

# NARA's Specifications for Housing Enclosures for Archival Records

(1991-1996)

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**Note:** This web version was prepared in 1999, based on:

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This version may differ from the printed version.

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# Introduction to Housing Enclosures for Archival Records

A primary preservation goal is to house all records appropriately based on their size, format, and composition. Housing enclosures provide physical support and protection as well as a buffer against adverse or fluctuating environmental conditions. Housings also provide a mechanism for organizing and maintaining records in intellectual units that can be easily and safely handled. Factors that are considered when designing housings include the optimum method of accessing, storing, and using the records; stability of all component housing materials; method of fabrication or assembly; and cost.

Given the importance of housings in an archives preservation program, the National Archives has devoted a great deal of attention to developing specifications. The attached specifications for boxes, folders, and spacer boards describe the physical and chemical properties of the component materials, design features, and workmanship criteria against which the finished products are evaluated. The specifications have been developed through the joint efforts of conservators and chemists in consultation with archivists. The specifications are used during the procurement process to assure that boxes and folders of the required quality are acquired for the long-term housing of archival records. Potential vendors or suppliers receive a copy of the specification and submit bid samples that are then evaluated against the requirements cited for both quality of materials and workmanship. Standard test methods of the Technical Association of the Pulp and Paper Industry and the American Society for Testing and Materials are employed as part of quality assurance testing. Archival repositories that do not have conservation or chemistry labs to perform testing should still find the specifications helpful in describing requirements for housings and evaluating purchased goods. Independent paper testing laboratories can also be used to perform basic paper testing.

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# Acid-Free Archives Box

January, 1991

## *Scope*

This specification covers the requirements for an assembled, acid-free, metal edged archives box with a hinged lid and a telescoping shallow front. (See [Figure 3-1](#).)

## *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 3-1](#).

### **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*

#### **Paperboard**

The paperboard for the box shall be made from any unbleached pulp that meets the requirements in this specification. The paperboard shall be free of alum-rosin sizing (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (TAPPI T-406om-88). Surfaces shall be free of knots, shives, and abrasive particles.

#### *Lining Paper* (where applicable)

The paper for the lining paper shall be made from new cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. The paper shall be free of groundwood (ASTM D1030, X 5 Spot Stains and TAPPI T-236cm-85), alum rosin sizing, (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (TAPPI T-406om-88). Surfaces shall be free of knots, shives, and abrasive particles.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used (ASTM D4988-89).

#### *Alkaline Reserve*

The paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all plies and layers, when tested according to ASTM D4988-89.

#### *Hydrogen Ion Concentration (pH)*

The pH value of the paperboard shall be between 8.0 and 10.0 when tested according to TAPPI T-509om-88.

#### *Abrasion*

Outer surfaces of the paperboard shall show a loss of less than 0.7 percent of the total weight (mounting card and sample) when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476om-84).

*Surface Smoothness (to determine the property of adhesion of a pressure sensitive label to the paperboard surface)*

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 D286-90, Procedure B modified as follows:

- use a 3/4" wide, office 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

*Thickness*

The paperboard thickness shall be 0.060 inches plus or minus 0.005 inches, when tested according to TAPPI T-411om-84.

*Stiffness*

The paperboard shall have an internal stiffness of at least 1,800 Tabor stiffness units in the machine direction and 800 Tabor stiffness units in the cross direction at 15 degrees deflection, when tested according to TAPPI T-489om-86.

*Finish*

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

*Color retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452om-87.

**Adhesive**

Water resistant adhesive shall be used when laminating two or more thicknesses of paperboard together to form a single board of the required thickness. When aged in an oven at 50 degrees centigrade and 87 percent relative humidity, the adhesive shall not soften or run, but shall hold the two or more thicknesses of paperboard firmly together. The properties of the adhesive shall not detract from the properties of the paperboard (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, or decrease the stiffness). The adhesive shall not be visible through or alter the color of the paperboard. If it is necessary to buffer the adhesive, the same buffer as in the paperboard (i.e. calcium carbonate, magnesium carbonate, or a combination of both) shall be used.

**Metal Edge Stay**

*General Information*

A metal edge stay shall be used to securely fasten together the joints of the box and lid. (See Figure 1.) It shall be made from a single unit of .0088 gauge cold rolled steel coated on the exterior with lacquer or baked enamel. It shall be positioned on the box so that at both ends it extends to within 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 inch wide and shall contain 8, 4-prong eyelets per 2 inch length.

**Pull Cord**

*General Information*

The box shall have a nylon pull cord mechanically attached (i.e., using no adhesives) to the inside bottom front of each box. (See Figure 1.) 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" (plus or minus 1/8") x 1/16" and shall extend 2 to 3 inches out from the edge of the box.

*Attachment of Pull Cord Loop*

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 an Instron Tensile Tester.
- Use an Instron Tensile Tester with a 50 kilogram load cell, the jaws set 2 inches apart, and the cross head and chart speeds set at 10 inches per minute.
- To pass the test, the cord shall not pull apart at the metal clasp when it is subjected to a force of up to 8 kilograms.

### *Color Retention*

Dyes used to color the pull cord shall show no bleeding when the pull cord is soaked in distilled water for 48 hours 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. The completed 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 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.

Adhesive, when used, shall be uniformly applied to all surfaces to provide a firm, even attachment of all components. C Each metal edge stay shall be made to the dimensions specified. Each shall securely fasten together the joints of the box and shall 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 made to the dimensions specified. It shall be attached to the box as specified.

### **Identification Markings**

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 *acid-free*.

### *Preparation for Delivery*

### **Packaging**

The archives boxes shall be packed in a standard commercial container that is sealed with tape. The number of boxes to be packed in each container shall be specified in the purchase order.

### **Marking**

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the type, size, and number of archives boxes packed in the container.

### *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 conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 3.5 degrees) and 50 percent relative humidity (plus or minus 2 percent RH.) (See TAPPI T-402om-88.)

## 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*) and the Technical Association of the Pulp and Paper Industry (*TAPPI*).

Publications describing these tests may be ordered directly from the technical associations at the following addresses:

*ASTM* - American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103

*TAPPI* - The Technical Association of the Pulp and Paper Industry, One Dunwoody Park, Atlanta, GA 30348

## Tests for Paperboard Quality

The requirements for paperboard quality shall be tested according to the following methods:

### Requirements Test Method

Rosin (Raspail test)	ASTM D 549-88
Reducible Sulfur	TAPPI T-406om-88
Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89
Hydrogen Ion concentration	TAPPI T-509om-88
Abrasion	TAPPI T-476om-84
Surface Smoothness (for label adhesion)	ASTM D286om-90
Thickness	TAPPI T-411om-84
Stiffness	TAPPI T489om-86
Color Retention	TAPPI T-452om-87

## Additional Tests for Lining Paper Quality

- Lignin
- Phloroglucinol ASTM D1030, X5 Spot Stains
- Kappa number TAPPI T-236cm-85

## Test for Pull Cord Strength

The adequacy of the attachment of the pull cord at the metal clasp shall be tested according to procedures described under the *Pull Cord* subsection of the Requirements section of this specification.

## Responsibility for Tests

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and service conform to prescribed requirements.

## Inspection

### Examination Criteria

An examination shall be made to determine whether the completed box complies with the Requirements section of this specification. The qualities and characteristics that shall be regarded as unacceptable in the completed box are listed below.

## Completed Box

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

### **Workmanship**

- Edges not cut straight, not smooth and even
- Scores and creases not deep enough to permit precise folding during construction
- Corners of the box, not square
- Box not capable of being opened repeatedly without cracking, splitting, fraying, or otherwise losing strength along the hinge of the lid
- Folded edges showing exterior splits and cracks
- Box warped and uneven on flat surface
- Lid bows open; not a snug fit
- Panels are gaped or bulged and are not aligned properly
- Surfaces not clean or smooth: not free of oozed adhesive, smudges, fingerprints or dirt; not free of lumps or indentations
- Surfaces torn, scuffed, or otherwise physically marred
- Metal edge stay not attached securely
- Metal edge stay not oriented as specified
- Surface of metal edge stay has sharp, raised edges
- Pull cord not securely attached at the metal clasp

### **Packaging for Delivery**

An examination shall be made to determine whether the packaging of the boxes for delivery comply with the requirements of **Preparation for Delivery** section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.

- Not number of boxes per container specified in contract
  - Container not sealed with tape
  - Container not legibly marked with the purchase order number
-

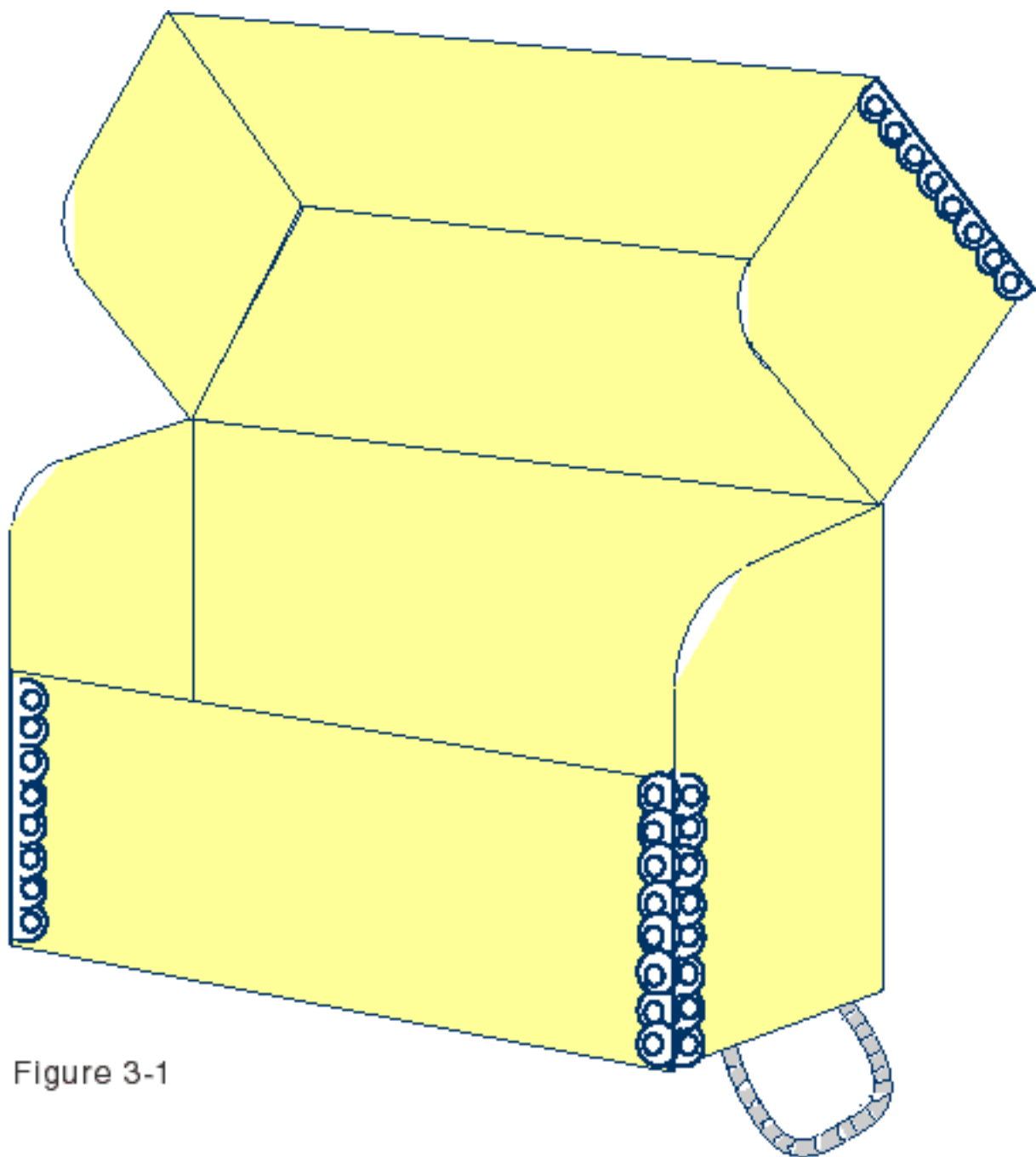


Figure 3-1



# Letter and Legal Size Archives Box Spacer Boards

July, 1991

## *Scope*

This specification covers the requirements for letter and legal size archives box spacer boards made from corrugated paperboard. (See [Figure 5-1](#) and [5-2](#).)

