



# The Library Binding Council Standard for Library Prebound Books

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## **1.0 Purpose and Scope**

This standard specifies methods and materials for binding volumes that can withstand library use; that is, for bindings that are sturdy, durable, and flexible. This Standard is applicable for the following general procedures:

### **1.1 Books**

Hard cover re-binding of publisher bound new books for library use.

## **2.0 Title and Citation**

This standard shall be cited as The Library Council Standard for Library Prebound Books hereinafter alternatively referred to as the Prebound Standard.

## **3.0 Representations and Warranty**

Only binding that adheres to the technical and material specifications herein may be represented as conforming to the Library Binding Council Standard for Library Prebound Books. With respect to such binding, when warranties are assured (whether directly or implied) or comparable assertions are made the binder shall warrant to the customers as follows:

“Warranty. We warrant that the binding represented by us as conforming to The Library Binding Council Standard for Library Prebound Books complies with all requirements therein. This statement is made pursuant to the Technical Specifications and the Material Specifications of the Prebound Standard issued by the Library Binding Council, and applicable federal and state laws relative to representations by a seller to a purchaser regarding the quality of a product and its adherence to a standard.”

## **Technical Specifications**

## **4.0 Examination**

Inspection shall include an examination of the condition of the paper, the nature and condition of the original page attachment, and the width of margins. Based on this inspection, a suitable method of leaf attachment shall be selected, and volumes that cannot be trimmed or milled without cutting into text or illustrations shall be identified.

## **5.0 Methods of Leaf Attachment**

Specifications are set forth for the following approved methods of attaching leaves:

### **5.1 Oversewing**

Oversewing is a method of attaching thin sections (i.e., piles) of leaves, one to another in succession, to create a semi-flexible text block. When done by machine, multiple needles pass obliquely through the binding margin of each section, forming stitches that link each section to adjacent sections. After spine preparation a minimum binding margin of 5/8" (16 mm) is desirable. Volumes with narrower margins shall not be oversewn unless no other practical method of leaf attachment is possible.

#### **5.1.1 Preparation**

If necessary, before leaf attachment the spines of text blocks shall be trimmed or milled as needed to free the leaves for sewing. No more than 1/8 inch (3 mm) of the binding margin shall be removed.

#### **5.1.2 Process**

All volumes shall be divided into uniform sections approximately 1/16 inch (1.5 mm) thick, variable depending on the nature and condition of the paper. With an endpaper in place the first section of leaves sewn shall be sewn multiple times to create a strong anchor. If their sewing is adequate successive sections need only to be sewn once. With an endpaper in place the final section shall be sewn multiple times to ensure proper fastening of the final pile of leaves. As many needles as possible shall be used, provided that the sewing is no closer to the

head and tail of the volume than 1/4 inch (6 mm) after trimming, and no farther from the head and tail than 1 inch (25 mm). The shuttle thread shall be coated with methyl cellulose paste during the sewing; or a thin line of paste shall be applied along the binding margin of the top sheet of each section prior to sewing.

In no case shall the sewing go into the print.

### 5.1.3 Endpaper Construction

#### 5.1.3.1 Three leaves

A single folio tipped 1/4 inch (6 mm) from the edge of a single leaf to make three leaves. A 1-1/4 inch (32 mm) strip of reinforcing cloth shall be adhered to the binding edge of the folio, and the exposed 1/4 inch (6 mm) margin of the single leaf. After sewing, the outermost endpaper shall be folded and tipped back flush and parallel to (but not extending beyond) the binding edge, to cover the sewing thread and to allow the endpaper to hinge from the binding edge.

#### 5.1.3.2 Two or three leaves

One leaf has a 1-1/4 inch (32 mm) wide reinforcing cloth extension. A second leaf is tipped to that extension along the binding edge, and a third leaf may be tipped to the second leaf.

## 5.2 Double-Fan Adhesive Binding

Double-fan adhesive binding (fan binding) is a method of adhering loose leaves together at the binding edge, using an emulsion copolymer of internally plasticized polyvinyl acetate adhesive, to create a text block.

No text block more than 2.75 inches (69.85mm) thick or weighing more than 5 pounds (2.25 kg) shall be double-fan adhesive bound. Because stiff and/or glossy papers do not fan bind well, the grain direction, flexibility, and surface finish of the paper must be taken into account when deciding whether to double-fan adhesive bind a volume.

