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Low Lignin Microfilm Box

October 2015

I. Scope

This specification covers the requirements for an assembled low lignin microfilm box with reverse tuck-in, two-end side flaps, locking notches at the right side flap, a thumb notch on the left side of the back panel, and printing on the front and back panels. (See figure 1 below.)

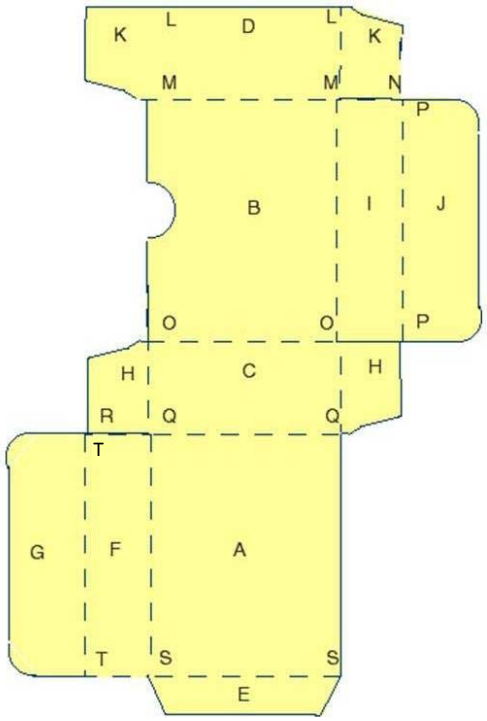

Figure 1

II. Requirements

Construction

The assembled box shall consist of one die cut paperboard box blank, cut and scored as indicated in the Figure 1 above.

The box orientation shall be as follows:

A. front
B. back
C. top
D. bottom

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The front of the box shall be extended to the left by a two-end flap, FG. The back of the box shall be extended to the right by a two-end flap IJ. Slits shall be made along lines MN, OP, and RQ so that scores can be made along lines MM, OO, and QQ. Scores shall also be made along lines LM and OQS at the left and LMOQ at the right.

Additional scores shall be made along the side flaps at lines PP and TT. One half inch slits shall be made in from each end of line PP to form the interlocking notches at the right side flap. A thumb notch shall be centered at the left edge on the back of the box and shall measure 3/8 inch. The corners of the outer segment of the right flap (J) and the left flap (G) shall be rounded.

Junction flap E and segments K and H shall be tapered as shown in Figure 1. Junction flap E shall be adhered to the inside of D so that the cut end of D is aligned evenly with score line S.

Dimensions

35mm microfilm
The exterior dimensions of a box to house 35mm microfilm shall measure 3 13/16" inches in height, 3 13/16 inches in width, and 1 5/8 inches in depth, ±1/16 inch. Junction flap E shall measure ≥5/16 inch.

16mm microfilm
The exterior dimensions of a box to house 16mm microfilm shall measure 3 13/16 inches in height, 3 13/16 inches in width, and 1 inch in depth, ±1/16 inch. Junction flap E shall measure ≥5/16 inch.

Paperboard

Composition

The paperboard for the box shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. It must not contain any post consumer waste recycled pulp. It must meet the following requirements:

- Free of groundwood:
  - test negative in ASTM D1030 phloroglucinol test with X5 Spot Stains (ASTM has withdrawn this standard in 2011. NARA is following 2007 version)
  - or Kappa # ≤5 in TAPPI T-236 test.
- Free of alum-rosin sizing (TAPPI T-408 or ASTM D 549)
- Contain <0.0008% reducible sulfur (TAPPI T-406).

- Free of optical whitening agent and fire retardant.
- Free of particles or other impurities such as:
  - metals,
  - waxes,
  - plasticizers (i.e. wet strength additives),
  - plastics,
  - residual bleach,
  - peroxide

The paperboard shall pass the Photographic Activity Test as described in ISO 18916 or the latest version.

Sizing

Alkaline sizing shall be used (surface, internal, or both).

