

Specifications for Low Lignin Archives Box

(Recommended for Use with Photographic Prints and Negatives)

October 2015

I. Scope

This specification covers the requirements for an assembled, low lignin, metal edged archives box with a hinged lid and a telescoping shallow front (See Figure 1 and 2), a shoe box type box with shallow lid (See Figure 3) or full lid (See Figure 4), or a drop front box with deep lid, where the drop front shall be on the long side of the box unless otherwise specified (See Figure 5). Metal edges and pull cords may not be required on all box types but will be specified in the contract with the box style.

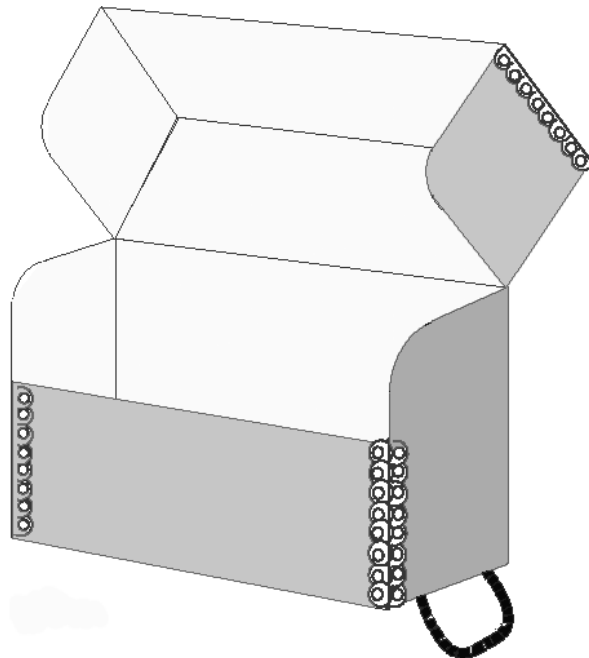


Figure 1 – Configuration of document box



Figure 2 – Inside of base of box showing pull cord (for document box only, not shoe box or drop front box).