### 5.2.1 Preparation

The spine of the text block shall be milled or trimmed if necessary to free all leaves so that they may be easily fanned. As many paper fibers as possible shall be exposed for optimum linkage of paper and adhesive. Linkage may be enhanced by notching the spine.

#### 5.2.2 Process

The text block, with front and back endpapers in place, shall be inspected to make sure all leaves and endpapers are flush with each other at the binding edge. The text block shall be securely clamped. The binding edge shall be fanned first in one direction, as adhesive is applied by brush or by roller; and then in the opposite direction, as adhesive is applied. The penetration of adhesive between leaves shall be approximately 0.008 inches (0.2 mm), so that each leaf is tipped to the next; but no adhesive shall run between pages farther than 1/8 inch (3 mm), and in no case shall it run into the text area. If the binding edge is notched, all notches shall be filled with adhesive.

A stretchable spine lining shall be squarely and snugly adhered to the spine of the text block following specifications in section 9.2, Lining Up the Spine: Adhesive Bound Books, of this standard. Text blocks shall be positioned squarely and allowed to dry until the adhesive is thoroughly solidified without the use of a heater or other drying device.

#### 5.2.3 Endpaper Construction

Endpapers for double-fan adhesive bindings shall consist of a single folded sheet which has its folded edge tipped to the binding edge of the text block during the fanning operation.

#### 5.3 Side Sewing

Side sewing is a method of attaching signatures or loose leaves together by machine sewing the entire text block, including endpapers, through the side along the binding margin, in a single pass. No text block more than 2 inches (50.8 mm) thick, or with a binding margin less than 1/2 inch (13 mm) wide, shall be side sewn.

### 5.3.1 Preparation

All wire staples shall be removed prior to sewing. However, with saddle stitched books the binder has the option to leave the staples in place to maintain proper page alignment.

### 5.3.2 Process

A lock stitch sewing shall be used. Stitches shall be approximately 1/2 inch (13 mm) long. The sewing shall be no farther from the head and tail of the text block than 1/2 inch (13 mm) after trimming, and shall be no farther in from the binding edge than 3/16 (5 mm) inch

### 5.3.3 Endpaper Construction.

Endpaper construction for side sewing shall meet the specifications in Section 5.1.3, Oversewing: Endpaper Construction, of this Standard.

## 5.4 PUR Binding

PUR binding is a method of adhering loose leaves together at the binding edge, using a polyurethane reactive adhesive, to create a text block.

### 5.4.1 Preparation

The spine of the text block shall be milled or trimmed as necessary to free all leaves of any glue or thread. Removal of all dust and debris is critical to obtaining a maximum adhesion level.

### 5.4.2 Process

The text block, with endpapers in place (except for text blocks using united endpapers), shall be securely clamped. The book block remains clamped throughout the entire process and is released only upon completion of the perfect binding process. If milling is to occur, the binding edge shall be milled first. The adhesive is then applied by either a roller or an extrusion mechanism. The penetration of adhesive between leaves should be kept as low as possible and the thickness of the adhesive should be between 0.012-0.015 inches (0.30-0.38 mm) thick. Adhesive applied heavier than this will result in the spine being

too stiff and the book not opening correctly.

If a united endpaper is used, it is to be applied to the text block at the covering station of the binding machine. If a single folded folio or an extended folio endpaper is used then after application of the adhesive to the book block a stretchable spine lining material shall be applied to the text block following specifications in section 9.2, Lining Up the Spine: Adhesive Bound Books, of this standard.

Text blocks shall be positioned squarely and allowed to dry until the adhesive is thoroughly solidified.

### 5.4.3 Endpaper Construction

#### 5.4.3.1 Single Folded Folio

A folded endpaper shall consist of a single folded sheet which has its folded edge adhered to the binding edge of the text block during leaf attachment.

#### 5.4.3.2 Extended Folio

An extended folio endpaper shall consist of a single folded sheet which has an extension attached to its folded edge and has its folded edge adhered to the binding edge of the text block during leaf attachment. The extension shall be positioned to protrude slightly beyond the fold of the folio in such a way as to be removed during the milling process. The purpose of the extension is to allow the preservation of a true fold in the endpapers following the milling process.

