

Library of Congress Preservation Directorate

Specification Number 100-100 – 16

Specifications for Paper Stock, Buffered

For the Storage of Artifacts

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.

1. Composition and Chemical Requirements

1.1 Fiber

The stock must be made from rag or other high alpha-cellulose content pulp, minimum of 87%. It must not contain any post consumer waste recycled pulp.

1.2 Lignin

The stock must give a negative reading for lignin as determined by the phloroglucinol test when tested according to TAPPI T 401, Appendix F, and shall have a Kappa number of 5 or less when tested according to TAPPI T 236.

1.3 Impurities

The stock must be free of metal particles, waxes, plasticizers, residual bleach, peroxide, sulfur (which will be less than 0.0008% reducible sulfur as determined by TAPPI T 406), and other components that could lead to the degradation of the paper stock itself, or the artifacts stored therein.

1.4 Metallic Impurities

Iron must not exceed 150 ppm and copper shall not exceed 6 ppm when tested according to TAPPI T 266.

1.5 Optical Brighteners

The stock must be free of optical brightening agents.

1.6 pH

The stock must have a pH value within a range of 8.0 - 9.5 as determined by TAPPI T 509, cold extraction (modified by slurring sample pulp before measurement).

1.7 Alkaline Reserve

The stock must contain an alkaline reserve with a minimum of 2% and a maximum of 5% calculated as CaCO₃ when tested according to TAPPI T 553 (modified by slurring sample pulp before measurement).

1.8 Sizing

Only neutral or alkaline sizing shall be used. No alum rosin or rosin sizing should be used, as determined by TAPPI T 408.

2. Physical and Performance Requirements

2.1 Basis Weight

The basis weight will be specified on the purchase order.

2.2 Color

The color of the stock should be white, off-white, or as specified on the purchase order.

2.3 Color Bleeding

The color must show no bleeding when soaked in distilled water for 48 hours while held under suitable weight in contact with white bond paper. The color must not rub off.

2.4 Color Retention

The color of the stock must not change more than 5 points of brightness as measured by directional reflectance at 457 nm (TAPPI T 452), when exposed 24 hours to a Xenon arc lamp in an Atlas Weatherometer under the following conditions: Irradiance Level: 1.0 watts/m² at 420 nm. Inner filter: Borosilicate glass. Outer filter: clear soda lime glass. Black panel temperature: 50°C. Wet bulb depression: 8.5°C.

2.5 Photographic Activity Test

The stock must pass the Photographic Activity Test (P.A.T.), meeting the criteria stipulated in sections 5.3, 6.3, and 7.2 of ISO 18916. Vendors may wish to confirm that their products pass the P.A.T. before submitting them to the Library of Congress for evaluation. The vendor may wish to send samples to the Image Permanence Institute (Rochester Institute of Technology/IPI, 70 Lomb Memorial Drive, Rochester, NY 14623-5604; Tel: 585-475-5199), or other testing laboratory, to determine conformance prior to submission.

2.6 Surfaces

The surfaces of the stock must be free of fingerprints, dirt, bubbles, knots, shives and other imperfections. The stock should be smooth, e.g., calendered, hot-rolled, and/or water polished.

2.7 Creases and Folds

The stock must not fray, crack or split when folded and/or creased.

2.8 Folding Endurance

The stock must meet the minimum requirement of 75 double folds for fold endurance in the machine direction. Tests will be conducted according to TAPPI T 511, after conditioning according to TAPPI T 402, using a 1 kg load.

3. Product Requirements

3.1 Construction

Construction parameters will be specified on the purchase order.

3.2 Workmanship

Edges must be cut square and clean, and sizes accurate.

3.3 Dimensions

Dimensions will be specified on the purchase order. The allowable tolerance for each dimension is $\pm 1/16$ inch.

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 quick reference table of the physical and chemical requirements and test methods used to ascertain compliance is provided in section 5.5.

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

5.5 Table of Physical and Chemical Requirements and Test Methods

| Property | Requirement | Test Method |
|-------------------|----------------------|---|
| Lignin | Negative / Kappa 5 | TAPPI T 401, Appendix F or TAPPI T 236 |
| Reducible Sulfur | < 0.0008% | TAPPI T 406 |
| Iron | ≤ 150 ppm | TAPPI T 266 |
| Copper | ≤ 6 ppm | TAPPI T 266 |
| pH | 8.0 – 9.5 | TAPPI T 509, cold extraction, slurried pulp |
| Alkaline Reserve | 2 – 5% | TAPPI T 553, slurried pulp |
| Alum Rosin Sizing | Negative | TAPPI T 408 |
| P.A.T. | Pass | ISO 18916 |
| Basis Weight | On purchase order | TAPPI T 410 |
| Folding Endurance | 75 MD | TAPPI T 511 |
| Color Bleeding | No bleed in 48 hours | See section 2.3 |
| Color Retention | ≤ 5 pts | TAPPI T 452 |

Configuration Management

| Date | Revision History |
|--------------|---|
| 19-Jun-2002 | Initial release of document on website, html format. |
| 14-Dec-2009 | Revised and reformatted for release as PDF document. |
| 30-Sept-2016 | Revised sections 1.1, 1.2, 2.6, 5.5. Deleted 3.4. Editorial update to footer. |