## *Requirements*

### **Construction**

The spacer boards shall be made from corrugated paperboard with a single wall construction (three-layer lamination) and type "B" fluting that runs parallel with the length of the board. Each spacer board shall have 5 score lines at each end, running perpendicular with the length of the board. The corners shall be rounded. The edges shall be serrated.

### **Dimensions**

#### *Letter Size Spacer Board*

A letter size spacer board shall measure 9 3/4 inches in height and 25 3/4 inches in width. The allowable variation for each dimension shall be plus or minus 1/16 inch.

#### *Legal Size Spacer Board*

A legal size spacer board shall measure 9 3/4 inches in height and 30 3/4 inches in width. The allowable variation for each dimension shall be plus or minus 1/16 inch.

#### *Score Lines*

Each spacer board shall have 5 score lines at each end, running perpendicular with the length of the board. The score lines shall be spaced at 1 inch intervals. For the letter size spacer board, the innermost score line shall begin 7 1/16 inches in from each end. For the legal size spacer board, the innermost score line shall begin 8 inches in from each end.

### **Paperboard**

#### *Composition*

The paperboard for the box shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. The paperboard shall be free of groundwood (ASTM D 1030, X 5 Spot Stains and TAPPI T-236cm-85), alum-rosin sizing (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (TAPPI T-406om-88). Surfaces shall be free of knots, shives, and abrasive particles.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used. (ASTM D4988-89)

#### *Alkaline Reserve*

The paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all plies and layers, when tested according to ASTM D4988-89.

#### *Hydrogen Ion Concentration (ph)*

The pH value of the paperboard shall be between 8.0 and 10.0 when tested according to TAPPI T-509om-88.

### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all plies and layers of the paperboard shall give a negative reading to the phloroglucinol test when tested according to ASTM D1030 or shall have a Kappa number of 5 or less when tested according to TAPPI T-236cm-85.

### *Color retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452om-87.

### **Adhesive**

A stable adhesive shall be used when adhering the two paperboard facings to each side of the fluted inner paperboard sheet. When aged in an oven at 50 degrees centigrade and 87 percent relative humidity, the adhesive used shall not soften or run, but shall hold the components of the corrugated paperboard firmly together. The properties of the adhesive shall not detract from the properties of the paperboard (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, decrease the stiffness). The adhesive shall not be visible through or alter the color of the paperboard. If it is necessary to buffer the adhesive, the same buffer as in the paperboard (i.e. calcium carbonate, magnesium carbonate, or a combination of both) shall be used.

### **Workmanship**

Each spacer board 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 spacer board shall be made to the dimensions specified. All edges shall be serrated uniformly and shall be free of untrimmed paper fragments. The corners of the spacer boards shall be evenly rounded and smooth. The plane of the spacer boards shall be flat and shall show no warping, twisting, buckling, or other distortion. The fluted inner paperboard sheet shall not be compressed on the surface or at the edges. The spacer boards 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.

Scores shall be uniform and deep enough to permit easy, precise folding and the retention of maximum strength along the score line. All score lines shall be free of fraying, cracks, and breaks.

The adhesive shall be uniformly applied to all surfaces to provide a firm, even attachment of all components.

### **Identification Markings**

The following information shall be legibly punched on the center bottom of each spacer board: name of manufacturer, pH range, year of manufacture, and the word letter for spacer boards intended for letter size archives boxes or legal for spacer boards intended for legal size archives boxes.

### ***Preparation for Delivery***

#### **Packaging**

The spacer boards shall be packed in a standard commercial container that is sealed with tape. The number of spacer boards to be packed in each container shall be specified in the purchase order.

#### **Marking**

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the type, size, and number of spacer boards packed in the container.

### ***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 conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 3.5 degrees) and 50 percent relative humidity (plus or minus 2 percent RH.) (See TAPPI T - 402om-88.)

## 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) and the Technical Association of the Pulp and Paper Industry (TAPPI).
- Publications describing these tests may be ordered directly from the technical associations at the following addresses:
  - ○ ASTM - American Society for Testing and Materials, 1916 Race Street Philadelphia, PA 19103
  - TAPPI - The Technical Association of the Pulp and Paper Industry, One Dunwoody Park, Atlanta, Georgia 30348

## Tests for Paperboard Quality

The requirements for paperboard quality shall be tested according to the following methods:

Requirements	Test Method
Rosin (Raspail test)	ASTM D549-88
Reducible Sulfur	TAPPI T-406om-88
Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89
Hydrogen ion concentration	TAPPI T-509om-88
Lignin	
-Phloroglucinol	ASTM D1030, X5
-Spot Stains-	
-Kappa number	TAPPI T-236cm-85
Color Retention	TAPPI T-452om-87

## Responsibility for Tests

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and services conform to prescribed requirements.

## Inspection

### Examination Criteria

An examination shall be made so determine whether the spacer board complies with the Requirements section (see pages 1-3). The qualities and characteristics that shall be regarded as unacceptable in the spacer board are listed below.

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

## Workmanship

- Edges not serrated evenly, not free of untrimmed paper fragments
- Scores not deep enough to permit precise folding during construction; fraying, cracks, or breaks along any scores
- Plane of the spacer board warped, twisted, buckled, or otherwise distorted
- Fluted inner paperboard sheet compressed on the surface or at the edges
- Corners not evenly rounded and smooth
- Surfaces not clean or smooth: not free of oozed adhesive, smudges, fingerprints or dirt; not free of lumps or indentations
- Surfaces not free of blisters, knots, or shives
- Surfaces torn, scuffed, or otherwise physically marred

### **Packaging for Delivery**

An examination shall be made to determine whether the packaging of the spacer boards for delivery complies with the requirements of Preparation for Delivery section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.

- Not number of spacer boards per container specified in contract
- Container not sealed with tape
- Container not legibly marked with the purchase order number
- Container not legibly marked with type of spacer boards within
- Container not legibly marked with size of spacer boards within
- Container not legibly marked with number of spacer boards within

### **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 service conform to the prescribed requirements.

### **Sampling for Examination**

#### *Construction and Workmanship*

To sample spacer boards for construction and workmanship, spacer boards shall be selected according to MI-STD 105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

#### *Testing*

To sample spacer boards for testing, spacer boards shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

#### *Preparation for Delivery*

To sample spacer boards for compliance with packaging and marking requirements, spacer boards shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 defective from each lot of material offered.

#### *Sampling Method*

The sampling of spacer boards for examination shall be carried out according to methods specified in sampling procedures and "Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and Forms Center; Standardization Document Order Department, Building 4, Section D; 700 Robbins Avenue; Philadelphia, Pennsylvania 19111-5094.

### **Ordering Information**

The following information shall be included in the purchase order:

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

Letter size Spacer Board

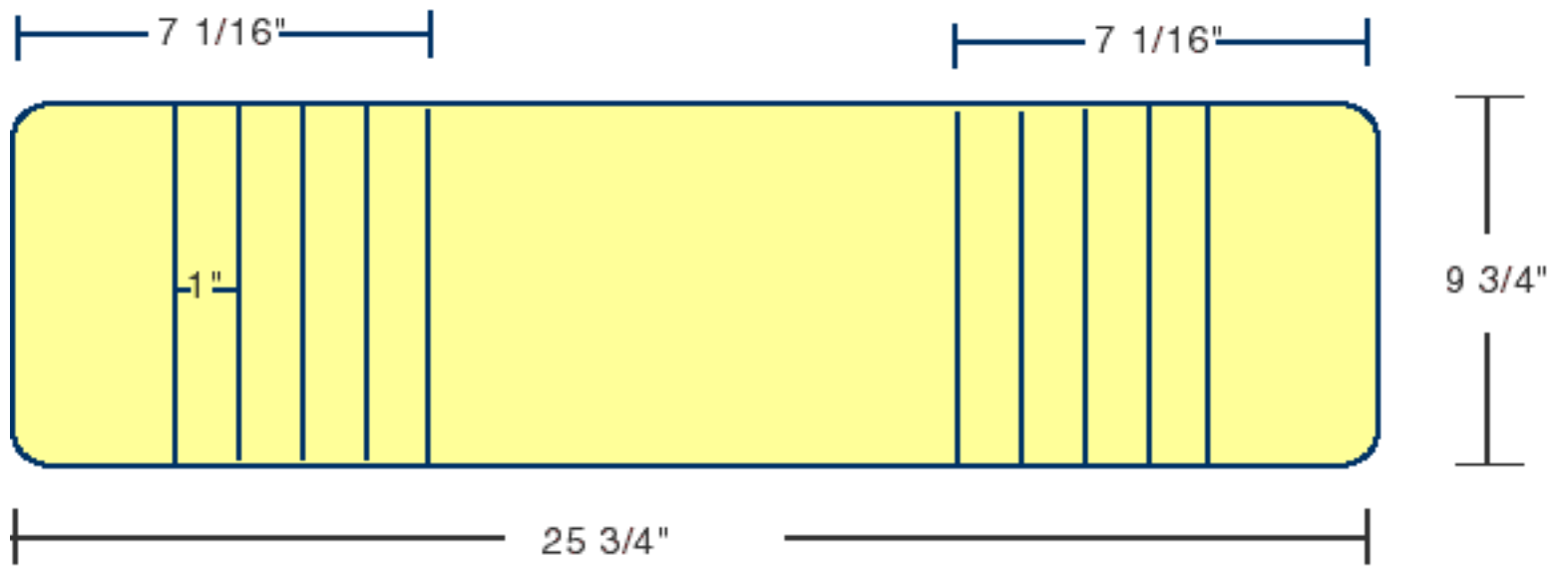


Figure 5-1

Legal size Spacer Board

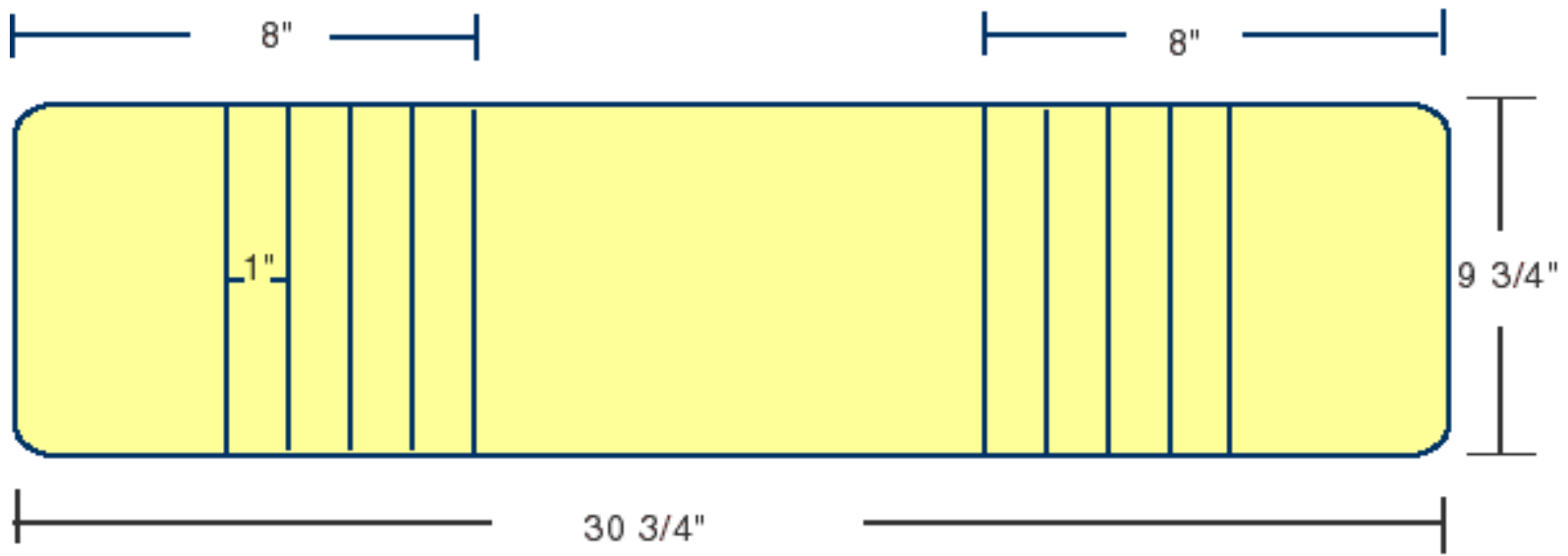


Figure 5-2

# Low Lignin Archives Box

First Issued January, 1991

## *Scope*

This specification covers the requirements for an assembled, low lignin, metal edged archives box with a hinged lid and a telescoping shallow front. [Figure 3-1](#)

## *Requirements*

### **Construction**

The assembled box shall consist of one paperboard box blank with metal edge stays oriented and secured on the box joints as indicated in [Figure 3-1](#).

