

Library of Congress Preservation Directorate
Specification Number 800-801 – 16
Specifications for Pressure Sensitive Adhesive Security Strips
For Application in the Spine Hollow of Bound Books

This specification is provided as a public service by the Preservation Directorate of the Library of Congress. Any commercial reproduction that implies endorsement of a product, service, or materials, in any publication, is strictly prohibited by law. This Specification is written for L.C. purchasing purposes and is subject to change when necessary. If you are reading a paper copy of this specification please check our website for the most up-to-date version.

Scope

Security devices that meet the requirements set forth in this specification are intended for use in the spine hollow of bound books designated as *General Collection* materials only. *These devices are not intended for use on rare or highly valuable materials, or application to photographic materials.*

1. Composition and Chemical Requirements

1.1 Carrier

The type of carrier will be specified on the purchase order, selected by the user for the intended application, from the following list of options. The selected material must meet the composition requirements as stated.

1.1.1 Polyester

The polyester may be a clear, colorless, or white opaque film, 1 – 2 mil thick. The polyester must be biaxially oriented, non-recycled film, with no plasticizers added.

1.1.2 Polypropylene

The polypropylene may be a clear, colorless, or white opaque film, 1 – 2 mil thick. Biaxial orientation is preferred.

1.1.3 Paper

The paper must meet the composition and chemical requirements stipulated in Library of Congress Specification 100-100, section 1.

1.2 Adhesive

The pressure-sensitive adhesive layer must possess high permanence characteristics such that the strips, once applied, remain attached permanently and can be removed only with difficulty. The adhesive must be clearly identifiable as an acrylic polymer or copolymer by its infra-red spectrum.

2. Physical and Performance Requirements

2.1 Flexibility

The carrier must remain flexible and not become brittle when exposed for 28 days at 80° C and 50% RH.

2.2 Bond Strength

The adhesive must demonstrate sufficient initial bond strength for the label to support a test weight of 25 grams for 10 minutes on 3 mm wide strips, and for 55 grams on 7 mm wide strips.

2.2.1 Test Method

This procedure is a 90 degree peel test, modified from ASTM D 2860. The bonding strength of the adhesive to two different substrates is assessed. Test Panels used in this test are LC Standard Test Panels BT-1 and BT-2. The materials used for these LC Standard Test Panels have been selected to represent paper and cloth materials typically used to line the spines of bound volumes, applied to 3 x 6 inch sections of 40 pt. board stock meeting LC Specification 300-300. Information on the composition of LC Standard Test Panels can be obtained from the Library of Congress Preservation Research and Testing Division.

2.2.1.1 Application and Curing

A set of three test strips is applied to each of the two Test Panels over a Mylar window that permits only a one inch square area of the adhesive side of the label to be in contact with the substrate, as illustrated in ASTM D 2860, procedure B. The labels are set in place by applying firm pressure with the edge of a 3M plastic applicator, model no. P.A.-1., to the labels in four downward strokes. The test samples are then allowed to cure for 7 days in an environmental chamber conditioned to 23°C and 50% RH.

2.2.1.2 Test and Evaluation

At the end of this dwell time the appropriate weight is suspended from the free end of the strip and timed for 10 minutes. At the end of this test period, the test strip must not have peeled away from the substrate by more than 10 millimeters. Failure of this test with any of the test panels will disqualify the stock and no further testing need be performed.

2.3 Bond Strength after Accelerated Aging

The adhesive, once set after the initial 7-day dwell time, must remain permanently affixed to both the carrier and the substrate with no loss of adhesive strength for the life of the object to which it is applied, under conditions of normal use.

2.3.1 Test Method

This procedure is a 90 degree peel test, modified from ASTM D 2860. Test Panels for this test will be the same as that used to test initial bond strength.

2.3.1.1 Application and Exposure

A set of three test strips is applied to each of the two Test Panels in the same manner as described in section 2.2.1.1. The test strips are then subjected to accelerated aging at 80°C and 50% RH for 28 days. At the end of the aging period the test samples are placed in an environmental chamber conditioned to 23°C and 50% RH for 24 hours.

2.3.1.2 Test and Evaluation

At the end of the conditioning period the peel test is performed as in section 2.2.2.2. At the end of this test period, the test strip must not have peeled away from the substrate by more than 10 millimeters.

2.4 Security Strip Operation

The security strips must be compatible with and function as intended with the Knogo brand “Chamelion” Theft Detection system. The security strips must be inconspicuous, not interfere with the use of library materials, or activate an alarm system (other than the EAS system). If there is more than one security strip affixed to an item, there shall not be any adverse effect on the detection capability. Security strips will be the permanently active (always on) type.