#### 5.4.3.3 United Endpapers

United endpapers are either two single leaves or two single folded sheets united by a strip of reinforcing cloth. The joining of the reinforcing material and the endpapers occurs during their manufacture. The reinforcing material shall extend squarely onto the outer side of each endpaper at least 1 inch (25 mm). Due to the intended use of a united endpaper the reinforcing material used shall comply with section 16.2, Reinforcing Material: Spine Lining Material, of this standard.



## **6.0 Trimming the Text Block**

Text blocks shall be trimmed as squarely and slightly as possible. The trimmed edges shall be smooth and without knife marks. The binder shall leave text blocks untrimmed when necessary to preserve text, marginal notes, illustrations, and gatefolds.

## **7.0 Gluing the Spine**

The adhesive shall thoroughly coat the spine. Text blocks shall be stacked squarely after gluing and allowed to dry without the use of a heater or other drying device.

### **7.1 Oversewing**

Polyvinyl acetate adhesive shall be applied to the spines of all oversewn text blocks before rounding and backing.

### **7.2 Side Sewn Text Blocks**

Binders are allowed the option of not gluing the spine of side sewn text blocks.

## **8.0 Spine Treatment**

### **8.1 Rounded Spines**

Oversewn text blocks shall be evenly rounded to form a smooth, convex spine and a concave fore edge; and shall be backed to form shoulders that are symmetrical, uniform from head to tail, and nearly equal in size to the anticipated board thickness.

When double-fan adhesive bound text blocks are rounded they shall only be slightly backed with a small shoulder, so as not to split the text block or lining material

Text blocks shall not be rounded and backed under the following conditions;

very fragile paper,  
thinner than 1/2 inch (13 mm),  
side sewn,  
PUR Bound

## 8.2 Flat Spines

Flat-backed text blocks are those for which the process of rounding and backing is omitted.

## **9.0 Lining Up the Spine**

The spines of text blocks shall be lined with a reinforcing material defined in section 16.2, Reinforcing Material: Spine Lining Material, of this standard.

### 9.1 Oversewn Books

The lining shall extend to within 1/2 inch (13 mm) of the head and tail of the text block, and extend squarely onto each endpaper at least 1 inch (25 mm). Text blocks that are rounded and backed shall have spine lining applied after the rounding and backing process.

#### 9.1.1 Side Sewn Text Blocks

The lining shall extend to within 1/2 inch (13 mm) of the head and tail of the text block, and extend squarely onto each endpaper at least 1 inch (25 mm). If the stitches of the side sewing are glued in place the binder has the option of omitting the lining up of the spine.

### 9.2 Adhesive Bound Books

The lining of Double-fan adhesive bound and PUR bound text blocks shall extend to within 1/4 inch (6 mm) of the head and tail of the spine, and extend squarely onto each endpaper at least 1 inch (25mm).

## **10.0 Case Making**

### 10.1 Cutting the Covering Material

Covering material shall be cut squarely. The cover material shall be cut large enough so that after the boards and inlay are properly placed, as defined in this standard by section 10.4, Case Making: Case

Assembly, there shall remain a 3/4 inch (19 mm) overhang to turn in on all four sides of the case.

## 10.2 Selecting and Cutting Boards

Boards shall be cut squarely and smoothly with the grain running parallel to the binding edge. The height of the boards shall be approximately 1/4 inch (6 mm) taller than the text block. The thickness of the boards shall be between 0.060 inch (1.5 mm) and 0.125 inch (3 mm), and appropriate for the size and weight of the text block. For heavy or large text blocks the board shall be no thinner than approximately 0.095 inch (2.4 mm). For small or light text blocks the board shall be no thicker than approximately 0.095 inch (2.4 mm).

### 10.2.1 Text Blocks with Rounded Spines

The width of the boards for rounded and backed volumes shall be equal to the width of the text block from shoulder to fore edge.

### 10.2.2 Text Blocks with Flat Spines

The width of the boards for flat spine volumes shall be cut approximately 1/4 inch (6 mm) narrower than the width of the text block.

## 10.3 Selecting and Cutting inlays

An inlay shall be used to reinforce the spine of the case. The inlay shall be cut squarely, approximately the same width as the spine of the text block, and the same height as the boards, with the grain running parallel to the binding edge.