### **Dimensions**

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

### **Paperboard**

#### *Composition*

The paperboard for the box shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. The paperboard shall be free of groundwood (ASTM D 1030, X 5 Spot Stains and **TAPPI** T-236-85), alum-rosin sizing (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (TAPPI T-406om-88). Surfaces shall be free of knots, shives, and abrasive particles.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used. (ASTM D4988-89)

#### *Alkaline Reserve*

The paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all plies and layers. when tested according to ASTM D4988-89.

#### *Hydrogen Ion Concentration (pH)*

The pH value of the paperboard shall be between 8.0 and 10.0 when tested according to TAPPI T-509om-88.

#### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all plies and layers of the paperboard shall give a negative reading to the phloroglucinol test when tested according to ASTM D1030 or shall have a Kappa number of 5 or less when tested according to TAPPI T-236cm-85.

#### *Abrasion*

Outer surfaces of the paperboard shall show a loss of less than 0.7 percent of the total weight (mounting card and sample)



when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476om-84).

*Surface Smoothness (to determine the property of adhesion of a pressure sensitive label to the paperboard surface)*

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 D286-90, Procedure B modified as follows

use a 3/4" wide, office 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.

*Thickness*

The paperboard thickness shall be 0.060 inches plus or minus 0.005 inches, when tested according to TAPPI T-411om-84.

*Stiffness*

The paperboard shall have an internal stiffness of at least 1,800 Tabor stiffness units in the machine direction and 800 Tabor stiffness units in the cross direction at 15 degrees deflection, when tested according to TAPPI T-489om-86.

*Finish*

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

*Color retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452om-87.

**Adhesive**

Water resistant adhesive shall be used when laminating two or more thicknesses of paperboard together to form a single board of the required thickness. When aged in an oven at 50 degrees centigrade and 87 percent relative humidity, the adhesive used shall not soften or run, but shall hold the two or more thicknesses of paperboard firmly together. The properties of the adhesive shall not detract from the properties of the paperboard (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, decrease the stiffness). The adhesive shall not be visible through or alter the color of the paperboard. If it is necessary to buffer the adhesive, the same buffer as in the paperboard (i.e. calcium carbonate, magnesium carbonate, or a combination of both) shall be used.

**Metal Edge Stay**

*General Information*

metal edge stay shall be used to securely fasten together the joints of the box and lid.(See [Figure 3-1](#).) It shall be made from a single unit of .0088 gauge cold rolled steel coated on the exterior with lacquer or baked enamel. It shall be positioned on the box so that at both ends it extends to within 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 inch wide and shall contain 8, 4-prong eyelets per 2 inch length.

## ***Pull Cord***

### *General*

The box shall have a nylon pull cord mechanically attached (i.e., using no adhesives) to the inside bottom front of each box. (See [Figure 3-1](#).) 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" (plus or minus 1/8") x 1/16" and shall extend 2 to 3 inches out from the edge of the box

### *Attachment*

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 an Instron Tensile Tester.

Use an Instron Tensile Tester with a 50 kilogram load cell, the jaws set 2 inches apart, and the cross head and chart speeds set at 10 inches per minute.

To pass the test, the cord shall not pull apart at the metal clasp when it is subjected to a force of up to 8 kilograms.

### *Color Retention*

Dyes used to color the pull cord shall show no bleeding when the pull cord is soaked in distilled water for 48 hours 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. The completed 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 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.

Adhesive, when used, shall be uniformly applied to all surfaces to provide a firm, even attachment of all components.

Each metal edge stay shall be made to the dimensions specified. Each shall securely fasten together the joints of the box and shall 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 made to the dimensions specified. It shall be attached to the box as specified.

## **Identification Markings**

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*.

## ***Preparation for Delivery***

## **Packaging**

The archives boxes shall be packed in a standard commercial container that is sealed with tape. The number of boxes to be packed in each container shall be specified in the purchase order.

## Marking

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the type, size, and number of archives boxes packed in the container.

## 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 conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 3.5 degrees) and 50 percent relative humidity (plus or minus 2 percent RH.) (See TAPPI T 402om-88.)

### 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*) and the Technical Association of the Pulp and Paper Industry (*TAPPI*).

Publications describing these tests may be ordered directly from the technical associations at the following addresses:

*ASTM* - American Society for Testing and Materials 1916, Race Street Philadelphia, PA 19103

*TAPPI* - The Technical Association of the Pulp and Paper Industry, One Dunwoody Park, Atlanta, Georgia 30348

### Tests for Paperboard Quality

The requirements for paperboard quality shall be tested according to the following methods:

Requirements	Test Method
Lignin (See p.1 )	
-Phloroglucinol	ASTM D1030, X5 Spot Stains
-Kappa number	TAPPI T-236cm-85
Rosin (Raspail test) (See p.1 )	ASTM D549-88
Reducible Sulfur (See p.1 )	TAPPI T-406om-88
Sizing (See p.1 )	ASTM D4988-89
Alkaline reserve (See p.1)	ASTM D4988-89
Hydrogen Ion concentration (See p.1)	TAPPI T-509om-88
Abrasion (See p. 2)	TAPPI T-476om 84
Surface Smoothness (for label adhesion)(See p.2)	ASTM D286om-90
Thickness (See p.2)	TAPPI T411om 84
Stiffness (See p.2 )	TAPPI T-489om-86
Color Retention (See p.2)	TAPPI T-452om-87

### Test for Pull Cord Strength

The adequacy of the attachment of the pull cord at the metal clasp shall be tested according to procedures described under the *Pull Cord* subsection of the Requirements section, on page 3 of this specification.

### Responsibility for Tests

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements

specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and services conform to prescribed requirements.

### ***Inspection***

#### **Examination Criteria**

An examination shall be made to determine whether the completed box complies with the **Requirements** section (*see* pages 1-4). The qualities and characteristics that shall be regarded as unacceptable in the completed box are listed below.

#### **Completed Box**

Not style specified

Not dimensions specified

Not materials (qualities or characteristics) specified

Not color specified

Not construction specified

Not identification markings specified

#### **Workmanship**

Edges not cut straight, not smooth and even

Scores and creases not deep enough to permit precise folding during construction

Corners of the box, not square

Box not capable of being opened repeatedly without cracking, splitting, fraying, or otherwise losing strength along the hinge of the lid

Folded edges showing exterior splits and cracks

Box warped and uneven on flat surface

Lid bows open; not a snug fit

Panels are gaped or bulged and are not aligned properly

Surfaces not clean or smooth: not free of oozed adhesive, smudges, fingerprints or dirt; not free of lumps or indentations

Surfaces torn, scuffed, or otherwise physically marred

Metal edge stay not attached securely

Edge stay not oriented as specified

Surface of metal edge stay has sharp, raised edges

Pull cord not securely attached at the metal clasp

#### **Packaging for Delivery**

An examination shall be made to determine whether the packaging of the boxes for delivery complies with the

requirements of Preparation for Delivery section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.

Not number of boxes per container specified in contract

Container not sealed with tape

Container not legibly marked with the purchase order number

Container not legibly marked with type of archives boxes within

Container not legibly marked with size of archives boxes within

Container not legibly marked with number of archives boxes within

### **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 service conform to the prescribed requirements.

### **Sampling for Examination**

#### *Construction and Workmanship*

To sample boxes for construction and workmanship, boxes shall be selected according to MILSTD-105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

#### *Testing*

To sample boxes for testing, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

#### *Preparation for Delivery*

To sample boxes for compliance with packaging and marking requirements, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 defective from each lot of material offered.

#### *Sampling Method*

The sampling of boxes for examination shall be carried out according to methods specified in "Sampling Procedures and Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and Forms Center; Standardization Document Order Department, Building 4, Section D; 700 Robbins Avenue; Philadelphia, Pennsylvania 19111-5094.

### **Ordering Information**

**The following information shall be included in the purchase order:**

Title and date of the specification

Box dimensions

Color of box, metal edge stay, and nylon cord

Number of boxes required

Purchase order number

Number of boxes per shipping container

Special delivery conditions

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# Low Lignin Document Storage Box

June 1993

## Scope

This specification covers the requirements for a document storage box which is one piece, shipped flat, self locking, and made from low lignin corrugated board.

## Requirements

### Construction

The shipped flat clam shell box shall consist of one B- or E-flute corrugated singlewall (double-faced) board, comprised of two facings (liners) adhered to one fluted medium with fluting running perpendicular with the spine of the box as indicated in [Figure 1-1](#). Assembly shall be self locking. Assembly shall not include adhesive or metal fasteners. Construction shall be such that the self locking walls are double thickness and alternate, that is, when the box is closed, both side walls and front wall shall be double thickness. The self locking assembly shall be such that the tabs fit snugly into "U" shaped incisions cut in the top and bottom of the box. See [Figure 2](#), [3](#), and [4](#). All fold lines are to be scored or crimped, with no perforations. When the paperboard is scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses. A shallow thumb cut shall be centered on the outside foreedge. The thumb cut shall not exceed 1/4" in height. See [Figures 1](#) and [2](#), [3](#), and [4](#). The distance between the lower edge of the extension flaps at the spine and the tray of the box shall not be greater than 1/8". The spine of the box shall be cut so that it is flush with the side walls when the assembled box is closed. See [Figure 1](#) and [2](#), [3](#), and [4](#) (drawings are not to scale).

### Dimensions

The dimensions of the box shall be specified in the contract as inside measurements in the following order: length, width, and depth with a tolerance of plus or minus 1/16"; and the specified maximum outside dimensions. All box sizes shall be constructed from the same corrugated board type.

### Paperboard

#### *Composition*

All layers of the corrugated paperboard laminate shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. The paperboard shall be free of groundwood (ASTM D1030, X 5 Spot Stains and Tappi T-236cm-85), alum-rosin sizing (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (Tappi T406cm-88). Surfaces shall be free of knots, shives, and abrasive particles.

#### *Color*

The color shall be gray or tan.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used (ASTM D4988-89).

#### *Alkaline Reserve*

The corrugated paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all layers of the lamination, when tested according to ASTM D4988-89.

### *Hydrogen Ion Concentration (pH) (cold extraction method)*

The pH value of the corrugated paperboard shall be between 8.0 and 10.0 when tested according to TAPPI T509cm-88.

### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all layers of the corrugated paperboard shall have a negative reading in the phloroglucinol test when tested according to ASTM D1030 or shall have a KAPPA number of 5 or less when tested according to TAPPI T-236cm-85.

### *Abrasion*

Outer surface of the paperboard shall show a loss of less than 0.3 percent of the total weight (mounting card and sample) when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476cm-91).

### *Surface Smoothness*

(to determine the property of adhesion of a pressure sensitive label to the paperboard surface) 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 D286-90, Procedure B modified as follows:

- use 3M brand #810 3/4" wide, pressure sensitive tape to conduct the test
- adhere the tape to the paperboard surface with 2 rolls of a 10kg steel roller; allow samples to set 3 days before testing
- suspend a 2oz weight from the tape

### *Thickness*

The corrugated paperboard thickness shall be no greater than 0.125 inches and no less than 0.115 inches for B-flute and no greater than 0.073 inches and no less than 0.062 inches for E-flute when tested according to TAPPI T-411 om-89.

### *Stiffness*

The corrugated paperboard shall be tested for stiffness in accordance with TAPPI T489cm-92 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 and a 5,000 Taber unit weight. The board shall have an average minimum stiffness of 3700 plus or minus 1000 Taber Stiffness Units for B-flute and 2600 plus or minus 1200 Taber Stiffness Units for E-flute. Collapse of the corrugating medium shall constitute failure.

### *Finish*

The corrugated paperboard shall be smooth and free of knots, shives, and other abrasive particles. The paperboard shall be free of dirt, marks, stains, surface or edge damage, or other imperfections or contaminations which might affect the utility or appearance of the product.

### *Color Retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452cm-87.

## **Workmanship**

Each box shall meet the requirements stated in this specification, shall be assembled 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. When assembled, 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. 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. The completed box shall contain no surface dirt (smudges, fingerprints, and the like) and shall not be marred (dents, bumps, etc.) in any way.

