

# Library of Congress Preservation Directorate

## Specification Number 100-100 – 09

### Specifications for Paper Stock, Buffered

### For the Storage of Artifacts

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## 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%, as defined in ISO 18902. 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 ASTM D 1030, X5 spot stains, 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 CaCO<sub>3</sub> 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/m<sup>2</sup> 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.

### **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.

#### **3.4 Marking**

A watermark that identifies the paper or papermaker should appear approximately once every eleven inches in the machine direction.

### **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	ASTM D 1030, X5 or TAPPI 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.