Alkaline Reserve

The paperboard shall contain an alkaline reserve of calcium carbonate, magnesium carbonate, or a combination of both, within a range of 3–6% (calculated as $CaCO_3$) when tested according to TAPPI T-553 or modified by slurrying the sample pulp prior to measurement, and shall be evenly distributed throughout all plies and layers. NARA will provide slurry method procedure upon request

Hydrogen Ion Concentration (pH)

The pH value of the paperboard shall be between 8.0 and 9.5 when tested according to cold extraction method TAPPI T-509 or modified by slurrying the sample pulp prior to measurement.

Lignin

To demonstrate the adequacy of bleaching or lignin removal, all plies and layers of the paperboard shall have a negative reading in the phloroglucinol test when tested according to ASTM D1030, or shall have a KAPPA number ≤5 when tested according to TAPPI T-236.

Abrasion Resistance

The outer surfaces of the paperboard shall show <0.7% of the total weight-loss (mounting card and sample) when tested according to TAPPI T-476 with a #CS10 wheel and 100 wear cycles.

Surface Smoothness

The paperboard shall reach a smoothness of 175-220 Sheffield units, when tested according to TAPPI T-538.

Thickness

The paperboard thickness shall be 0.030 inches ±0.002 inch (30 point), when tested according to TAPPI T-411.

Bending Resistance

When tested according to TAPPI T-556 (7.5° deflection), the paperboard shall have an internal stiffness of:

- ≥800 mN (machine direction), and
- ≥250 mN (cross direction)

Finish

The paperboard shall be plate finished (calendered) on both sides.

Color

The paperboard shall be colored following the requirement in purchase order.

Color & Dye Bleeding/Transferring

Dyes used to color the paperboard or colorant used to mark the paperboard shall show no bleeding or transferring when soaked in distilled water for 48 hrs. under ambient temperature while held in direct contact with white bond paper.

Adhesive

A stable and water resistant adhesive shall be used to adhere D (the junction flap) to E (the bottom of the box). More specifically:

- Water resistant adhesive shall be used.
- When aging in a humidity chamber of 50°C and 87% RH for 4 hrs., the adhesive shall hold the components firmly together, not soften or run.
- The addition of adhesive shall not negatively impact the specification of the paperboard, such as reduce the pH or alkaline reserve, increase the sulfur content, decrease the stiffness, or to cause the paperboard to fail the "Photographic Activity Test" as described in ISO 18916 (or the latest version).

- If it is necessary to buffer the adhesive, the same buffer shall be used as those in the paperboard (calcium or magnesium carbonate, or a combination of both).
- The adhesive shall be invisible through and not alter the color of the paperboard.
- The adhesive shall not contain iron, copper or other ingredients that may be detrimental to archival records.
- The adhesive shall 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.

Printing Ink

The printing ink shall be dark blue, and once printed on the paperboard shall be stable as specified in the above "*Color & Dye Bleeding/Transferring*" section.

Marking Content and Design (product level)

The content and design printed on the paperboard shall follow the specific requirement in purchase order.

Workmanship

Each box shall meet the requirements stated in this specification, shall be constructed in accordance with good commercial practice, and shall be free of imperfections that may affect its utility or aesthetic appearance.

- Each box shall be made to the dimensions specified.
- All panels shall fit closely without gaps or warping.
- All edges shall be cut straight and shall be smooth and even. In the assembled box, the corners of the box shall be square.
- The bottom of the box shall rest evenly on a flat plane.
- The corners of the outer segment of the right flap (J) and the left flap (G) shall be rounded. Junction flap E shall be adhered to the inside of D so that the cut end of D is aligned evenly with score line S. Junction flap E and segments K, H shall be tapered as shown in Figure 1.
- The box shall contain no surface dirt (smudges, fingerprints, and the like) and no oozed adhesive and shall not be marred (dents, bumps, and the like) in any way.
- The paperboard shall be scored and creased uniformly.
- Scores and creases shall be deep enough to permit precise folding during assembly.
- All folded edges shall be free of fraying, cracks, and breaks.

- All slits in the paperboard to facilitate scoring or to create notches shall remain intact and shall not tear inward as the box is used.
- The side flaps shall be able to withstand repeated opening without cracking, splitting, fraying, or otherwise losing strength along the folds.
- Adhesive shall be uniformly applied to the appropriate surface to provide a firm, even attachment of all components.
- The thumb notch shall be centered at the left edge of the back of the box and shall be shaped uniformly and be smooth and even at the edge.
- The printing on the front and back of the box shall be legible, sharp, clean, and uniform.