### 10.3.1 Rounded Spines

The inlay shall be no thicker than 0.030 inch (0.76 mm) and no thinner than 0.012 inch (0.3 mm).

### 10.3.2 Flat spines

The inlay shall be no thicker than 0.088 inch (2.2 mm) and no thinner than 0.012 inch (0.3 mm).

## 10.4 Case Assembly

The boards and the inlay shall be squarely and securely adhered to the covering material. The corners of the cover material shall be left uncut so that library corners can be made; or shall be cut at a 45 degree angle so that traditional corners can be made. The covering material shall be turned in snugly and uniformly at least 5/8 inch (16 mm) on all sides, and shall adhere neatly and tightly to the edges of the boards.

The joint or space between the inlay and the boards shall be no wider than necessary to provide stress free opening of the cover, but not so wide that it impairs proper joint adhesion following the casing-in process.

### 10.4.1 Cases for Rounded Spines

The spaces between the inlay and the boards shall be uniform and approximately 1/4 inch (6 mm) wide.

### 10.4.2 Cases for Flat Spines

The spaces between the inlay and the boards shall be uniform and no less than 3/8 inch (10 mm).

## **11.0 Casing-In**

Volumes shall be cased-in tightly and squarely using a polyvinyl acetate adhesive that is compatible with the covering material and the adhesive used for making the case. All squares shall be uniform around the perimeter of the text block; and shall be 1/8 inch (3 mm) wide, plus or minus 1/16 inch (1.5 mm), depending on the size of the text block.

Cased-in volumes shall be either pressed between metal-edged boards until thoroughly dry, or processed through a building-in

machine using sufficient pressure, dwell, and heat to ensure good adhesion of the endpapers to the boards and turn-ins, and good adhesion of the covering material to the spine lining and endpapers in the joint area of the text block. The amount of adhesive applied to the joints, and the methods used for building in, shall be sufficient to insure that joints are tight and secure and cannot be separated without damaging the bonded surfaces.

Endpapers shall be smooth and free of wrinkles and bubbles.

## **12.0      Inspection**

Each volume shall be inspected to insure that:

The case and the edges of the text block are free from adhesives.  
Workmanship is neat.

There has been strict adherence to this standard.

# **Materials Specifications**

## **13.0      Paper**

### **13.1      Endpapers**

#### **13.1.1      Paper Composition**

All endpapers shall be constructed of paper that meets the specifications according to the presiding “Permanence of Paper for Publications and Documents in Libraries and Archives, ANSI/NISO Z39.48-1992 (R2002)”

Five Hundred (500) 25 inch (63.5 cm) by 38 inch (96.52 cm) sheets of the paper used to construct endpapers shall weigh no less than 80 pounds (36 kg).

#### **13.1.2      Mechanical Characteristics**

Endpapers shall meet or exceed the following specifications:

Test	Performance	Tappi Test Number
Bursting Strength (Mullen)	40 lbs./sq. in. (2.8 kg/sq. cm)	TAPPI T-403
Folding Endurance (MIT), with grain	275 double folds	TAPPI T-511
Folding Endurance (MIT), across grain	200 double folds	TAPPI T-511
Tensile Strength, with grain	40 lbs./sq. in. (2.8 kg/sq. cm)	TAPPI T-404
Tensile Strength, across grain	25 lbs./sq. in. (1.8 kg/sq. cm)	TAPPI T-404
Tear Resistance (Elmendorf), with grain	4.0 oz (114 grams)	TAPPI T-414
Tear Resistance (Elmendorf), across grain	4.9 oz (140 grams)	TAPPI T-414

#### **14.0 Inlays**

Inlays shall be of appropriate flexibility and thickness for each book. The grain direction shall run parallel to the binding edge. Inlays shall have a minimum pH of 6.5.

#### **15.0 Cover Board**

##### **15.1 General Requirements**

###### **15.1.1 Surface**

Cover board shall be free from surface lumps and reasonably smooth and flat; the usable portion of the sheet shall be reasonably free from all chip indentations and other mechanical imperfections.

###### **15.1.2 Direction of Grain**

The grain shall run parallel to the binding edge.

15.1.3 Density

Individual sheets shall be not less than 0.6 nor more than 1.0 grams per cubic centimeter.

15.1.4 Internal Bond

All board shall have adequate internal bond in order to resist delamination.