The paperboard shall be scored evenly. Perforations along fold lines are not acceptable. Scores shall be continuous and deep enough to permit precise folding during assembly. When the paperboard is scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses. 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.

Shallow thumb cut on outer foredge shall be smooth, centered, and symmetrical.

Paperboard fluting shall be perpendicular to the spine. (See Figure 1.)

### **Identification Markings**

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.

## ***Preparation for Delivery***

### **Packaging**

The document storage boxes shall be shipped flat in a standard commercial container that is sealed with tape. The number of knocked down boxes to be packed in each container shall be specified in the purchase order.

### **Marking**

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the size and number of document storage boxes packed in the container.

## ***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 test shall be performed at and the samples conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 1.8 degrees) and 50 percent relative humidity (plus or minus 2 percent R.H.) See TAPPI T-402cm-88.)

### **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) and 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 associations at the following addresses:

ANSI - American National Standards Institute, 1430 Broadway, New York, New York 10018

ASTM - American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103

TAPPI - The Technical Association of the Pulp and Paper Industry, One Dunwoody Park, Atlanta, GA 30348

### **Tests for Paperboard Quality**

The requirements for paperboard quality shall be tested according to the following method:

<b>Requirements</b>	<b>Test Method</b>
Lignin	
-Phloroglucinol	ASTM D1030, X5 Spot Stains
-Kappa number	TAPPI T-236cm-85
Rosin (Raspail test)	ASTM D 549-88
Reducible Sulfur	TAPPI T-406om-88

Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89
Hydrogen ion concentration	TAPPI T 509om-88
Abrasion	TAPPI T476om-91
Surface Smoothness	ASTM D286om-90
Thickness	TAPPI T 411om-89
Stiffness	TAPPI T489om-92
Color Retention	TAPPI T 452om-92

## **Responsibility for Tests**

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and service conform to prescribed requirements.

## ***Inspection***

### **Examination Criteria**

An examination shall be made to determine whether the completed box complies with the *Requirements* section of this specification. The qualities and characteristics that shall be regarded as unacceptable in the completed box are listed below.

### **Shipped Flat Box**

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

### **Workmanship**

- Edges not cut straight, not smooth and even
- Scores not deep enough to permit precise folding during assembly
- Corners of the box, not square
- Box not capable of being opened repeatedly without cracking, splitting, fraying, or otherwise losing strength along the hinge of the lid
- When folded, edges showing exterior splits and cracks
- Completed box warped and uneven on flat surface
- Lid bows open; not a snug fit
- Assembled box torques or twists when filled with documents
- Panels gape or bulge and are not aligned properly
- Surfaces not clean or smooth; smudges, fingerprints or dirt; not free of lumps or indentations
- Surfaces torn, scuffed, or otherwise physically marred
- Packaging for Delivery

- An examination shall be made to determine whether the packaging of the boxes for delivery comply with the requirements of Preparation for Delivery section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.
- Not number of boxes per container specified in contract
- Container not sealed with tape
- Container not legibly marked with the purchase order number
- Container not legibly marked with number of document boxes within

## **Responsibility for Inspection**

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all inspection requirements as 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**

### *Construction and Workmanship*

To sample boxes for construction and workmanship, boxes shall be selected for an examination of construction and workmanship following sampling procedures described in MIL-STD 105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Testing*

To sample boxes for testing, boxes shall be selected according to MIL-STD 105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

### *Preparation for Delivery*

To sample boxes for compliance with packaging and marking requirements, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Sampling Method*

The sampling of boxes for examination shall be carried out according to methods specified in "Sampling Procedures and Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and Forms Center; Standardization Document Order Department, Building 4, Section D; 700 Robbins Avenue; Philadelphia, Pennsylvania, 19111-5094.

## **Ordering Information**

**The following information shall be included in the purchase order:**

Title and date of the specification

Purchase order number

Number of knocked down boxes per shipping container

Special delivery conditions

### **List of possible vendor sources**

*Archivart*

Division of Heller and Usdan

7 Caesar Place  
Moonachie, NJ 07074  
1-800-333-4466  
FAX: (201) 935-5964  
Attn: Robert Stiff

*Conservation Resources International Inc.*  
8000 H Forbes Place  
Springfield, VA 22151  
(703) 321-7730  
FAX: (703) 321-0629  
Attn: Bill Hollinger

*Hollinger Corporation*  
P.O. Box 8360  
Fredricksburg, VA 22404  
1-800-634-0491  
Attn: Tom Mahoney

*Light Impressions*  
439 Monroe Ave  
Rochester, NY 14607-3717  
1-800-828-9859

*University Products*  
517 Main Street  
P.O. Box 101  
Holyoke, MA 01041-0101  
1-800-762- 1165  
FAX: 1 (413) 532-9281  
Attn: David McGoon  
1-800-628- 1912

*Custom Manufacturing Inc.*  
P.O. Box 88  
Germantown, MD. 20875  
(717) 642-6253  
Attn: Michael Waters

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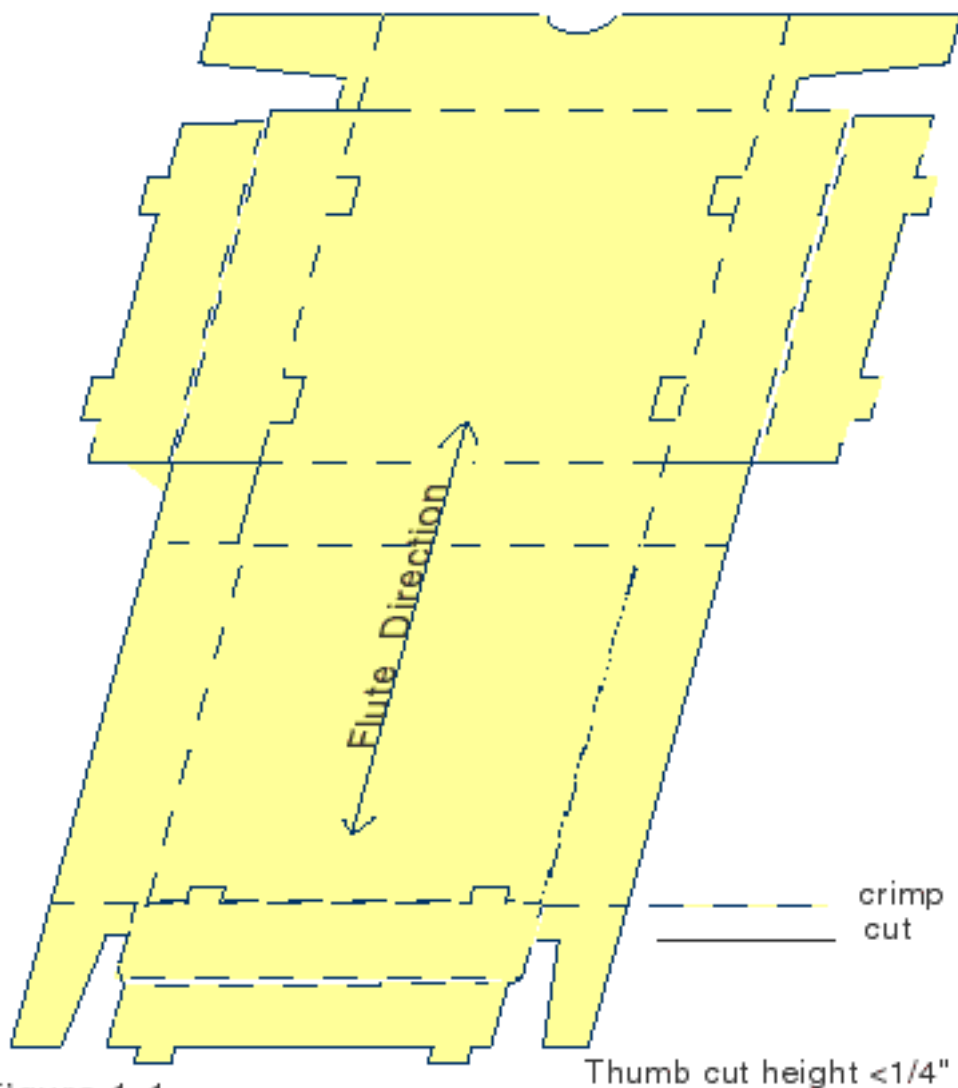


