

Specifications for Cubic Foot Archival Storage Box

October 2015

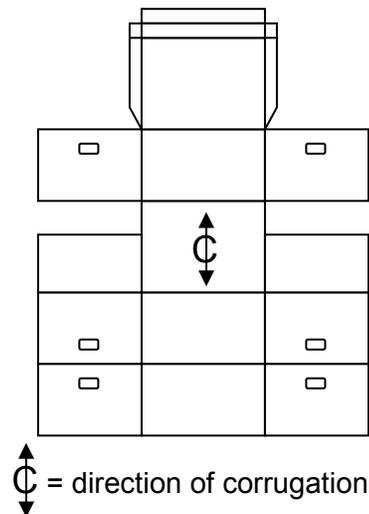
I. Scope

This specification covers the requirements for a hinged lid box, acid free with calcium carbonate buffering made from B-Flute corrugated paper board shipped flat and palletized.

II. Requirements

Construction

The single piece box shall be assembled from B-flute corrugated single-wall (double-faced) board, comprised of two facings (liners) adhered to one fluted medium. The assembled box shall consist of the die cut corrugated boxboard blanks cut, scored, and adhered as indicated in Figure 1 (drawing is not to scale). Adhesives shall meet NARA's Quality Assurance Provisions included in this specification. Assembly shall not include metal fasteners.



Dimensions (NOTE: Always double check dimensions prior to sending out based upon shelving constraints.)

A. Standard Sized Storage Box (For Letter or Legal Folders)

Interior dimensions 14 15/16 inches length, x 12 inches wide x 10 inches depth, such that a legal sized folder will fit in one orientation and a letter size folder fit in the



perpendicular orientation. The exterior dimension at the top of a box with a closed lid is not to exceed 15 13/16 inches in length and 12 3/4 inches in width in order to fit on the regional shelves and the height shall not exceed 10 13/16 inches. All dimensions will be accurate to plus/minus 1/16 inch. Please check product dimensions prior to sending out!

B. Letter Only Sized Storage Box

Interior dimensions 14 5/16 inches length, x 12 inches wide x 10 inches depth, such that a letter size folder will fit along the width of the box to use the maximum space for letter folder storage. The exterior dimension at the top of a box with a closed lid is not to exceed 15 3/16 inches in length and 12 3/4 inches in width in order to fit on the regional shelves and the height should not exceed 10 13/16 inches. All dimensions will be accurate to plus/minus 1/16 inches.

Paperboard (Singlewall B-Flute Corrugated Board)

Composition

All layers of the corrugated paperboard laminate shall be made from any unbleached pulp meets the following specification:

- Free of alum-rosin sizing (ASTM D 549 or TAPPI T-408)
- 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,

Sizing

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

Alkaline Reserve

The corrugated paperboard shall contain an alkaline reserve of calcium carbonate, magnesium carbonate, or a combination of both, within a range of 3–6% (calculated as CaCO₃) 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 corrugated paperboard shall be between 8.0 and 10.0 when tested according to cold extraction method TAPPI T-509 or modified by slurring the sample pulp prior to measurement.

Basis Weight

The corrugated paperboard must have a combined basis weight of ≥ 110 lb./1,000 ft² as determined by TAPPI T-410.

- Liners: ≥ 42 lb./1,000 ft²
- Corrugated medium: ≥ 26 lb./1,000 ft²

Abrasion Resistance

The outer surfaces of the liner board stock must show <0.3% 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 corrugated paperboard liner shall hold a piece of weighted PS tape securely for ≥ 10 min. in 6 out of 9 trials, when tested according to ASTM D2860.

Note: 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

Smoothness shall be 250-400 Sheffield units as determined by TAPPI T-538.

Bending Resistance

The corrugated paperboard shall be tested for bending resistance in accordance with TAPPI T-836, and shall satisfy the following requirement:

$$\geq 6.2 \text{ N}\cdot\text{m (MD)} \text{ and } \geq 2.9 \text{ N}\cdot\text{m (CD)}.$$

Or



The corrugated paperboard shall be tested for bending resistance by adapting TAPPI T-556 to confirm that minimum acceptable stiffness, listed below, is met, except that for each specimen tested the corrugations shall run in the long direction of the specimen. Test conditions shall include 7.5 degrees deflection.

≥ 7000 mN (MD) and ≥ 4600 mN (CD).

Delamination

The corrugated paperboard shall have sufficient folding strength, especially along the score lines. It shall show no continuous visual break of the plies when the board is flexed 180°, both parallel and perpendicular to the flutes, or along the score lines, when testing according to ASTM D 4727, section 9.3 (for singlewall corrugated fiberboard).