15.1.5 Moisture Content

Moisture content at time of shipment shall be not less than 4% nor more than 8%. Test procedure SIB TAPPI T-412.

15.2 Thickness, Bursting Strength and Flexural Properties

The thickness, bursting strength and flexural properties of cover board shall conform to the requirements given in Table 1 below.

Table 1. Thickness, Bursting Strength and Flexural Properties

Nominal Thickness		Bursting Strength lbs/sq.in (kg/cm <sup>2</sup> )	Breaking Minimum	Flexural Load	Properties Deflection Minimum	at Rupture
Inch (mm)	Points		Lengthwise Pounds (kg)	Crosswise Pounds (kg)	Lengthwise Inch (mm)	Crosswise Inch (mm)
0.058 (1.47)	58	235 (15.8)	2.1 (0.95)	1.6 (0.72)	0.22 (5.58)	0.34 (8.6)
0.065 (1.65)	65	255 (17.9)	2.5 (1.13)	1.9 (0.86)	0.22 (5.58)	0.34 (8.6)
0.070 (1.78)	70	275 (19.3)	2.8 (1.27)	2.1 (0.95)	0.22 (5.58)	0.34 (8.6)
0.075 (1.90)	75	295 (20.7)	3.3 (1.49)	2.4 (1.09)	0.22 (5.58)	0.34 (8.6)
0.080 (2.03)	80	315 (22.1)	3.8 (1.49)	2.8 (1.27)	0.22 (5.58)	0.34 (8.6)
0.088 (2.23)	88	350 (24.6)	4.4 (1.99)	3.3 (1.49)	0.22 (5.58)	0.34 (8.6)
0.098 (2.49)	98	385 (27.0)	5.1 (2.31)	3.8 (1.72)	0.22 (5.58)	0.34 (8.6)
0.110 (2.79)	110	425 (29.9)	5.6 (2.54)	4.3 (1.95)	0.22 (5.58)	0.34 (8.6)

#### 15.2.1 Thickness Tolerance

The thickness tolerance shall be plus or minus .003 inch (0.76 mm) on boards up to and including 32 inches (813 mm) in the shorter dimension of area. On boards over 32 inches (813 mm) in the shorter dimension of area, an additional tolerance of 50 percent of the above amount is allowed.

### 15.3 Methods of Sampling and Testing

#### 15.3.1 Sampling for Test

The test sample used for making thickness, density, and bursting strength determination shall consist of ten specimens cut 10 X 10 inches (254 X 254 mm), each specimen being cut from a different board. Where a delivery consists of less than 30 bundles, not less than three bundles shall be sampled. On all deliveries of 30 bundles or more, at least 10% of the bundles shall be samples, except where a delivery consists of more than 100 bundles, in which even 10 bundles shall be sampled.

#### 15.3.2 Control Testing

For ordinary control testing, the prevailing temperature and humidity conditions are satisfactory. In controversial cases, the specimens shall be tested at 70 degrees F. (21 degrees C.) and at 50-65% relative humidity after being exposed to this condition for 72 hours. Such tests may be made in any accredited commercial testing laboratory satisfactory to both buyer and seller.

#### 15.3.3 Thickness

Twenty readings shall be made, two on each of the ten test specimens cut 10 X 10 inches (254 X 254 mm). Each of the twenty individual readings shall not vary over 0.003 inch (0.076 mm) above or below the



designated nominal thickness. In test reports thickness shall be expressed in decimal parts of an inch.

#### 15.3.4 Density

The density is computed from the thickness and the weight per unit area. The latter is determined by measuring the dimensions of each of the ten specimens used for the thickness determination to an accuracy of 0.1 inch (2.54 mm), and weighing each specimen separately in grams. The density is computed according to the following formula:

$$\text{Density (Grams/cubic cm)} = \frac{\text{weight of one test specimen in grams}}{\text{Area of test specimen in sq. inches} \times \text{Thickness of test specimen in decimal parts of an inch}} \times 16.39$$

The density of each of the individual test specimens shall fall between the limits prescribed for minimum-maximum density cited in Section 15.1.3, Cover Board: Density, of this document.

