain or generate oxidants. Pressure-sensitive or rubber-based adhesives are not acceptable. When used, the adhesive must not extend beyond the joined area.

2.10 Durability

The boxes must be sturdy enough to withstand normal wear and tear during use. The lid must be able to withstand repeated opening without cracking, splitting, fraying or otherwise losing strength along the hinge.

2.11 Metal Edge Stays

The metal edge stays must be made from a single unit of 0.0088 gauge cold rolled steel coated on the exterior with chrome, lacquer or baked enamel. The metal edge stays must be one inch wide and contain a minimum of eight 4-prong eyelets per 2 inch length. The metal edge stays must be chrome in color or as specified on the purchase order.

3. Product Requirements

3.1 Construction

The boxes must consist of one blank of 40 pt. board stock constructed as a single unit comprising a base with a hinged lid. (Illustration below)

3.1.1 Base

The four walls of the base must all be the same height.

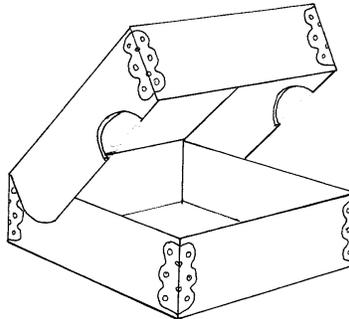
3.1.2 Corner Joints

The box corners must be joined with continuous metal edge stays. The prongs of the stays should fully penetrate the box board so that they are visible on the inside, and must be free of sharp raised edges inside and outside.

3.1.3 Lid

Thumb holes with a circumference between 3/4 – 1 inch must be cut out on both sides of the hinged lid, beginning approximately 3/4 inch from the front corners. The back corners of

the lid should be rounded. The overlap of the lid should be slightly shorter than the base sides to allow the box to close completely and rest flat on its bottom. The lid must remain shut when closed, but not bind.



Single reel microfilm storage box

3.2 Workmanship

The boxes must have clean cut edges and properly aligned panels with no unnecessary scores or cuts. All dimensions of the box maker's blank must be accurately cut, scored and slotted so that the assembled parts fit closely without binding. The edges must be straight, corner joints must meet exactly, and corners must be squared to 90 degrees. The boxes must stand straight and level when resting on the bottom.

3.3 Dimensions

Dimensions of the box are shown in the table below.

| Dimensions | Length | Width | Height |
|------------------|-----------|-----------|-----------|
| Inner dimensions | 3 3/4 in. | 3 3/4 in. | 1 1/2 in. |

3.4 Thickness

The boxes should be constructed of 40 pt. board stock.

3.5 Marking

Each box must be marked with the name of the manufacturer, year of manufacture, and the actual pH.

3.5.1 Placement and Size

The identifying information must not be larger than 2 1/2 inches long and 1 1/2 inches high. It should be centered on the bottom of the box, legible from the outside.

3.5.2 Marking Method

The information can be stamped in ink or embossed.

3.5.2.1 Ink Stamping

The stamping must be done on the outside of the box. The ink must not smear, fade, or rub off after drying. The ink must not run, bleed through, or transfer to other materials if it becomes wet. There must be no ink on the interior of the box.

3.5.2.2 Embossing

The embossing must be done from the outside of the box. The impression must be legible from the outside only, with no penetration to the interior of the box.

4. Packaging and Identification

4.1 Packages

The items must be packed in standard commercial containers that are constructed to ensure that they arrive at the Library of Congress in dry, undamaged condition. The outside of each container must be identified by type, size and number of items within; manufacturing run or batch number; LC Purchase Order / Contract number and line number.

5. Compliance with Specification

5.1 Quality Assurance Testing

The Library of Congress has the right to perform any of the tests set forth in the specification where such tests are deemed necessary to ensure that supplies conform to prescribed requirements.

5.2 Sampling

To sample for testing, shipments will be sampled according to ANSI/ASQ Z1.4, inspection level S-2, AQL 2.5%.

5.3 Methods

Tests will be conducted in accordance with specified test methods of the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), the Technical Association of the Pulp and Paper Industry (TAPPI), and the International Organization for Standardization (ISO). Publications describing these tests may be ordered directly from the technical associations, their websites, or other on-line standards vendors.

5.4 Acceptance

Materials will be accepted when the Library of Congress has ascertained that the products comply with all parts of the specification. A quick reference table of the physical and chemical requirements and test methods used to ascertain compliance is provided in section 5.5.

FAILURE TO MEET ANY PART OF THE SPECIFICATION WILL BE CAUSE FOR REJECTION

5.5 Table of Physical and Chemical Requirements and Test Methods

| Property | Requirement | Test Method |
|-------------------|---------------------------------------|---|
| Lignin | Negative / Kappa 5 | TAPPI T 401, Appendix F or TAPPI T 236 |
| Reducible Sulfur | < 0.0008% | TAPPI T 406 |
| Iron | ≤ 150 ppm | TAPPI T 266 |
| Copper | ≤ 6 ppm | TAPPI T 266 |
| pH | 8.0 – 9.5 | TAPPI T 509, cold extraction, slurried pulp |
| Alkaline Reserve | 2 – 5% | TAPPI T 553, slurried pulp |
| Alum Rosin Sizing | Negative | TAPPI T 408 |
| Basis Weight | 40 pt: 550 lbs./3,000 ft ² | TAPPI T 410 |
| Color Bleeding | No bleed in 48 hours | See section 2.3 |
| Color Retention | ≤ 5 pts | TAPPI T 452 |
| Stiffness | 40 pt: 2800 MD, 800 CD | TAPPI T 489 |

Configuration Management

| Date | Revision History |
|--------------|---|
| 19-Jun-2002 | Initial release of document on website, html format. |
| 14-Dec-2009 | Revised and reformatted for release as PDF document. |
| 30-Sept-2016 | Revised Sections 1.1, 1.2, 2.2, 2.5, 2.9, 5.5. Deleted 2.7. Editorial update to footer. |