2.4.1 Verification of Performance of Magnetic Strip

Before Quality Assurance laboratory testing is conducted, the performance of the security strip as a theft detection device will be evaluated by testing the magnetic strips in conjunction with the Library’s model of book theft detectors (Knogo brand “Chamelion” model 2971-WA). Both pre-award and post-award security strips must pass Library testing. Random sample testing will be conducted on each shipment received.

2.4.1.1 Test Equipment

The Library will use a calibration tag and a testing device capable of measuring the signal level from a tag. The calibration tag will be a tag from the Library’s stock that is known to function at an acceptable level. The testing device is a custom made electronic device that can stimulate the tag with an electro-magnetic field and then read the response of the tag to that field. The device has a display that reads in value from 0.0000 to 2.0000.

2.4.1.2 Test Procedure

A calibration tag will be used to determine the position on the testing device that causes a display reading of 1.00. Ten tags will be randomly selected from a manufacturer’s shipment. Each of the sampled tags will be positioned on the testing device in the 1.00 reading position. The reading will be recorded on a copy of the following sheet.

2.4.1.3 Pass / Fail Criteria

All ten samples must have a reading of 0.70 or better for the shipment to be accepted.

3. Product Requirements

3.1 Construction

The security devices must be provided on a release liner that will allow for easy and complete peeling of the strips from the liner without shearing of the adhesive layer.

3.2 Workmanship

All edges must be cut square and clean, and sizes accurate.

3.3 Dimensions

Any variation from the dimensions of the security strips as set forth in this specification must be discussed in advance with the purchaser. Designated lengths for the strips will be noted on the purchase order.

3.3.1 Width

The width shall be 3 – 7 mm. Dimensional tolerance is $\pm 0.5\text{mm}$.

3.3.2 Length

The length shall be 89 – 127 mm. Dimensional tolerance is $\pm 1\text{mm}$.

3.4 Odors

The security strips must not emit odors deemed objectionable or hazardous to the work environment by the Library of Congress, when evaluated as described in TAPPI T 483.

3.5 Shelf-Life

The adhesive must have a minimum one year usable shelf-life such that the initial adhesion strength will be the same for strips applied up to one year after the original delivery date under ambient storage conditions.

4. Packaging and Identification

4.1 Inner Packages

Each package must plainly identify the type, size and number of items within, the name of the supplier or manufacturer, year of manufacture, and manufacturing run or batch number.

4.2 Outer Package

The items must be packed in standard commercial containers that are constructed to ensure that they arrive at the Library of Congress in dry, undamaged condition. The outside of each container must be identified by type, size and number of items within; manufacturing run or batch number; LC Purchase Order / Contract number and line number.

5. Compliance with Specification

5.1 Quality Assurance Testing

The Library of Congress has the right to perform any of the tests set forth in the specification where such tests are deemed necessary to ensure that supplies conform to prescribed requirements.

5.2 Sampling

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

5.3 Methods

Tests will be conducted in accordance with specified test methods of the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), the Technical Association of the Pulp and Paper Industry (TAPPI), and the International Organization for Standardization (ISO). Publications describing these tests may be ordered directly from the technical associations, their websites, or other on-line standards vendors.

5.4 Acceptance

Materials will be accepted when the Library of Congress has ascertained that the products comply with all parts of the specification. A partial list of the physical and chemical requirements and test methods used to ascertain compliance is provided in a quick reference table in section 5.5.

FAILURE TO MEET ANY PART OF THE SPECIFICATION WILL BE CAUSE FOR REJECTION

5.5 Table of Physical and Chemical Requirements and Test Methods

Property	Requirement	Test Method
pH (paper carrier only)	8.0 – 9.5	TAPPI T 509, cold extraction, slurried pulp
Alkaline Reserve (paper)	2 – 5%	TAPPI T 553, slurried pulp
Lignin (paper)	Negative / Kappa 5	TAPPI T 401, Appendix F or TAPPI T 236
Alum Rosin Sizing (paper)	Negative	TAPPI T 408
Adhesive Composition	Acrylic	FTIR
Bond Strength, (3 mm) 7 day dwell	25g, ≤ 10 mm peel	ASTM D 2860 (modified)
Bond Strength, (3 mm) aged	25g, ≤ 10 mm peel	ASTM D 2860 (modified)
Bond Strength, (5 mm) 7 day dwell	55g, ≤ 10 mm peel	ASTM D 2860 (modified)
Bond Strength, aged	55g, ≤ 10 mm peel	ASTM D 2860 (modified)

5.6 Certification of Performance of Magnetic Strip

Electronic Surveillance Tags – Certification Form	
Test Date	
Individual Performing Test	
Sample Identifiers	
Contract Number	
Shipment Date	
Lot Number	

Test Results Form	
Sample	Meter Reading
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Configuration Management

Date	Revision History
07-Feb-2002	Original document.
14-Dec-2009	Revised and reformatted for release as PDF document.
30-Sept-2016	Revised section 5.5. Editorial update to footer.