Figure 1-1

Thumb cut height  $<1/4''$

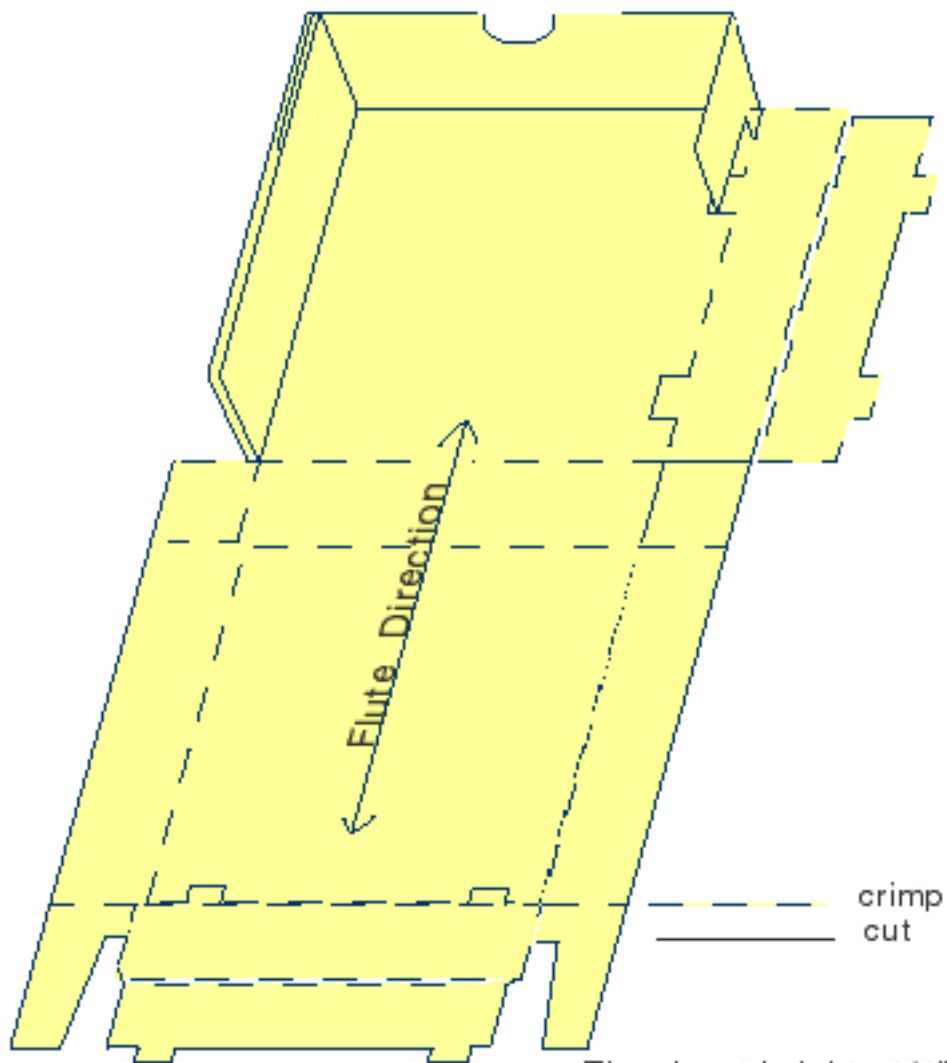


Figure 1-2

Thumb cut height <math><1/4\text{''}</math>

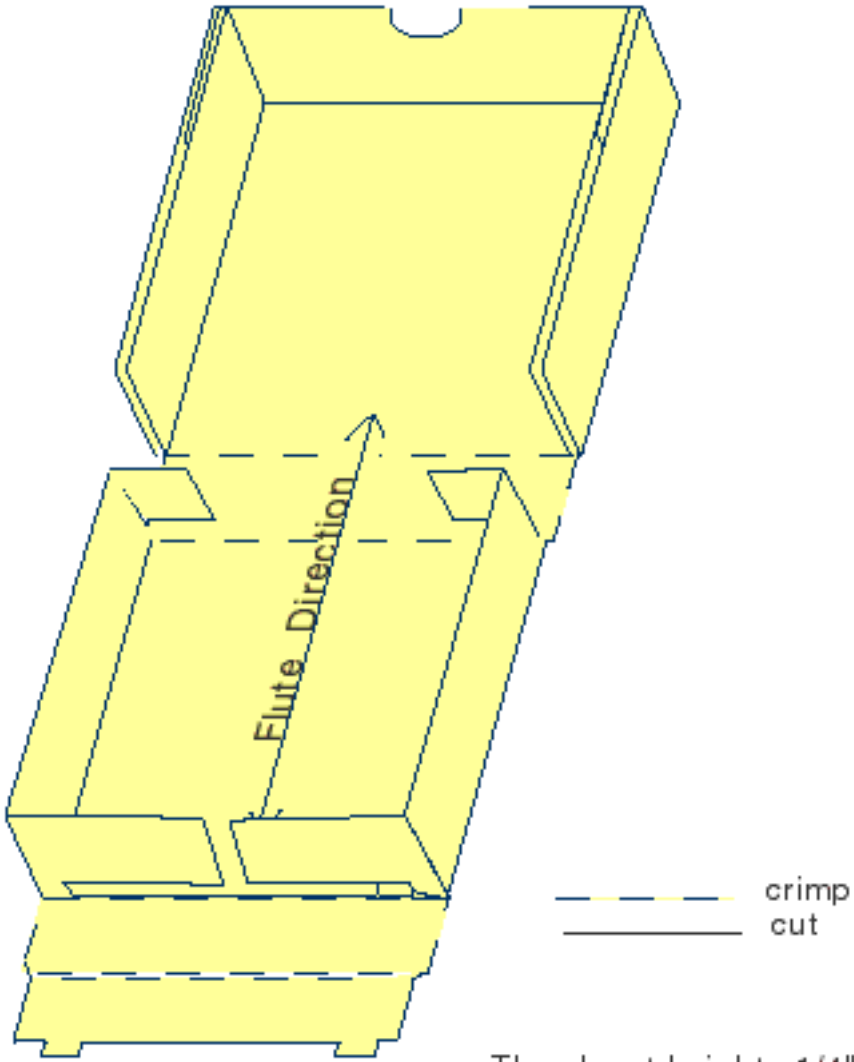


Figure 1-3

Thumb cut height  $<1/4''$

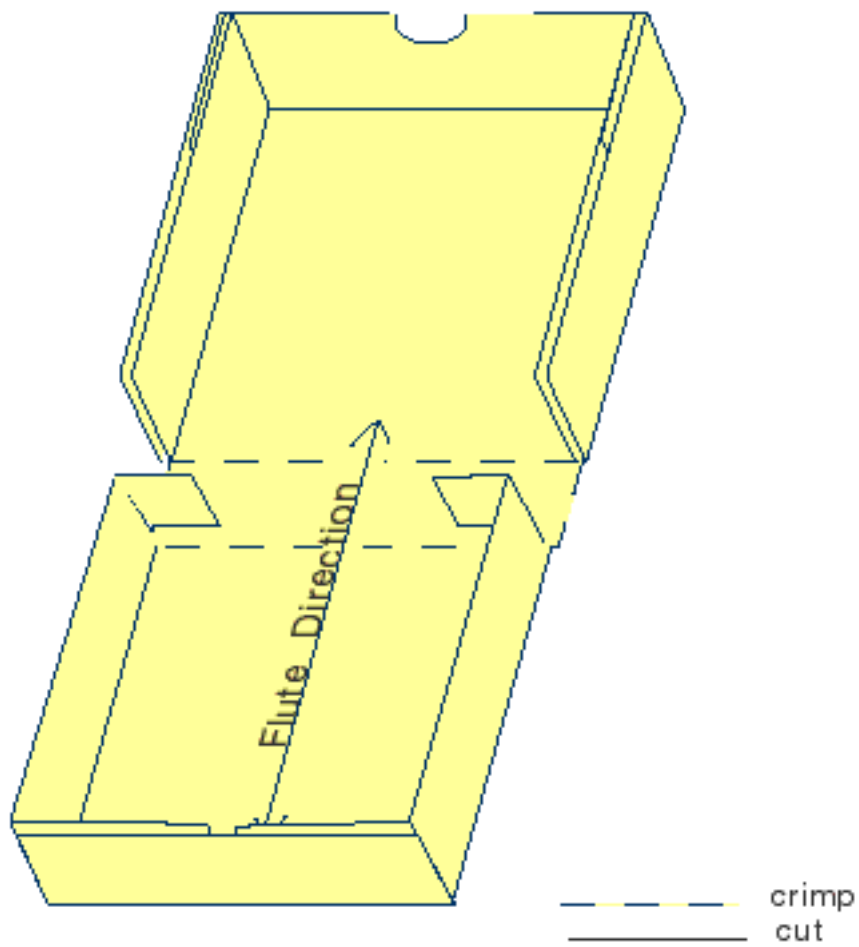


Figure 1-4

Thumb cut height <math><1/4''</math>



# Low Lignin Flat Storage Box

May 1996

## *Scope*

This specification covers the requirements for an assembled flat storage box with a removable full telescoping lid, made from low lignin corrugated board.

## *Requirements*

### **Construction**

The two piece box shall consist of a top and bottom 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 two die cut corrugated box blanks cut, scored, and adhered as indicated in Figure 1. Adhesives shall meet the NARA Quality Assurance Provisions included in this specification. Assembly shall not include metal fasteners. Construction shall be such that the adhered walls are double thickness and alternate. The full telescoping lid shall be 1/4" shallower than the box bottom height to allow ease of removal. When the paperboard is scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses. Drawing is not to scale.

### **Dimensions**

The dimensions of the box shall be specified in the contract as

#### **inside box bottom**

measurements in the following order: length, width, and depth with a tolerance of plus or minus 1/16".

### **Paperboard**

#### *Composition*

All layers of the corrugated paperboard laminate shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. The paperboard shall be free of groundwood (ASTM D1030, X 5 Spot Stains and Tappi T-2360m-85), alum-rosin sizing (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (Tappi T4060m-88). Surfaces shall be free of knots, strives, and abrasive particles.

#### *Color*

The color shall be gray.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used (ASTM D4988-89).

#### *Alkaline Reserve*

The corrugated paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all layers of the lamination, when tested according to ASTM D4988-89.

#### *Hydrogen Ion Concentration (pH) (cold extraction method)*

The pH value of the corrugated paperboard shall be between 8.0 and 9.6 when tested according to TAPPI T5090m-88.

#### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all layers of the corrugated paperboard shall have a negative reading in the phloroglucinol test when tested according to ASTM D1030 or shall have a KAPPA number of 5 or less when tested according to TAPPI T-236om-85.

#### *Abrasion*

Outer surface of the paperboard shall show a loss of less than 0.3 percent of the total weight (mounting card and sample) when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476om-01).

*Surface Smoothness* (to determine the property of adhesion of a pressure sensitive label to the paperboard surface)

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 D286-90, Procedure B modified as follows: -use 3M brand #810 3/4" wide, pressure sensitive tape to conduct the test -adhere the tape to the paperboard surface with 2 rolls of a 10kg steel roller; allow samples to set 3 days before testing -suspend a 2OZ weight from the tape

#### *Thickness*

The corrugated paperboard thickness shall be no greater than 0.125 inches and no less than 0.115 inches for B-flute when tested according to TAPPI T-411 om-89.

#### *Stiffness*

The corrugated paperboard shall be tested for stiffness in accordance with TAPPI T-489om-92 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 and a 5,000 Taber unit weight. The board shall have a stiffness of between 3,000 and 6,000 Taber Stiffness Units. Collapse of the corrugating medium shall constitute failure.

#### *Finish*

The corrugated paperboard shall be smooth and free of knots, strives, and other abrasive particles. The paperboard shall be free of dirt, marks, stains, surface or edge damage, or other imperfections or contaminations which might affect the utility or appearance of the product.

#### *Color Retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452om-87.

### **Adhesive Used in Laminating the Corrugated Board**

Water resistant purified starch adhesive shall be used which shall contain no free sulfur or other impurity which would detract from the properties of the paperboard (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, decrease the stiffness).

### **Adhesive used in Assembly**

Water resistant adhesive shall be used to adhere fold downs in both box top and bottom. Pressure sensitive adhesives shall not be used in assembly. When aged in an oven at 50 degrees centigrade and 87 percent relative humidity, the adhesive shall not soften or run, but shall firmly and evenly adhere fold downs to box sides. The properties of the adhesive shall not detract from the properties of the corrugated board (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, or decrease the folding endurance. The adhesive shall not be visible through or alter the color of the corrugated board. If it is necessary to buffer the adhesive, the same buffer as in the corrugated board (i.e. calcium carbonate, magnesium carbonate, or a combination of both) shall be used.

### **Workmanship**

Each box shall meet the requirements stated in this specification, shall be assembled 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. When assembled, all components 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. 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. The completed box shall contain no surface dirt (smudges, fingerprints, and the like) and shall not be marred (dents, bumps, etc.) in any way.

The paperboard shall be scored evenly. When the paperboard is scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses. All edges shall be free of fraying, cracks, and breaks.

### **Identification Markings**

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*. Figure 2.

### ***Preparation for Delivery***

### **Packaging**

The map storage boxes shall be shipped assembled and the box spacers and liners shall be shipped flat in standard commercial containers that are sealed with tape. The number of boxes to be packed in each container shall be specified in the purchase order.

### **Marking**

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the size and number of map storage boxes and associated components packed in the container.

### ***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 test shall be performed at and the samples conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 1.8 degrees) and 50 percent relative humidity (plus or minus 2 percent R.H.) See TAPPI T-402om-88.

### **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) and 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 associations at the following addresses:

- ASTM - American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
- TAPPI - The Technical Association of the Pulp and Paper Industry, One Dunwoody Park, Atlanta, GA 30348

### **Tests for Paperboard Quality**

The requirements for paperboard quality shall be tested according to the following method:

### **Requirements Test Method**

Lignin	
-Phloroglucinol	ASTM D1030, X5 Spot Stains
-Kappa number	TAPPI T-236om-85
Rosin (Raspail test)	ASTM D 549-88
Reducible Sulfur	TAPPI T-406om-88
Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89
Hydrogen ion concentration	TAPPI T 509om-88
Abrasion	TAPPI T476om-91

Surface Smoothness	ASTM D2860m-90
Thickness	TAPPI T 4110m-89
Stiffness	TAPPI T4890m-92
Color Retention	
TAPPI T 4520m-92	

### **Responsibility for Tests**

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and services conform to prescribed requirements

### ***Inspection***

### **Examination Criteria**

An examination shall be made to determine whether the completed box complies with the **Requirements** section of this specification (see pages 1-4). The qualities and characteristics that shall be regarded as unacceptable in the completed box and additional are listed below.

### **Shipped Box and Additional Components**

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

### **Workmanship**

- Edges not cut straight, not smooth and even
- Scores not deep enough to permit precise folding during assembly
- Corners not square
- When folded, edges showing exterior splits and cracks
- Completed box warped and uneven on flat surface
- Box top bows open; not a snug fit
- Assembled box torques or twists when filled
- Panels are gaped or bulged and are not aligned properly
- Surfaces not clean or smooth; smudges, fingerprints or dirt; not free of lumps or indentations
- Surfaces torn, scuffed, or otherwise physically marred
- Assembled box torques or twists when filled record material

### **Packaging for Delivery**

- An examination shall be made to determine whether the packaging of the boxes for delivery comply with the requirements of Preparation for Delivery section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.
- Not number of boxes per container specified in contract
- Container not sealed with tape

- Container not legibly marked with the purchase order number
- Container not legibly marked with number of boxes within

## **Responsibility for Inspection**

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all inspection requirements as 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**

### *Construction and Workmanship*

To sample boxes for construction and workmanship, boxes shall be selected for an examination of construction and workmanship following sampling procedures described in MIL-STD105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Testing*

To sample boxes for testing, boxes shall be selected according to MIL-STD 105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

### *Preparation for Delivery*

To sample boxes for compliance with packaging and marking requirements, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Sampling Method*

The sampling of boxes for examination shall be carried out according to methods specified in "Sampling Procedures and Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and Forms Center; Standardization Document Order Department, Building 4, Section D; 700 Robbins Avenue; Philadelphia, Pennsylvania, 1911 1-5094.

