

Library of Congress Preservation Directorate
Specification Number 300-313 – 09
Specifications for Phonograph Record Storage Boxes

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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 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 60 pt. Board

The minimum basis weight should be 800 lbs/ 3,000 ft²

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, 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 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.

2.13 Cloth Tape

The cloth tape used to secure the back corners of the box should be 100% cotton, starch filled cloth. This can be the "Holland" type (such as #2843 Holland), a "C" cloth type or comparable cotton cloth. The cloth should be a minimum of 2 inches wide.

2.13.1 Coating

Coatings that will accelerate deterioration of the cloth, such as pyroxylin, are not acceptable.

2.13.2 Adhesive

The adhesive used to secure the cloth tape must meet the requirements in section 2.9. The adhesive can be water-activated, "acid-free" protein, or poly vinyl acetate that does not off-gas acetic acid.

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. The rear corners of the base must be secured with cloth strips all along, from top to bottom, holding the corner edges together.

3.1.2 Corner Joints

The box corners must be joined with continuous metal edge stays. The metal stays on the back corners of the base should be at the top only, measuring 3 inches in length. The stays should stop 1/4 inch from the cut edges 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 overlap of the lid should be a minimum of 2 inches for boxes for 12 inch discs, and 4 inches for boxes for 16 inch discs. 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.

3.1.5 Cushioned Floor

Cushioning on the floor of the boxes should be provided by three boards. The bottom and middle boards should be lightly adhered to each other using a non-off-gassing adhesive (not tape). The bottom board should be adhered to the center of the middle board. The top and middle board should not be adhered to each other. The long sides of the boards should be cut to be a "push tight fit" into the box. There should be no gaps between the sides of the box and the cushioning pieces.

3.1.5.1 Bottom Board

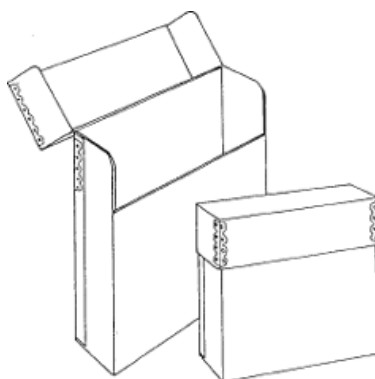
The bottom board should be B-Flute corrugated board meeting LC Specification 600-612. The length of the board should be cut to fit between the bottom flaps of the base. The board can be 1 inch shorter than the space between the flaps. The width of the board should be cut to fit between the crease edges of the floor of the box base.

3.1.5.2 Middle Board

The middle board should be B-Flute corrugated board meeting LC Specification 600-612. The board should be cut with the flutes running parallel to the long direction to fit tightly enough to be a push fit to hold it in place without adhesion to the box. There should be no gap at all along the long sides of the box.

3.1.5.3 Top Board

The top board should be the same 60 pt board used to construct the box, cut to the same size as the middle board.



Phonograph record 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

The size of the boxes will be stated on the purchase order. The inner dimensions of boxes for 12 inch discs and 16 inch discs are shown in the table below. The inner height of the boxes is measured after the insertion of the floor cushioning. The front wall of boxes for 12 inch discs should be 3/4 of the height of the side and back walls. The front wall of boxes for 16 inch discs should be 3 inches lower than the side and back walls.

Inner Dimensions	Length	Width	Height
For 12 in. discs	13 1/16 in.	2 7/8 in.	13 1/16 in.
For 16 in. discs	18 1/2 in.	2 1/4 in.	18 3/8 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 ²	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
24-Jun-2002	Initial release of document on website, html format.
14-Dec-2009	Revised and reformatted for release as PDF document.