Burst Strength

The corrugated paperboard shall be tested for burst strength using TAPPI T-810 and meet a requirement of ≥170 PSI.

Note: Need to pass ≥5 out of 6 total tests. If failed, retest 12 times with ≥8 passes.

Flat Crush

The corrugated board should have a flat crush reading of ≥48psi when tested according to TAPPI T-825 (rigid support method).

Adhesion Strength of Flutes (Pin Adhesion)

The adhesion strength between the flutes and liners shall reach ≥48 lbs per foot of glue line, when tested according to TAPPI T 821.

Adhesive

A stable adhesive shall be used when adhering the two paperboard facings to each side of the fluted inner paperboard sheet. 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 of the corrugated paperboard 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.

Color & Dye Bleed/Transfer

The color shall be light blue or light tan. Dyes used to color the corrugated board shall show no bleeding or transferring when soaked in deionized water for 48 hrs. under ambient temperature while held in direct contact with white bond paper.

Workmanship

The corrugated paperboard shall be assembled in accordance with good commercial practice, and shall be free of visible imperfections that may affect its utility or aesthetic appearance.

- The smoothest side (felt side) of the liners should be the outer surfaces of the board.
- The wire side of the liners should be next to the corrugated medium, to promote maximum adhesion.
- The flutes must be adhered to each liner all along their tips.
- The paperboard shall be scored evenly.
- When scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses.
- The corrugated paperboard should show no continuous visual surface break (checking) of the outer component ply, nor any facing completely split through at the score line (fracture).
- The surfaces shall be free of knots, shives, tears, punctures, wrinkles, blisters, washboarding, splices, abrasive particles and surface dirt of any kind, such as smudges, fingerprints, or scuff, marks. The surfaces shall not be marred (dents, bumps, etc.) or show any other types of physical defects.
- The outer surface of the liner board shall be highly finished (calendered or 'water polished') to resist soiling.
- The pin punch or embossing method used for identification shall not affect the smoothness of the board by passing through the board from the opposite side.
- All edges shall be cut straight and shall be smooth and even, free of fraying, cracks, and breaks.



- The corners of the corrugated board shall be square.
- Each cubic foot box shall be made to the dimensions specified.
- When assembled, all components shall fit closely without gaps or warping.
- When assembled the top and bottom shall rest flat on a flat plane. When locked into place, the self locking sides shall remain in position.
- When closed the top and bottom shall fit snugly and remain closed.

Identification Markings (product level)

The following identification information shall be legibly embossed or pricked on what will be the outside bottom of each box: name of manufacturer, pH range, year of manufacture. The pin punch or embossing shall not affect the smoothness of the board by passing through the board from the opposite side. The identification information shall not include the use of printing or media of any kind.

III. Preparation for Delivery

Packaging

The cubic foot boxes shall be shipped flat following standard commercial shipping practices that meet the following requirements: full enclosure (i.e. a box) sealed with tape to provide rigid support and protection from the elements that is non-damaging to the contents (does not bend, crimp, or fold edges or corners) so that the product arrives dry and undamaged.

Marking: The outside of each packing container shall be legibly marked with the following information; the vendor, contract number, type, size and number of items on the palettes.

An examination shall be made to determine whether the packaging of the corrugated boards for delivery complies with all the requirements in this section of the specification.

The following characteristics in the packaging will be regarded as unacceptable:

- The number of corrugated boards per container is different from the number specified in contract
- Container is not sealed with tape
- Container is not legibly marked with the purchase order number
- Container is not legibly marked with the type of corrugated boards within
- Container is not legibly marked with size of corrugated boards within
- Container is not legibly marked with number of corrugated boards within



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.

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

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).

Test Methods

The requirements for paperboard 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*) and the American National Standards Institute (*ANSI*). Publications describing these tests may be ordered directly from the technical association.

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, sizing, sulfur, basis weight, abrasion and bending resistances, label adhesion capability, burst strength, flat crush, surface smoothness, pin adhesion, score and fold strength, bleeding and adhesive], two samples of each item listed, 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
Reducible Sulfur	<0.0008%	TAPPI T-406
Alkaline reserve	3 – 6% (calculated as CaCO ₃)	TAPPI T-553 (or slurry method)
pH	8.0 – 10	TAPPI T-509 (or slurry method)
Basis Weight boxboard corrugate medium liners	≥110 lbs./1,000 ft ² ≥26 lbs./1,000 ft ² ≥42 lbs./1,000 ft ²	TAPPI T-410
Abrasion Resistance	<0.3% (total weight-loss)	TAPPI T-476 (#CS10 wheel, 100 wear cycles, on outer surfaces)
Surface Smoothness	250-400 Sheffield units	TAPPI T 538
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
Bending Resistance	≥6.2 N-m (MD) & ≥2.9 N-m (CD) or ≥ 7000 mN (MD) & ≥ 4600 mN (CD).	TAPPI T-836 or TAPPI T-556
Delamination	No fraying, cracking, splitting, or continuous surface break of plies (see details in page 4)	ASTM D 4727, section 9.3. Flex the sample 180° both parallel and perpendicular to the flutes, or along the score lines.
Flat Crush	≥48 psi	TAPPI T-825
Burst Strength	≥170 psi	TAPPI T-810. Need to pass ≥5 tests out of 6 total tests. If failed, re-test 12 times with a total of ≥8 passes.
Adhesion Strength of Flutes (Pin Adhesion)	≥48 lbs per foot of glue line	TAPPI T-821
Color & Dye Bleed / Transfer	No visible transferring	See above text for detailed test method and conditions