## **Ordering Information**

### **The following information shall be included in the purchase order:**

- Title and date of the specification
- Purchase order number
- Number of boxes per shipping container
- Special delivery conditions

## **List of possible vendor sources**

### *Archivart*

Division of Heller and Usdan  
7 Caesar Place  
Moonachie, NJ 07074  
1-800-333-4466  
FAX: (201) 935 5964  
Att Robert Stiff

### *Conservation Resources International Inc.*

8000 H Forbes Place  
Springfield, VA 22151  
(703) 321-7730  
FAX: (703) 321 -0629  
Attn: Bill Hollinger

*Light Impressions*  
439 Monroe Ave  
Rochester, NY 14607-3717  
1-800-828-9859

*University Products*  
517 Main Street  
P.O. Box 101  
Holyoke, MA 01041-0101  
1-800-762-1165  
FAX: 1-800.532.9281  
Attn: John Dunphy

*Gaylord Brothers*  
PO Box 4901  
Syracuse, NY 13221-4901  
1.800.448.6160  
FAX: 1.800.272.3412

**BOX DIMENSIONS**

All dimensions are + *1/16"*

**BOX BOTTOM:** interior measurements

L. 23"

W. 20 1/4"

H. 1 1/2"

QUANTITY BOXES: 400

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# Low Lignin Microfilm Box

(for microfilm boxes to house the 1920 Census *only*)

April, 1991

## *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 7-1](#).)

## *Requirements*

### **Construction**

The assembled box shall consist of one die cut paperboard box blank, cut and scored as indicated in [Figure 7-1](#).

The box orientation shall be as follows:

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

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 7-1](#).

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, plus or minus 1/16 inch. Junction flap E shall measure at least 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, plus or minus 1/16 inch. Junction flap E shall measure at least 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. The paperboard shall be free of groundwood (ASTM D 1030, X 5 Spot Stains and TAPPI T-236cm-85), alum-rosin sizing

(ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (TAPPI T-406om-88). It shall be free of any components that will cause the paperboard to fail the photographic activity test (ANSI IT9.2-1988, Section 5) Surfaces shall be free of knots, shives, and abrasive particles.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used. (ASTM D4988-89)

#### *Alkaline Reserve*

The paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all plies and layers, when tested according to ASTM D4988-89.

#### *Hydrogen Ion Concentration (pH)*

The pH value of the paperboard shall be between 8.0 and 10.0 when tested according to TAPPI T-509om-88.

#### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all plies and layers of the paperboard shall give a negative reading to the phloroglucinol test when tested according to ASTM D1030 or shall have a Kappa number of 5 or less when tested according to TAPPI T-236cm-85.

#### *Abrasion*

Outer surfaces of the paperboard shall show a loss of less than 0.7 percent of the total weight (mounting card and sample) when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476om-84).

#### *Thickness*

The paperboard thickness shall be 0.027 inches plus or minus 0.002 inches, when tested according to TAPPI T-411om-84.

#### *Stiffness*

The paperboard shall have an internal stiffness of at least 800 Tabor stiffness units in the machine direction and 250 Tabor stiffness units in the cross direction at 15 degrees deflection, when tested according to TAPPI T-489om-86.

#### *Finish*

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

#### *Color*

The paperboard shall be colored light blue on the outside (with a Munsell color measurement of between 10BG 5/6 - 6.6 and white on the inside.

#### *Color retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452om-87.

#### **Adhesive**

Water resistant adhesive shall be used to adhere D (the junction flap) to E (the bottom of the box). When aged in an oven at 50 degrees centigrade and 87 percent relative humidity, the adhesive shall not soften or run, but shall firmly and evenly adhere D (the junction flap) to E (the bottom of the box). The properties of the adhesive shall not detract from the properties of the paperboard (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, decrease the folding endurance, or cause the paperboard to fail the photographic activity test, ANSI IT9.2-1988, Section 5.). The adhesive shall not be visible through or alter the color of the paperboard. If it is necessary to buffer the adhesive, the same buffer as in the paperboard (i.e. calcium carbonate, magnesium carbonate, or a combination of both) shall be used.

#### **Printing Ink**

The printing ink shall be dark blue, with a Munsell color measurement of 2.5PB 2/6. It shall be colorfast, non-bleeding, and non-acidic. Specifically, the ink shall show no bleeding when the printed paperboard is soaked in distilled water for 48 hours while held in direct contact with white bond paper. The ink shall not reduce the alkaline reserve nor decrease the pH of the paperboard.



## Printed Matter

The following image and text shall be legibly printed in dark blue ink (with a Munsell color of 2.5PB2/6) on the front of the box (See [Figure 2](#)):

- The National Archives seal The seal shall measure 1 3/4 inches in diameter and shall be centered on the front of the box.
- 1920 CENSUS This text shall occupy an area 2 1/4 inches in width x 5/16 inch in height and shall be centered and positioned approximately 1/8 inch above the top of the seal.
- MICROFILM This text shall occupy an area 2 1/4 inches in width x 1/4 inch in height and shall be centered and positioned approximately 5/16 inch below the bottom of the seal.

The following text shall be legibly printed in dark blue ink (with a Munsell color of 2.5PB 2/6) on the back of the box:

- This microfilm has been reproduced by the National Archives and Records Administration from the highest quality master negatives available from the Bureau of the Census. The original film includes defects that affect the legibility of some frames.
- This text shall be centered and shall occupy an area 2 1/2 inches in width x 2 inches in height.

## 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 edges shall be cut straight and shall be smooth and even. 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 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. The side flaps shall be able to withstand repeated opening without cracking, splitting, fraying, or otherwise losing strength along the folds. 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. In the assembled box, the corners of the box shall be square. The bottom of the box shall rest evenly on a flat plane. All panels shall fit closely without gaps or warping. 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. 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. The notch shall be shaped uniformly and shall be smooth and even at the edge. The printing on the front and back of the box shall be legible, sharp, clean, and uniform.

## *Preparation for Delivery*

### Packaging

The microfilm boxes shall be packed flat in a standard commercial container that is sealed with tape. The number of boxes to be packed in each container shall be specified in the purchase order.

**Marking** The outside of each packing container shall be legibly marked with the following information: the purchase order number and the type, size, and number of microfilm boxes packed in the container.

## *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 conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 35 degrees) and 50 percent relative humidity (plus or minus 2 percent RH.) (See TAPPI T-402om-88.)

## 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), and the Technical Association of the Pulp and Paper Industry (TAPPI). Publications describing these tests may be ordered directly from the technical associations at the following addresses:

ANSI - American National Standards Institute  
1430 Broadway  
New York, New York 10018

ASTM - American Society for Testing and Materials  
1916 Race Street  
Philadelphia, PA 19103

TAPPI -The Technical Association of the Pulp and Paper Industry  
One Dunwoody Park  
Atlanta, GA 30348

## Tests for Paperboard Quality

The requirements for paperboard quality shall be tested according to the following methods:

### Requirements Test Method

Lignin	
-Phloroglucinol	ASTM D1030, X5
-Spot Stains	
-Kappa number	TAPPI T-236cm-85
Rosin (Raspail test)	ASTMD549-88
Reducible Sulfur	TAPPI T-406om 88
Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89
Hydrogen ion concentration	TAPPI T-509om 88
Thickness	TAPPI T-411om-84
Stiffness	TAPPI T-489om-86
Color Retention	TAPPI T-452om-87

## Test for Photographic Activity

The microfilm box (paperboard and any adhesive used) shall pass the photographic activity test described in ANSI IT9.2-1988, Section 5.

## Verification of Color Requirements

The color of the paperboard and the printing ink shall be verified using the *Munsell Book of Color, Glossy Finish Collection*, 1976.

## Responsibility for Tests

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and services conform to prescribed requirements.

## Inspection

## Examination Criteria

An examination shall be made to determine whether the completed box complies with the Requirements section. The qualities and characteristics that shall be regarded as unacceptable in the completed box are listed below.

### Completed Box

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

### Workmanship

- Edges not cut straight, not smooth and even
- Slits in the paperboard not capable of remaining intact over time
- Scores and creases not deep enough to permit precise folding during construction
- Corners of the outer segment of the right and left flaps not rounded
- Junction flap E and segments K and H not tapered as shown in [Figure 1](#)
- Corners of the closed box, not square
- Closed box warped and uneven on flat surface
- Box not capable of being opened repeatedly without cracking, splitting, fraying, or otherwise losing strength along the folds at the side flaps
- Folded edges showing exterior splits and cracks
- Side flaps bow open; not a snug fit
- Panels are gaped or bulged and are not aligned properly
- Surfaces not clean or smooth: not free of oozed adhesive, smudges, fingerprints or dirt; not free of lumps or indentations
- Surfaces torn, scuffed, or otherwise physically marred
- Printed matter not legible, sharp, cleanly, nor evenly printed
- The thumb notch not centered at the left edge of the back of the box; not uniform in shape; not smooth nor even at the edge
- 

### Packaging for Delivery

An examination shall be made to determine whether the packaging of the boxes for delivery complies with the requirements of **Preparation for Delivery** section of this specification.

The characteristics that shall be regarded as unacceptable in the packaging are listed below.

- Not number of boxes per container specified in contract
- Container not sealed with tape
- Container not legibly marked with the purchase order number
- Container not legibly marked with type of microfilm boxes within
- Container not legibly marked with size of microfilm boxes within
- Container not legibly marked with number of microfilm boxes within
-

## **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 service conform to the prescribed requirements.

## **Sampling for Examination**

### *Construction and Workmanship*

To sample boxes for construction and workmanship, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Testing*

To sample boxes for testing, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

### *Preparation for Delivery*

To sample boxes for compliance with packaging and marking requirements, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 defective from each lot of material offered.

### *Sampling Method*

The sampling of file folders for examination shall be carried out according to methods specified in "Sampling Procedures and Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and Forms Center; Standardization Document Order Department, Building 4, Section D; 700 Robbins Avenue; Philadelphia, Pennsylvania 19111-5094.

## **Ordering Information**

**The following information shall be included in the purchase order:**

- Title and date of the specification
  - Box dimensions
  - Color of box and printing ink
  - Number of boxes required
  - Purchase order number
  - Number of boxes per shipping container
  - Special delivery conditions
-

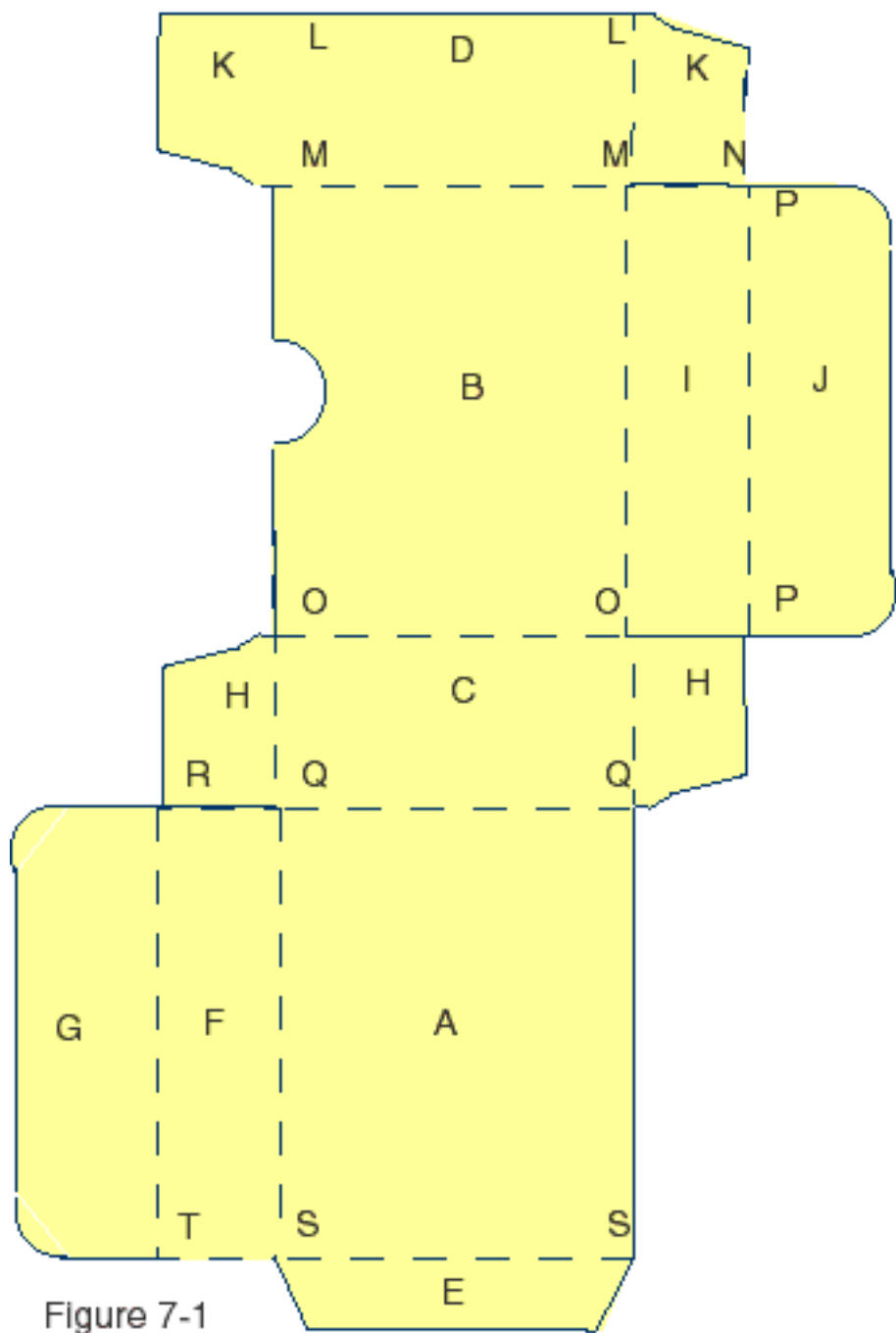


Figure 7-1

# 1920 CENSUS



## MICROFILM

# Low Lignin Photograph Storage Box

January, 1993

## Scope

This specification covers the requirements for a photograph storage box which is one piece, shipped flat, self locking, and made from low lignin corrugated board.

