Library of Congress Preservation Directorate
Specification Number 200-222 – 16
Specifications for Folders, Straight Cut, Fold Perpendicular to the Grain
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%. 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 folder 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 slurrying 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 slurrying 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 Thickness and Basis Weight
The stock must meet the following minimum requirements for basis weight as determined by TAPPI T 410.

2.1.1 10 pt. Card
The minimum basis weight should be 145 lbs/ 3,000 ft²

2.1.2 20 pt. Card
The minimum basis weight should be 250 lbs/ 3,000 ft²

2.2 Color
The color of the stock should be tan, unless otherwise specified on the purchase order. The color must not be so dark that it obscures color-dependent test evaluations, e.g., spot stain tests.

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, and any adhesives used, 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 and Smoothness
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 following minimum requirements 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.

2.8.1 10 pt Card
The minimum fold endurance must be not less than 750 double folds.

2.8.2 20 pt Card
The minimum fold endurance must be not less than 1000 double folds.

2.9 Stiffness
The stock must meet the following minimum requirements for stiffness. Test will be conducted according to TAPPI T 489, after conditioning by TAPPI method T 402.

2.9.1 10 pt. Card
The minimum internal stiffness must be not less than 80 Taber units in the machine direction and 30 in the cross direction.

2.9.2 20 pt. Card
The minimum internal stiffness must be not less than 380 Taber units in the machine direction and 160 in the cross direction.

2.10 Adhesive
If an adhesive is required, it must not soften or run. The adhesive must not cause the stock to become transparent or alter the color of the stock. The adhesive must not yellow, discolor, or fail (causing delamination) over time. The adhesive should not contain sulfur, iron, copper or other ingredients that may be detrimental to photographic materials, and is required to pass the P.A.T. The adhesive should not contain or generate oxidants. Pressure-sensitive or rubber-based adhesives are not acceptable. When used, the adhesive must not extend beyond the joined area.

3. Product Requirements

3.1 Construction
The fold should be in the longer of the two dimensions of the folder. The grain (machine direction) of the folder stock must run perpendicular to the fold. (Illustration below)
3.2 Workmanship
The folders must be cut straight with squared sides. The sizes must be accurate. The edges must be smooth and even and meet exactly. There must be minimal planar distortion upon visual inspection.

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

3.4 Thickness
The thickness of the card will be specified on the purchase order.

3.5 Marking
Each folder must be marked with the name of the manufacturer, year of manufacture, and the actual pH.

3.5.1 Placement and Size
The identifying information must not be larger than 2 1/2 inches long and 1 1/2 inches high. It should be centered on the back flap of each folder.

3.5.2 Marking Method
The information can be stamped in ink or embossed.

3.5.2.1 Ink Stamping
The stamping must be done on the outside of the folder. The ink must pass the Photographic Activity Test as described in ISO 18916. The ink must not smear, fade, or rub off after drying. The ink must not run, bleed through, or transfer to other materials if it becomes wet. There must be no ink on the interior of the folder.

3.5.2.2 Embossing
The embossing must be done such that the raised text is to the outside of the folder. The impression should be as light as possible while still being legible.
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

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lignin</td>
<td>Negative / Kappa 5</td>
<td>TAPPI T 401, Appendix F or TAPPI T 236</td>
</tr>
<tr>
<td>Reducible Sulfur</td>
<td>&lt; 0.0008%</td>
<td>TAPPI T 406</td>
</tr>
<tr>
<td>Iron</td>
<td>≤ 150 ppm</td>
<td>TAPPI T 266</td>
</tr>
<tr>
<td>Copper</td>
<td>≤ 6 ppm</td>
<td>TAPPI T 266</td>
</tr>
<tr>
<td>pH</td>
<td>8.0 – 9.5</td>
<td>TAPPI T 509, cold extraction, slurried pulp</td>
</tr>
<tr>
<td>Alkaline Reserve</td>
<td>2 – 5%</td>
<td>TAPPI T 553, slurried pulp</td>
</tr>
<tr>
<td>Alum Rosin Sizing</td>
<td>Negative</td>
<td>TAPPI T 408</td>
</tr>
<tr>
<td>P.A.T.</td>
<td>Pass</td>
<td>ISO 18916</td>
</tr>
</tbody>
</table>
| Basis Weight            | 10 pt: 145 lbs./3,000 ft²  
                          | 20 pt: 250 lbs./3,000 ft²   | TAPPI T 410                                      |
| Folding Endurance       | 10 pt: 750 MD        | TAPPI T 511                                      |
|                         | 20 pt: 1,000 MD      |                                                  |
| Color Bleeding          | No bleed in 48 hours | See section 2.3                                  |
| Color Retention         | ≤ 5 pts              | TAPPI T 452                                      |
| Stiffness               | 10 pt: 80 MD, 30 CD  
                          | 20 pt: 380 MD, 160 CD                          | TAPPI T 489                                      |

### Configuration Management

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision History</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-Jun-2002</td>
<td>Initial release of document on website, html format.</td>
</tr>
<tr>
<td>14-Dec-2009</td>
<td>Revised and reformatted for release as PDF document.</td>
</tr>
<tr>
<td>30-Sept-2016</td>
<td>Revised Sections 1.1, 1.2, 2.2, 2.5, 2.6, 2.10, 5.5. Deleted 2.9. Editorial update to footer.</td>
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