V. Inspection

Examination Criteria

An examination shall be made to determine whether the completed corrugated board complies with the Requirements section of this specification (see pages 1-5). The qualities and characteristics that shall be regarded as unacceptable in the completed corrugated boards are listed below.

Completed corrugated boards are:

- Not style specified
- Not dimensions specified
- Not materials (qualities or characteristics) specified
- Not color specified
- Not construction specified
- Not identification markings specified

Workmanship

- Edges are not cut straight, not smooth and even
- Corners are not evenly rounded and smooth
- Surfaces are not clean or smooth, have oozed adhesive, smudges, fingerprints or dirt
- Surfaces have blisters, knots, or shives
- Surfaces have scuffs and abrasions
- Fraying, cracks, or breaks along any edge of the corrugated board

Responsibility for Inspection

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all inspection requirements specified herein. The National Archives reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to the prescribed requirements.

Sampling for Examination

Sampling Method

The sampling of corrugated 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.

Required Ordering Information

The following information shall be included in the purchase order.

- Title and date of the specification
- corrugated boards dimensions
- Number of corrugated boards required
- Purchase order number
- Number of corrugated boards per shipping container
- Special delivery conditions

Revision note:

This is a revision from Feb. 2015 version.



SHIPPING DESTINATIONS

Deliveries may be made to all NARA Sites and the primary shipping destinations are below. Delivery Orders for NARA Sites not shown below shall include delivery hours. All Delivery Orders will include Point of Contract (POC).

PRIMARY DESTINATIONS	PRIMARY DESTINATIONS
National Archives Archival Operations - Waltham 380 Trapelo Road Waltham, MA 02154 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	National Archives Archival Operations – New York 1 Bowling Green New York, NY 10004 <i>(see Note 2)</i> Delivery Hours: Mon-Fri 9:30 AM-2:30 PM
National Archives Archival Operations - Philadelphia 14700 Townsend Road Philadelphia, PA 19154-1025 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	National Archives Archival Operations – Washington DC Loading Dock 7 th & Pennsylvania Ave., R Washington, DC 20408 <i>(see Note 1)</i> Delivery Hours: Mon-Fri 9:00 AM-3:00 PM
National Archives at College Park 3301 Metzertott Road College Park, MD 20740 Delivery Hours: Mon-Fri 9:00 AM-3:00 PM	National Archives Archival Operations - Atlanta 5780 Jonesboro Road Morrow, GA 30260-3087 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM
National Archives Archival Operations – Fort Worth 1400 John Burgess Drive Fort Worth, TX 76140 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	National Archives Archival Operations – Chicago 7358 South Pulaski Road Chicago, IL 60629 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM
National Archives Archival Operations – Kansas City 400 West Pershing Road Kansas City, MO 64131 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	National Archives Archival Operations – Denver 17101 Huron Street Broomfield, CO 80023-8909 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM
National Archives Archival Operations – San Bruno 1000 Commodor Drive San Bruno CA 94066 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	National Archives Archival Operations – Seattle 6125 Sand Point Way, NE Seattle, WA 98115 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM
National Archives Archival Operations – Anchorage 654 West 3 rd Street Anchorage AK 99501 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	National Archives Archival Operations - Riverside 23123 Cajalco Road Perris CA 92570 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM



NATIONAL
ARCHIVES

National Personnel Records Center Archival Operations – St. Louis 1 Archives Drive St Louis, MO 63138 Delivery Hours: Mon-Fri 9:30 AM-2:30 PM	
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NOTES TO CONTRACTOR:

1. At Delivery Location: National Archives – 7th & Pennsylvania Ave., NW Washington DC, low boy trailers cannot get into garage.
2. At Delivery Location: National Archives New York – 1 Bowling Green, New York, NY 10004, trailers cannot exceed 12 feet – six inches in height. Twenty-four advance notice, prior to delivery, is required.