## Requirements

### Construction

The shipped flat clam shell box shall consist of one B- or E-flute corrugated single wall (double-faced) board, comprised of two facings (liners) adhered to one fluted medium with fluting running perpendicular with the spine of the box as indicated in [Figure 1-1](#). Assembly shall be self locking. Assembly shall not include adhesive or metal fasteners.

Construction shall be such that the self locking walls are double thickness and alternate. That is, when the box is closed both side walls and front wall shall be double thickness. The self locking assembly shall be such that the tabs fit snugly into "U" shaped incisions cut in the top and bottom of the box. See [Figure 1-2](#). When the paperboard is scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses. A shallow thumb cut shall be centered on the outside foreedge. The thumb cut shall not exceed 1/4" in height. See [Figure 1-1](#) and [1-2](#), [1-3](#), and [1-4](#). The distance between the lower edge of the extension flaps at the spine and the tray of the box shall not be greater than 1/8". The spine of the box shall be cut so that it is flush with the side walls when the assembled box is closed. See [Figure 1-1](#) and [1-2](#), [1-3](#), and [1-4](#). Drawings are not to scale.

### Dimensions

The dimensions of the box shall be specified in the contract as inside measurements in the following order: length, width, and depth with a tolerance of plus or minus 1/16"; and the specified maximum outside dimensions. All box sizes shall be constructed from the same corrugated board type.

### Paperboard

#### *Composition*

All layers of the corrugated paperboard laminate shall be made from cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. The paperboard shall be free of groundwood (ASTM D1030, X 5 Spot Stains and Tappi T-236cm-85), alum-rosin sizing (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less than 0.0008 percent reducible sulfur (Tappi T406cm-88). The paperboard shall pass the Photo Activity Test as described in IT9.2-1991 Section 5 (or the latest version). Samples shall be tested directly against the test detectors (without interleaving) for fade and stain. Results shall be reported as % difference from the control. The enclosure material shall not produce a density change in the colloidal silver fade detectors greater than plus or minus 20% of the change obtained with the filter paper control. Surfaces shall be free of knots, shives, and abrasive particles.

#### *Color*

The color shall be grey or tan.

#### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used (ASTM D4988-89).

### *Alkaline Reserve*

The corrugated paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both evenly distributed throughout all layers of the lamination, when tested according to ASTM D4988-89.

### *Hydrogen Ion Concentration (pH) (cold extraction method)*

The pH value of the corrugated paperboard shall be between 8.0 and 9.5 when tested according to TAPPI T509cm-88.

### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all layers of the corrugated paperboard shall have a negative reading in the phloroglucinol test when tested according to ASTM D1030 or shall have a KAPPA number of 5 or less when tested according to TAPPI T-236cm-85.

### *Abrasion*

Outer surface of the paperboard shall show a loss of less than 0.3 percent of the total weight (mounting card and sample) when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476cm-91).

### *Surface Smoothness*

(to determine the property of adhesion of a pressure sensitive label to the paperboard surface) 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 D286-90, Procedure B modified as follows:

- use 3M brand #810 3/4" wide, pressure sensitive tape to conduct the test
- adhere the tape to the paperboard surface with 2 rolls of a 10kg steel roller; allow samples to set 3 days before testing
- suspend a 2oz weight from the tape

### *Thickness*

The corrugated paperboard thickness shall be no greater than 0.125 inches and no less than 0.115 inches for B-flute and no greater than 0.073 inches and no less than 0.062 inches for E-flute when tested according to TAPPI T-411 om-89.

### *Stiffness*

The corrugated paperboard shall be tested for stiffness in accordance with TAPPI T-489cm-92 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 and a 5,000 Taber unit weight. The board shall have an average minimum stiffness of 3765 plus or minus 1000 Taber Stiffness Units for B-flute and 2685 plus or minus 500 Tabor Stiffness Units for E-flute. Collapse of the corrugating medium shall constitute failure.

### *Finish*

The corrugated paperboard shall be smooth and free of knots, shives, and other abrasive particles. The paperboard shall be free of dirt, marks, stains, surface or edge damage, or other imperfections or contaminations which might affect the utility or appearance of the product.

### *Color Retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452cm-87.

## **Adhesive Used in Laminating the Corrugated Board**

Water resistant purified starch adhesive shall be used which shall contain no free sulfur or other impurity which would cause the corrugated paperboard to fail the "Photographic Activity Test" as described in ANSI IT9.1-1991, Section 5 (or latest version).

## **Workmanship**

Each box shall meet the requirements stated in this specification, shall be assembled 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. When assembled, 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. 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. The completed box shall contain no surface dirt (smudges, fingerprints, and the like) and shall not be marred (dents, bumps, etc.) in any way.

The paperboard shall be scored evenly. Scores shall be continuous and deep enough to permit precise folding during assembly. When the paperboard is scored twice to assemble a double wall, the space between parallel scores shall not exceed two board thicknesses. 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.

Shallow thumb cut on outer foreedge shall be smooth, centered, and symmetrical.

Paperboard fluting shall be perpendicular to the spine. (See Figure 1-1.)

### **Identification Markings**

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.

## ***Preparation for Delivery***

### **Packaging**

The photographic storage boxes shall be shipped flat in a standard commercial container that is sealed with tape. The number of knocked down boxes to be packed in each container shall be specified in the purchase order.

### **Marking**

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the size and number of photographic storage boxes packed in the container.

## ***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 test shall be performed at and the samples conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 1.8 degrees) and 50 percent relative humidity (plus or minus 2 percent R.H.) See TAPPI T-402cm-88.) The exception is the Photo Activity Test which is tested at 70 degrees Centigrade and 86% relative humidity without pre-conditioning.

### **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) and 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 associations at the following addresses:

ANSI - American National Standards Institute  
1430 Broadway  
New York, New York 10018

ASTM - American Society for Testing and Materials  
1916 Race Street  
Philadelphia, PA 19103

## Tests for Paperboard Quality

The requirements for paperboard quality shall be tested according to the following method:

<b>Requirements</b>	<b>Test Method</b>
Lignin	
-Phloroglucinol	ASTM D1030, X5
Spot Stains	
Kappa number	TAPPI T-236om-85
Rosin (Raspail test)	ASTM D 549-88
Reducible Sulfur	TAPPI T-406om-88
Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89
Hydrogen ion concentration	TAPPI T 509om-88
Abrasion	TAPPI T4760m-91
Surface Smoothness	ASTM D286om-90
Thickness	TAPPI T 411om-89
Stiffness	TAPPI T489om-92
Color Retention	TAPPI T 452om-92
Photo Activity Test	
-Paperboard	ANSI IT9.2-1991 (Section 5)
-Adhesive	ANSI IT9.2-1991 (Section 5)

## Responsibility for Tests

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure that supplies and service conform to prescribed requirements

## *Inspection*

### Examination Criteria

An examination shall be made to determine whether the completed box complies with the Requirements section of this specification. The qualities and characteristics that shall be regarded as unacceptable in the completed box are listed below.

### Shipped Flat Box

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

## **Workmanship**

- Edges not cut straight, not smooth and even
- Scores not deep enough to permit precise folding during assembly
- Corners of the box, not square
- Box not capable of being opened repeatedly without cracking, splitting, fraying, or otherwise losing strength along the hinge of the lid
- When folded, edges showing exterior splits and cracks
- Completed box warped and uneven on flat surface
- Lid bows open; not a snug fit
- Assembled box torques or twists when filled with photographs
- Panels are gaped or bulged and are not aligned properly
- Surfaces not clean or smooth; smudges, fingerprints or dirt; not free of lumps or indentations
- Surfaces torn, scuffed, or otherwise physically marred
- 

## **Packaging for Delivery**

- An examination shall be made to determine whether the packaging of the boxes for delivery comply with the requirements of Preparation for Delivery section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.
- Not number of boxes per container specified in contract
- Container not sealed with tape
- Container not legibly marked with the purchase order number
- Container not legibly marked with number of photograph boxes within
- 

## **Responsibility for Inspection**

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all inspection requirements as 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**

### *Construction and Workmanship*

To sample boxes for construction and workmanship, boxes shall be selected for an examination of construction and workmanship following sampling procedures described in MIL-STD105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Testing*

To sample boxes for testing, boxes shall be selected according to MIL-STD 105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

### *Preparation for Delivery*

To sample boxes for compliance with packaging and marking requirements, boxes shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

### *Sampling Method*

The sampling of boxes for examination shall be carried out according to methods specified in "Sampling Procedures and Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and

## ***Ordering Information***

**The following information shall be included in the purchase order:**

- Title and date of the specification
- Purchase order number
- Number of knocked down boxes per shipping container
- Special delivery conditions
- 

### **List of possible vendor sources**

**Archivart  
Division of Heller and Usdan  
7 Caesar Place  
Moonachie, NJ 07074  
1-800-333-4466  
FAX: (201) 935 5964  
Attn: Robert Stiff**

**Conservation Resources International Inc.  
8000 H Forbes Place  
Springfield, VA 22151  
(703) 321-7730  
FAX: (703) 321-0629  
Attn: Bill Hollinger**

**Hollinger Corporation  
P.O. Box 8360  
Fredricksburg, VA 22404  
1-800-634-0491  
Attn: Tom Mahoney**

**Light Impressions  
439 Monroe Ave  
Rochester, NY 14607-3717  
1-800-828-9859**

**University Products  
517 Main Street  
P.O. Box 101  
Holyoke, MA 01041-0101  
1-800-762-1165  
FAX: 1 (413) 532-9281  
Attn: David McGoon  
1-800-628-1912**

**Custom Manufacturing Inc.  
P.O. Box 88  
Germantown, MD. 20875  
(717) 642-6253  
Attn: Michael Waters**

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# Letter and Legal Size File Folders

March, 1991

## *Scope*

This specification covers the requirements for letter and legal size file folders.

## **Requirements**

### **Construction**

The file folder shall be made from a single piece of paperboard folded along a primary score line. It shall contain two additional score lines positioned on the front flap and shall have a reinforced top margin on the back flap. The folder shall have straight sides that meet evenly (when the folder is folded) with rounded corners on both the front and back flaps. (See [figure 7-a.](#))

### **Dimensions**

#### *Letter Size Folder*

A letter size file folder, folded along the primary score line, shall measure 8 5/8 inches in height (for the front flap), 9 5/8 inches in height (for the back flap), and 11 3/4 inches in width. The allowable variation for each dimension shall be plus or minus 1/16 inch.

#### *Legal Size Folder*

A legal size file folder folded at the primary score line shall measure 8 5/8 inches in height (for the front flap), 9 5/8 inches in height (for the back flap), and 14 3/4 inches in width. The allowable variation for each dimension shall be plus or minus 1/16 inch

#### *Score Lines on the Front Flap*

For both letter and legal size folders, the first score line shall be 3/8 inch away from the primary fold. The second score line shall be 3/4 inch away from the primary fold.

#### *Top Margin on the Back Flap*

For both letter and legal size folders, the top margin on the back flap shall measure 1 3/8 inches, plus or minus 1/16 inch.