#### 15.3.5 Bursting Strength

In determining the bursting strength, twenty bursts shall be made, one on each side of the ten test specimens. The average of the twenty bursts shall be reported as the average bursting strength. The average bursting strength shall not be lower than the figures given under specific requirements for the designated nominal thickness. See Table 1, Section 15.2, Cover Board: Thickness, Bursting Strength and Flexural Properties, of this document.

#### 15.3.6 Flexural Properties

The flexural properties shall be determined with a tensile testing machine, using an attachment by means of which a load is applied with the loading clamp to the specimen at midspan between two parallel supports 3 inches (76mm) apart suspended from the upper clamp of the tester. The ends of the test specimen shall be equidistant from the supports. The load is applied to the board at the rate of 12 inches (305mm) per minute. The load in pounds required to break the specimen is recorded as breaking load and the deflection in inches at rupture is recorded as deflection rupture (a recording device should be provided for convenience in measuring deflection).

Ten test specimens, 1 X 5 inches (25 X 127 mm), shall be cut in each direction of the board and tested for flexural properties. Two results shall be reported for breaking load; the average of the 10 tests on samples cut lengthwise, and the average of 10 tests of samples cut crosswise. These averages shall not fall below the corresponding figures for breaking load given on Table 1, Section 15.2, Cover Board: Thickness, Bursting Strength and Flexural Properties, of this document for the designated nominal thickness. Two results shall be reported for deflection at rupture; the average of the 10 tests on samples cut lengthwise, and the average of the 10 tests of samples cut crosswise. These averages shall not fall below the corresponding figures for breaking load given in Table 1, Section 15.2, Cover Board: Thickness, Bursting Strength and Flexural Properties, of this document for the designated nominal thickness.

**16.0 Reinforcing Material**

**16.1 Reinforcing Cloth for Endpapers**

Endpapers shall be reinforced with cotton cloth that shall meet or exceed the following specifications:

<b>Specification</b>	<b>Warp</b>	<b>Fill</b>
Threads per inch (cm)	77 (33.3)	72 (28.3)
Tensile Strength - Strip Method	45 lbs/inch (8kg/cm)	20 lbs/inch (3.6 kg/cm)

Alternative material for reinforcing endpapers (including synthetic material) may be substituted for cotton cloth providing that it meets or exceeds the performance of the cotton cloth specified above, as evidenced by an independent testing laboratory.

**16.2 Spine Lining Material**

**16.2.1 Sewn Text Blocks**

The spine lining material for sewn text blocks shall be a cotton cloth weighing no less than 4 ounces per square yard (135.6 g/sq.m) and shall meet or exceed the following specifications:

<b>Specification</b>	<b>Warp</b>	<b>Fill</b>
Threads per inch (cm)	45 (17.7)	38 (15)
Tensile Strength - Strip Method	54 lbs/inch (9.6 kg/cm)	42 lbs/inch (7.5 kg/cm)

Alternative material for lining spines (including synthetic material) may be substituted for cotton cloth providing that it meets or exceeds the performance of the cotton cloth specified above, as evidenced by an independent testing laboratory.

#### 16.2.2 Adhesive Bound Text Blocks

The spines of adhesive bound text blocks shall be lined with a stretchable fabric that does not split if the volume is rounded and backed.

The performance of stretchable material for lining the spine shall meet or exceed the following specifications:

<b>Test</b>	<b>Warp</b>	<b>Fill</b>
Tensile Strength, lbs/inch (kg/cm)	75 (13.4)	27 (4.82)
Tear Resistance, oz (grams)	15.80 (448)	23.13 (656)

### 17.0 Covering Materials

Specifications are set forth for the following covering materials:

#### 17.1 Group E Equivelant

Group E equivalent covering materials shall be impregnated with a non-migratory resinous material and shall exceed or conform to the performance requirements for Group E Buckram of ANSI Standard L29.1-1977 (R1984), "Fabrics for Book Covers," as listed below.

Abrasion Resistance, Test 5302	175 cycles
Breaking Strength, Test 5102	
Warp	100 lbs. (45.3 kg)
Filling	55 lbs. (24.9 kg)
Sum	165 lbs. (74.8 kg)
Colorfastness, Test 5660	Fair after 40 hours
Grease Resistance	None within 5 minutes
Tear Strength, Test 5132	
Warp	900 grams
Filling	900 grams
Water Resistance	No penetration in 10 minutes
Odor	Free of marked odor

### 17.2      Group C-1 Equivelant

Light-weight volumes (i.e., those weighting less than 2 pounds) may be covered with Group C-1 equivalent covering material. These materials shall exceed or conform to the performance requirements for Group C-1 of ANSI standard L29.1-1977 (R1984), "Fabrics for Book Covers", as listed below.