III. Preparation for Delivery

Packaging and Labeling (package level)

The microfilm boxes shall be packed in a standard commercial container that is sealed with tape to ensure that they arrive dry and undamaged. The number of boxes to be packed in each container shall be specified in the purchase order.

The outside of each packing container shall be legibly marked with:

- the purchase order number or contract number, and
- the type, size, and number of archives boxes packed in the container, and
- the name of supplier/manufacturer and year of manufacture

IV. Quality Assurance Provisions

Testing

Test procedures and controls specified in this document shall be used to determine the quality of the product. Other procedures and controls must be approved by the National Archives before test results will be accepted.

Unless otherwise indicated, the tests shall be performed at, and the samples be conditioned to, a standard conditions of 73±3.5 °F and 50±2% RH (TAPPI T-402).

Sampling for Test

Sampling Method

The sampling of microfilm boxes in each shipment for examination shall be carried out according to methods specified in ANSI/ASQ Z1.4, inspection level S-2.

Acceptable quality levels

- For construction and workmanship at product level, the acceptable quality level shall be ≤4.0% defective from each lot of material delivered.
- For QC testing at product level, the acceptable quality level shall be ≤2.5% defective from each lot of material delivered.
- For compliance with packaging and marking requirements at package level, the acceptable quality level shall be ≤4.0% defective from each lot of material delivered.

Test Methods

The requirements for quality and characteristics shall be tested in accordance with specified test methods of the American Society for Testing and Materials (*ASTM*), the Technical association of the Pulp and Paper Industry (*TAPPI*), the International Organization for Standardization (*ISO*), and American National Standards Institute (*ANSI*). Publications describing these tests may be ordered directly from the technical associations.

Responsibility for Tests

The Contractor is responsible for quality control to ensure the specifications of this contract are met. The Contractor shall provide test results to the Contract Specialist (CS) and/or Contracting Officer (CO), **for each production lot** used to provide supplies under this contract. The test results shall display, at a minimum, the characteristics listed below and shall be provided at least 30 days prior to shipping any items from the production lot under this contract. The Contractor may use his or her own facilities or any commercial laboratory certified to run quality assurance test methods listed below. The National Archives and Records Administration (NARA) reserves the right to perform quality assurance at any time during the contract where such tests are deemed necessary to assure that supplies and services conform to the specifications. Therefore, the test results [pH, alkaline reserve, lignin, sizing, sulfur, abrasion and bending resistances, thickness, bleeding, PAT and adhesive], two samples of each item purchased, and a sample of at least 12” x 12” of the material used to make the item (for example boxboard), shall be sent together to the CS within 14 days after award of the contract. Additionally, the Contractor shall provide a sample of at least 12” x 12” of the material from a new production lot at any time, upon request of the Government.

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Table of QC Test Items and Specifications

Test Items	Spec. Targets	Notes (test methods, test conditions, etc.)
Alum-rosin sizing	Negative	TAPPI T-408 or ASTM D 549
Lignin	Negative or Kappa number ≤5	Phloroglucinol test, ASTM D1030 (X5 Spot Stains) TAPPI T-236
Reducible Sulfur	<0.0008%	TAPPI T-406
Alkaline reserve	3 - 6% (calculated as $CaCO_3$)	TAPPI T-553 (or slurry method)
pH	8.0 – 9.5	TAPPI T-509 (or slurry method)
Abrasion Resistance	<0.7% (total weight-loss)	TAPPI T-476 (#CS10 wheel, 100 wear cycles, on outer surfaces)
Surface Smoothness	175-220 Sheffield units.	TAPPI T 538
Thickness	0.030 ±0.002 inch (30 point)	TAPPI T-411
Bending Resistance	≥800 mN (machine direction) ≥250 mN (cross direction)	TAPPI T-556 (7.5° deflection)
Color & Dye Bleed / Transfer (including ink for surface marking)	No visible transferring	See page 4 for detailed test method and conditions
Photographic Activity Test	Pass	ISO 18916 or the latest version

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Revision note:

This specification is a revision of May 2014 version.