## **Paperboard**

### *Composition*

Paperboard for the file folder shall be made from new cotton or linen pulp, fully bleached chemical wood pulp, or a mixture. Paperboard shall be free of groundwood (ASTM D1030, X 5 Spot Stains and TAPPI T-236cm-85), alum rosin sizing, (ASTM D549-88), particles of metal, waxes, plasticizers (i.e. wet strength additives), plastics, and shall contain less 0.0008 percent reducible sulfur (TAPPI T-406om-88). It shall be free of any components that will cause the paperboard to fail the photographic activity test (ANSI IT9.2-1988, Section 5). Surfaces shall be free of knots, shives, and abrasive particles.

### *Sizing*

Alkaline sizing (surface, internal, or both) shall be used. (ASTM D4988-89)

### *Alkaline Reserve*

The paperboard shall have a minimum of 3 percent calcium carbonate, magnesium carbonate, or a combination of both

evenly distributed throughout all plies and layers, when tested according to ASTM D4988-89.

#### *Hydrogen Ion Concentration (pH)*

The pH value of the paperboard shall be between 8.0 and 10.0 when tested according to TAPPI T-509om-88.

#### *Lignin*

To demonstrate the adequacy of bleaching or lignin removal, all plies and layers of the paperboard shall give a negative reading to the phloroglucinol test when tested according to ASTM D1030 or shall have a Kappa number of 5 or less when tested according to TAPPI T-236cm-85.

#### *Abrasion*

Outer surfaces of the paperboard shall show a loss of less than 2 percent of the total weight (mounting card and sample) when tested with #CS 10 wheel and 100 wear cycles (TAPPI T-476om-84).

#### *Surface Smoothness*

The paperboard shall show a minimum smoothness of 175 Sheffield units, when tested according to TAPPI UM-518.

#### *Thickness*

The paperboard shall have an average thickness between 0.0095 inches and 0.015 inches, when tested according to TAPPI T-411om 84.

#### *Stiffness*

The paperboard shall have an internal stiffness of at least 19 Tabor stiffness units when tested according to TAPPI T-489om-86.

#### *Machine Direction*

The machine direction of the paperboard shall be perpendicular to the primary fold.

#### *Score Lines*

The paperboard shall be scored uniformly and deeply enough to permit easy, precise folding and the retention of maximum strength along the fold line.

#### *Finish*

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

#### *Color retention*

Dyes used to color the paperboard shall show no bleeding when soaked in distilled water for 48 hours while held in direct contact with white bond paper. The board shall not show a loss or gain of more than 5 points of brightness after exposure in a Sunlighter II apparatus for 96 hours or a fadeometer for 36 hours, when tested according to TAPPI T-452om-87.

#### **Adhesive**

Water resistant adhesive shall be used to adhere the top margin of the back flap. When aged in an oven at 50 degrees centigrade and 87 percent relative humidity, the adhesive shall not soften or run, but shall firmly and evenly adhere the top margin to the back flap. The properties of the adhesive shall not detract from the properties of the paperboard (i.e. reduce the alkaline reserve, increase the percentage of sulfur, decrease the pH, decrease the folding endurance, or cause the paperboard to fail the photographic activity test, ANSI IT9.2-1988, Section 5). The adhesive shall not be visible through or alter the color of the paperboard. If it is necessary to buffer the adhesive, the same buffer as in the paperboard (i.e. calcium carbonate, magnesium carbonate, or a combination of both) shall be used.

#### **Workmanship**

Each folder 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 folder shall be made to the dimensions specified. All edges shall be cut straight and shall be smooth and even. The corners on both the front and back flaps shall be evenly rounded and smooth. The side edges shall meet evenly when the folder is folded to any width.

All surfaces shall be smooth with no blisters, knots, or shives. The folder shall contain no surface dirt (smudges, fingerprints, and the like) and no oozed adhesive and shall not be marred (scuffed, abraded, and the like) in any way.

The paperboard shall be scored and creased uniformly along the primary fold line. Additional scores shall be uniform and deep enough to permit easy, precise folding and the retention of maximum strength along the score line. All folded edges and score lines shall be free of fraying, cracks, and breaks.

### **Identification Markings**

The following information shall be legibly embossed on the inside bottom flap of each folder: name of manufacturer, pH range, year of manufacture, and the words low lignin.

### ***Preparation for Delivery***

#### **Packaging**

The file folders shall be folded along the primary fold and shall be packed in standard commercial container and sealed with tape. The number of folders to be packed in each container shall be specified in the purchase order.

#### **Marking**

The outside of each packing container shall be legibly marked with the following information: the purchase order number and the type, size, and number of file folders packed in the container.

### ***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 conditioned to standard conditions of 73 degrees Fahrenheit (plus or minus 3.5 degrees) and 50 percent relative humidity (plus or minus 2 percent RH.) (See TAPPI T-402om-88.)

#### **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), and the Technical association of the Pulp and Paper Industry (TAPPI).
- Publications describing these tests may be ordered directly from the technical associations at the following addresses:
  - ANSI - American National Standards Institute, 1430 Broadway, New York, New York 10018
  - ASTM - American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103
  - TAPPI - The Technical Association of the Pulp and Paper industry, One Dunwoody Park, Atlanta, GA 30348

#### **Tests for Paperboard Quality**

The requirements for paperboard quality shall be tested according to the following methods:

Requirements	Test Method
Lignin (See p. 1)	
-Pholoroglucinol	ASTM D1030, X5 Spot Stains
-Kappa number	TAPPI T-236cm-85
Rosin (Raspail test)	ASTM D549-88
Reducible Sulfur	TAPPI T-406om-88
Sizing	ASTM D4988-89
Alkaline reserve	ASTM D4988-89

Hydrogen ion concentration	TAPPI T-509om-88
Abrasion	TAPPI T-476om-84
Surface Smoothness	TAPPI UM-518
Thickness	TAPPI T-411om-84
Stiffness	TAPPI T-489om-86
Color Retention	TAPPI T-452om-87

### **Test for Photographic Activity**

The file folder (paperboard and any adhesive used) shall pass the photographic activity test described in ANSI IT9.2-1988, Section 5.

### **Responsibility for Tests**

Unless otherwise specified in the purchase order, the supplier is responsible for the performance of all requirements specified herein. Unless otherwise specified, the supplier may use his or her own facilities or any commercial laboratory acceptable to the National Archives. The National Archives reserves the right to perform any of the tests set forth in the specification where such test are deemed necessary to assure that supplies and services conform to prescribed requirements.

### ***Inspection***

#### **Examination Criteria**

An examination shall be made to determine whether the completed file folder complies with the Requirements section of this specification (see pages 1-3). The qualities and characteristics that shall be regarded as unacceptable in the completed folder are listed below.

#### **Completed Folder**

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

#### **Workmanship**

- Edges not cut straight, not smooth and even
- Corners not evenly rounded and smooth
- Surfaces not clean or smooth not free of oozed adhesive, smudges, fingerprints or dirt
- Surfaces not free of blisters, knots, or shives
- Surfaces not free of scuffs and abrasions
- Fraying, cracks, or breaks along any folded or scored edges
- Side edges not meeting evenly when the folder is folded to any width

#### **Packaging for Delivery**

An examination shall be made to determine whether the packaging of the boxes for delivery complies with the requirements of Preparation for Delivery Section of this specification. The characteristics that shall be regarded as unacceptable in the packaging are listed below.

Not number of folders per container specified in contract



- Container not sealed with tape
- Container not legibly marked with the purchase order number
- Container not legibly marked with the type of file folder within
- Container not legibly marked with size of file folder within
- Container not legibly marked with number of file folders within

### **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**

#### *Construction and Workmanship*

To sample file folders for construction and workmanship, file folders shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 percent defective from each lot of material offered.

#### *Testing*

To sample file folders for testing, file folders shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 2.5 percent defective from each lot of material offered.

#### *Preparation for Delivery*

To sample file folders for compliance with packaging and marking requirements, file folders shall be selected according to MIL-STD-105E at inspection level S-2 with an acceptable quality level of 4.0 defective from each lot of material offered.

#### *Sampling Method*

The sampling of file folders for examination shall be carried out according to methods specified in "Sampling Procedures and Tables for Inspection by Attributes", MIL-STD-105E, issued January 2, 1990 and available from Naval Publications and Forms Center; Standardization Document Order Department, Building 4, Section D; 700 Robbins Avenue; Philadelphia, Pennsylvania 19111-5094.

### **Ordering Information**

The following information shall be included in the purchase order.

- Title and date of the specification
  - File folder dimensions
  - Number of file folders required
  - Purchase order number
  - Number of file folders per shipping container
  - Special delivery conditions
-

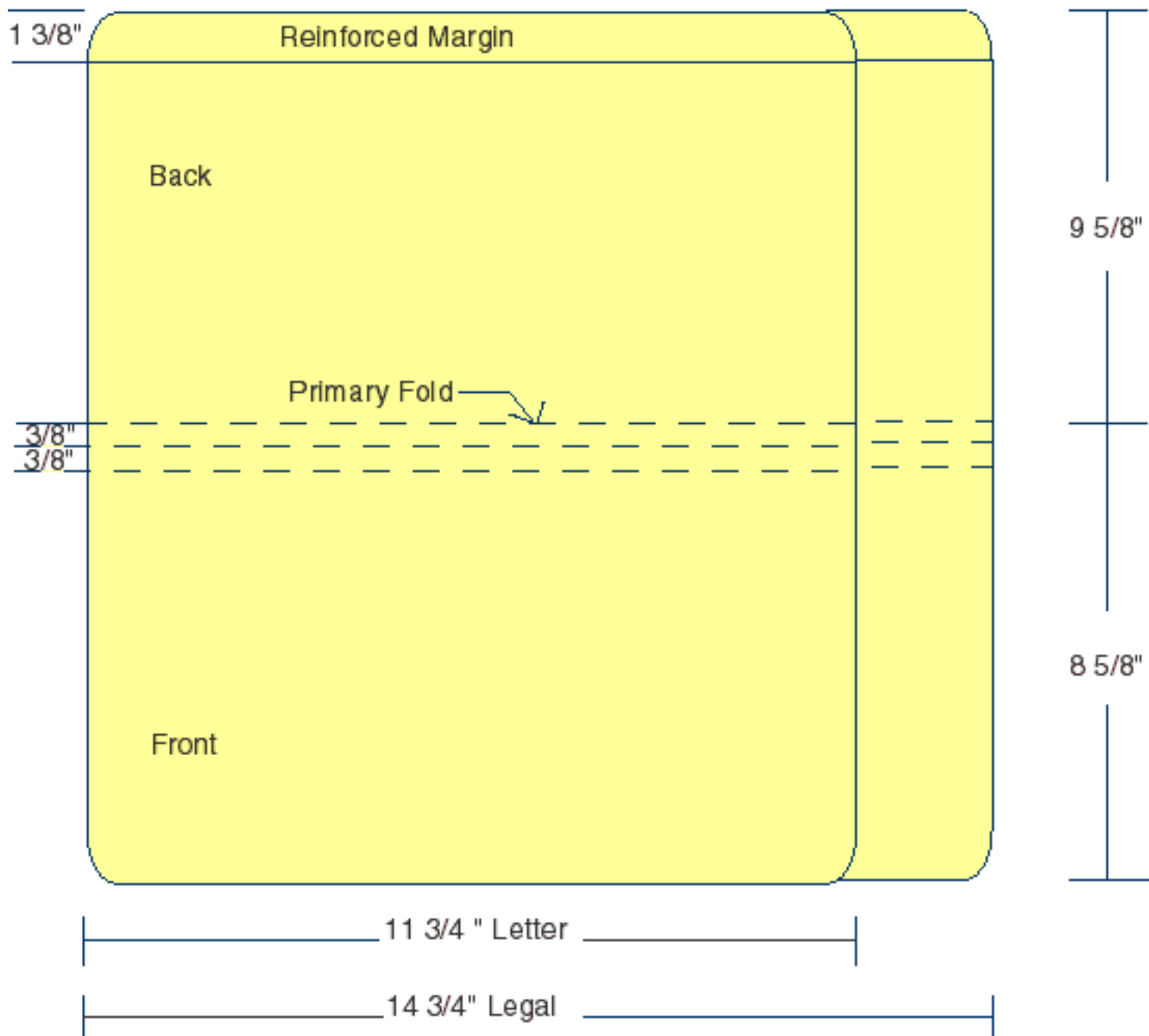


Figure 7-A