Abrasion Resistance, Test 5302	100 cycles
Breaking Strength, Test 5102	
Warp	64 lbs. (29.03 kg)
Filling	48 lbs. (21.77 kg)
Sum	112 lbs. (50.8 kg)
Colorfastness, Test 5660	Fair after 40 hours
Grease Resistance	None within 5 minutes
Tear Strength, Test 5132	
Warp	512 grams (18.05 oz.)
Filling	448 grams (15.80 oz.)
Water Resistance	No penetration in 10 minutes
Odor	Free of marked odor

### 17.3      Type II Saturated Paper or Laminated Paper Equivalent

Light-weight volumes (i.e., those weighting less than 2 pounds) may be covered with Type II saturated paper, pre-printed laminated paper, or their equivalents. These materials shall exceed or conform to the performance requirements listed below.

Abrasion Resistance, Test 5302	125 cycles
Breaking Strength, Test 5102	
Warp	25 lbs. (11.3 kg)
Filling	40 lbs. (18.1 kg)
Sum	65 lbs. (29.4 kg)
Colorfastness, Test 5660	Fair after 40 hours
Grease Resistance	None within 5 minutes
Tear Strength, Test 5132	
Warp	100 grams
Filling	100 grams
Water Resistance	No penetration in 10 minutes
Odor	Free of marked odor

## **18.0 Adhesives**

### **18.1 Adhesives for All Processes**

Adhesives used in all processes shall be capable of forming a permanent bond between the surfaces to be joined. The adhesive force shall be of such quality that the bonded materials cannot be separated without damaging them. Adhesives shall neither discolor when they are applied, nor after long term aging.

### **18.2 Adhesives for Double-Fan Adhesive Binding, Gluing the spine and Lining Up the Spine**

Adhesives used for double-fan adhesive binding and for lining up the spine shall be an emulsion copolymer of the internally plasticized polyvinyl acetate adhesive that is flexible and that will not cross link on long term aging at normal room temperature range of 77-86 degrees Fahrenheit (25-30 degrees Celsius).

### **18.3 Adhesives for PUR Binding**

Page attachment by PUR adhesives shall meet or exceed the following specifications:

<b>Test</b>	<b>Book Specifications</b>	<b>Performance</b>
Page Pull Test after flexing	8.5 x 11 x 2 inch (21.59 x 27.94 x 5.08 cm) volumes, 60lb (89 gsm) coated paper (cross grain)	70 lbs. (31.75 kg)

LTP Openability Test	8.5 x 11 x 2 inch (21.59 x 27.94 x 5.08 cm) volumes, 60lb (89 gsm) coated paper (cross grain)	7.9 inches (20.06 cm)
Tumble Test: rounded & backed	8.5 x 11 x 2 inch (21.59 x 27.94 x 5.08 cm) volumes, 60lb (89 gsm) coated paper (cross grain)	600 tumbles
Tumble Test: flat-backed	8.5 x 11 x 2 inch (21.59 x 27.94 x 5.08 cm) volumes, 60lb (89 gsm) coated paper (cross grain)	300 tumbles

#### 18.4 Adhesives for Making the Case

The adhesive used for making the case shall have good long-term aging characteristics. It shall be a high grade animal glue or polyvinyl acetate emulsion adhesive.

#### 18.5 Adhesives for Casing In

Text blocks shall be cased in using a polyvinyl acetate emulsion adhesive with good long-term aging characteristics. The adhesive used for casing-in shall be compatible with the adhesive used to make the case, so that the case adheres tightly and securely to the text block. Adhesion of the covering material to the spine lining and endpapers in the joint is critical.

### **19.0 Thread**

#### 19.1 Thread for Oversewing

Thread for oversewing shall be at least equal to Federal Specifications A-A-52094A of March 30, 2007 for cotton thread; and Federal Specifications A-A-59826 of March 3, 2009 for nylon thread.

#### 19.2 Thread for Side Sewing

Thread for side sewing shall be at least equal in performance to cotton thread No. 14-4 cord.