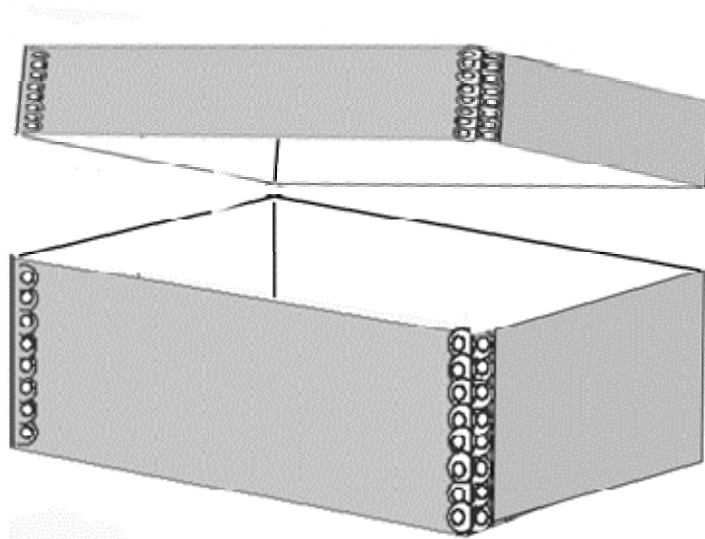


Figure 3 – Configuration of shoe box with shallow lid

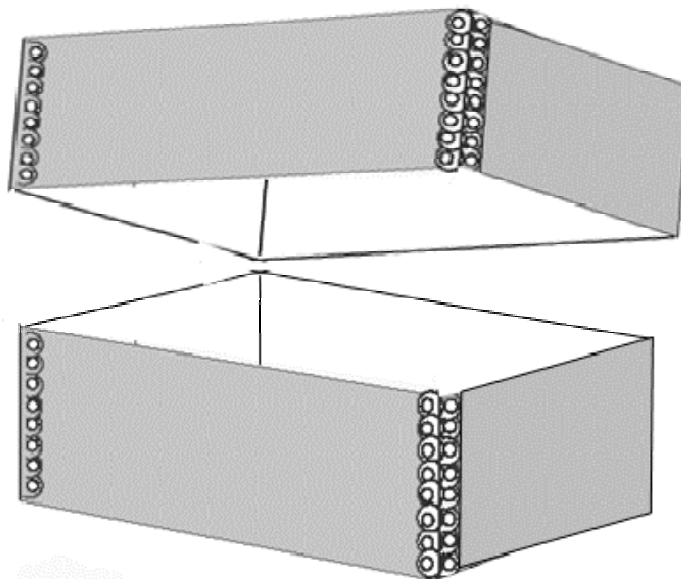


Figure 4 – Configuration of shoe box with full lid

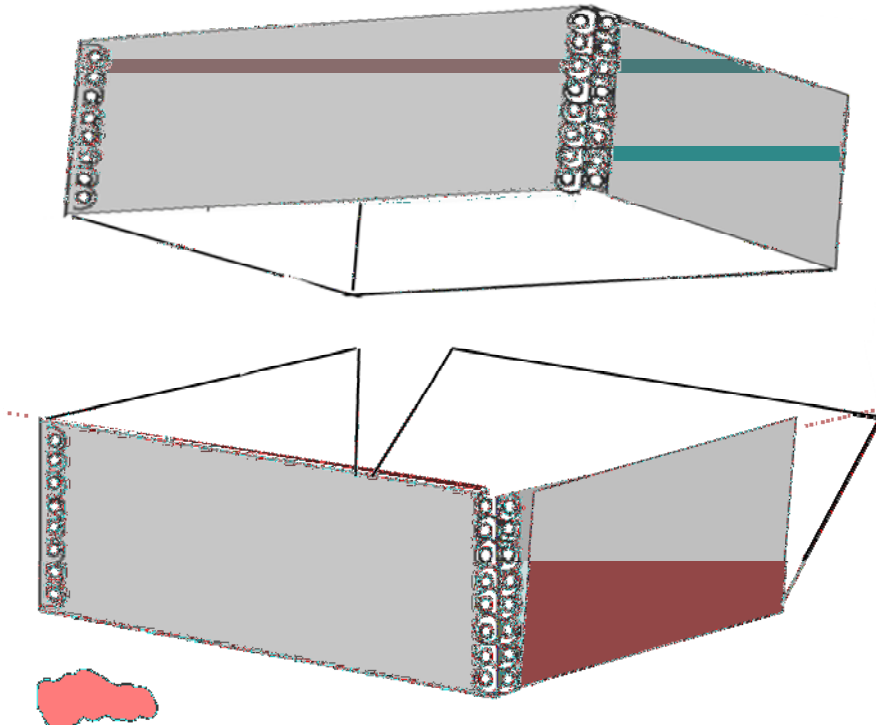


Figure 5 – Configuration of drop front box with deep lid

II. Requirements

Construction

The assembled box shall consist of one paperboard box blanks with metal edge stays oriented and secured on the box joints as indicated in Figure 1, 3, 4, or 5. The style will be specified in the contract.

Dimensions

The dimensions of the box shall be specified in the contract as inside measurements in the following order: length, width, and depth.

Paperboard (including paperboard lined with paper)

Composition

The paperboard shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture of them. Lining paper (where applicable) shall be made from new cotton or linen pulp, fully bleached chemical wood pulp, or a mixture of them. Both shall meet the following specification:



- 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

In addition, the paperboard or lining paper (where applicable) 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 3–7% (calculated as CaCO_3) when tested according to TAPPI T-553 or modified by slurring 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 slurring the sample pulp prior to measurement.

Abrasion Resistance

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

Label Adhesion

The surface of the paperboard shall hold a piece of weighted pressure sensitive tape securely in place for at least 10 minutes in 6 out of 9 trials, when tested according to ASTM D2860, Procedure B modified as follows:

- use a 3/4", 3M Scotch[®] Magic[™] 810 pressure sensitive tape to conduct the test
- adhere the tape to the paperboard surface with 2 rolls of a 10kg steel roller
- suspend a 2oz weight from the tape

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 0.060" \pm 0.005" (60 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:

- \geq 5500 mN (machine direction), and
- \geq 2200 mN (cross direction)

Finish

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

Color

The color of the box shall be specified in the contract.

Color & Dye Bleed/Transfer

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

Adhesive (for laminating >2 paperboards together to form a thicker single board):

- 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 paperboards 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, or decrease the stiffness.
- 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 sulfur, iron, copper or other ingredients that may be detrimental to archival records.
- The adhesive shall not contain or generate oxidants.
- When used, the adhesive must not extend beyond the joined area.

Metal Edge Stay (where applicable)

General Information

A metal edge stay shall be used to securely fasten together the joints of the box and lid. (See Figure 1-5). It shall be made from a single unit of 0.0088 gauge cold rolled steel coated with lacquer or baked enamel. It shall be positioned on the box so that at both ends it extends to $\leq 1/4$ " of the edge of the paperboard.

Finish

The outer surface of the metal edge stay shall be free of sharp, raised edges.

Color

The color of the metal edge stay shall be specified in the contract.

