

**Library of Congress Preservation Directorate**  
**Specification Number 300-311 – 09**  
**Specifications for Document Storage Boxes**  
**For the Storage of Artifacts**

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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%, as defined in ISO 18902. 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 ASTM D 1030, X5 spot stains, 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 CaCO<sub>3</sub> 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 60 pt. Board**

The minimum basis weight should be 800 lbs/ 3,000 ft<sup>2</sup>

### **2.2 Color**

The color of the stock should be tan, cream, or buff, or will be specified on the purchase order. The color must not be so dark that it obscures color-dependent test evaluations.

### **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/m<sup>2</sup> 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 Surfaces**

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

### **2.6 Creases and Folds**

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

### **2.7 Abrasion**

The outer surfaces of the stock must show a loss of less than 2% in weight when tested with a #CS10 wheel and 100 wear cycles according to TAPPI T 476.

### **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 60 pt. Board

The minimum internal stiffness must be not less than 5,600 Taber units in the machine direction and 2,500 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. 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. The pull cord must not come out of the box when pulled or separate from itself.

## 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.

## 2.12 Pull Cords

The pull cords must be made of black nylon cord that is formed into a loop by fastening the two free ends together with a metal clasp. Metal pulls are not acceptable.

### 2.12.1 Color Bleeding

The dye of the strings must show no bleeding when soaked in distilled water for 48 hours while held under suitable weight in contact with white bond paper.

### 2.12.2 Cord Strength

The cords must not come apart when subjected to the following test procedure. Use a constant-rate-of-elongation tensile tester, set the jaws 2 inches apart and the cross-head speed to 10 inches per minute. Cut the pull cord in half at the point opposite the metal clasp and mount each loose end in opposite jaws of the tester. The cord must remain connected at the metal clasp when subjected to a force of up to 8 kilograms.

## 3. Product Requirements

### 3.1 Construction

The boxes must consist of one blank of 60 pt. board stock constructed as a single unit comprising a base with a hinged lid. (Illustration below)

### 3.1.1 Base

The grain direction of the board stock should run parallel to the long dimension of the box. The front wall of the base should be shorter than the side and back walls, which should all be the same height. The side walls should be doubled to the full height or half way up. The floor of the base should be reinforced with flaps that do not bind when pressed into place. The floor flaps should meet, but not overlap. There must be no cut-out holes on the side panels of the box. The front corners of the side walls of the base should be rounded.

### 3.1.2 Corner Joints

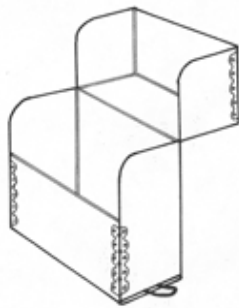
The box corners must be joined with continuous metal edge stays. The stays should stop 1/4 inch from the cut edge of the top and the folded crease at the bottom of the corners to avoid the problem of the stays working loose. The prongs of the stays should fully penetrate the box board so that they are visible on the inside, and must be free of sharp raised edges inside and outside.

### 3.1.3 Lid

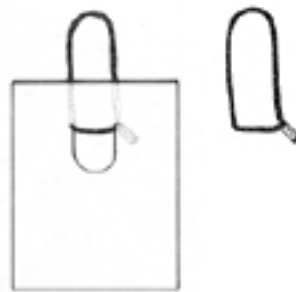
The lid should hinge along one long side. The back corners of the lid should be rounded. The lid must overlap the front wall by at least one inch. The lid must remain shut when closed, but not bind.

### 3.1.4 Pull Cord

The pull cord should extend out two inches from the edge of the right side (proper left side) of the box. The pull must be mechanically attached to the box without the use of an adhesive. The pull should be secured to the box by looping around a U-shaped tab cut into the right flap of the box floor.



Document storage box



Pull cord attachment

## 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. Full width boxes must be able to stand level with the lid open.

### 3.3 Dimensions

The size of the boxes will be stated on the purchase order. The inner dimensions for boxes of different sizes are shown in the table below. Standard letter and legal size folders must fit inside the box without binding.

| Inner Dimensions | Length     | Width     | Height     | Front Wall Height |
|------------------|------------|-----------|------------|-------------------|
| Letter size      | 12 1/4 in. | 5 in.     | 10 1/4 in. | 6 in.             |
| Legal size       | 15 1/4 in. | 5 in.     | 10 1/4 in. | 6 in.             |
| Oversize legal   | 15 1/2 in. | 5 in.     | 12 1/2 in. | 8 1/2 in.         |
| Special          | 15 1/4 in. | 4 3/4 in. | 10 1/4 in. | 6 in.             |
| Half width       |            | 2 1/2 in. |            | 6 in.             |

### 3.4 Thickness

The boxes should be constructed of 60 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                    | ASTM D 1030, X5 or TAPPI 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      | 60 pt: 800 lbs./3,000 ft <sup>2</sup> | TAPPI T 410                                 |
| Color Bleeding    | No bleed in 48 hours                  | See section 2.3                             |
| Color Retention   | ≤ 5 pts                               | TAPPI T 452                                 |
| Abrasion          | ≤ 2%                                  | TAPPI T 476                                 |
| Stiffness         | 60 pt: 5600 MD, 2500 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. |