Dimensions

The metal edge stay shall be 1" wide and shall contain 8, 4-prong eyelets per 2" length.

Pull Cord (where applicable but contract may specify no pull cord necessary)

General Information

The box shall have a nylon/polyester/polypropylene pull cord mechanically attached (i.e., using no adhesives) to the inside bottom front of each box. (See Fig. 2). The pull cord shall be formed into a loop and fastened together at the two free ends with a metal clasp. It shall measure 5" ($\pm 1/8$ ") x 1/16" and shall extend 2"-3" out from the edge of box.

Cord Strength

The pull cord shall withstand being pulled apart at the metal clasp when the following test procedure is used.

- Cut the pull cord in half at the point opposite the metal clasp.
- Mount the two loose ends in the jaws of a constant rate of elongation tensile tester.
- Use a 50kg load cell, the jaws set 2” apart, and the cross head and chart speeds set at 10”/min.
- To pass the test, the cord shall not pull apart at the metal clasp when it is subjected to a force of up to 8kg.

Color & Dye Bleed/Transfer

- Dyes used to color the pull cord shall show no bleeding when the pull cord is soaked in distilled water under ambient temperature for 48hrs., while held in direct contact with white bond paper.
- The dyes shall resist transfer when the dry pull cord is rubbed against a piece of Whatman #1 filter paper.

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.
- The corners of the box shall be square.
- The bottom of the box shall rest evenly on a flat plane.
- Adhesive, when used, shall be uniformly applied to all surfaces to provide a firm, even attachment of all components.
- The surfaces of the completed box shall be free of knots, shives, and abrasive particles and 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 construction.
- All folded edges shall be free of fraying, cracks, and breaks.
- The lid shall be able to withstand repeated opening without cracking, splitting, fraying, or otherwise losing strength along the hinge.
- Each metal edge stay shall be made to the dimensions specified and shall securely fasten together the joints of the box and be positioned as specified.
- All the prongs of each metal edge stay shall fully penetrate the paperboard so that they are visible on the inside of the box or lid.



- The pull cord shall be attached to the box and be made to the dimensions specified.

Identification Markings (product level)

The following information shall be legibly embossed on the outside bottom of each box: name of manufacturer, pH range, year of manufacture and the words “*low lignin*”. The impression must be legible from the outside only, with no penetration to the interior of the box. The pin punch or embossing must not affect the smoothness of the board by penetrating the entire thickness of the board. The identification information shall not include the use of printing or media of any kind.

III. Preparation for Delivery

Packaging

The archives 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.

Marking (package level)

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.
- the name of supplier/manufacturer and year of manufacture

IV. Quality Assurance Provisions

Tests

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 $50\pm 2\%$ RH (TAPPI T-402).

Sampling for Tests

Sampling Method

The sampling of paper boards 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 $\leq 4.0\%$ defective from each lot of material delivered.
- For QC testing at product level, the acceptable quality level shall be $\leq 2.5\%$ defective from each lot of material delivered.
- For compliance with packaging and marking requirements at package level, the acceptable quality level shall be $\leq 4.0\%$ defective from each lot of material delivered.

Test Methods

The requirements for paperboard quality and characteristics shall be tested 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), the International Organization for Standardization (ISO), and the American National Standards Institute (ANSI). Publications describing these tests may be ordered directly from these 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, label adhesion capability, 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.

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 - 7% (calculated as CaCO ₃)	TAPPI T-553 (or slurry method)
pH	8.0 – 9.5	TAPPI T-509 (or slurry method)
Photographic Activity Test	Pass	ISO 18916 or the latest version
Abrasion Resistance	<0.7% (total weight-loss)	TAPPI T-476 (#CS10 wheel, 100 wear cycles, on outer surfaces)
Label Adhesion	Suspend a 2oz weight from the tape for ≥10 min. (≥6 passes out of 9 trials)	ASTM D2860, Method B, modified by: <ul style="list-style-type: none"> • Use a 3/4" wide, 3M Scotch® Magic™ 810 pressure sensitive tape • Adhere the tape to the sample surface with 2 rolls of a 10kg steel roller
Surface Smoothness	175-220 Sheffield units.	TAPPI T 538
Thickness	0.055 - 0.065" (60 point)	TAPPI T-411
Bending Resistance	≥5500 mN (machine direction) ≥2200 mN (cross direction)	TAPPI T-556 (7.5° deflection)
Color & Dye Bleed / Transfer	No visible transferring	See description in page 5 for detailed test method and conditions
Pull Cord Strength (where applicable)	Pass	See description in page 7 for detailed test method and conditions

Revision note:

This is a revision from May 2014 version.