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## Tip: Mending Paper with the Lightest Available Japanese Tissue

### INTRODUCTION

Mending and lining damaged paper with precoated tissue (Baker 1990) has been a useful conservation technique for almost 30 years, and many publications since have investigated the materials used to prepare it (notably, Pataki 2009). Over the last 10 years, the conservators, technicians, and interns of Harvard Library's Weissman Preservation Center (WPC) have been putting this literature into practice while continually refining the recipes, preparation, and use of precoated tissues on paper, parchment, and textiles. The most commonly used precoated mending tissues at the WPC are machine-made kozo tissues weighing 5g/m<sup>2</sup> or 3.5g/m<sup>2</sup>. Recently, the WPC staff purchased a roll of the lightest tissue intended for conservation on the market—1.6g/m<sup>2</sup>—and found it to have excellent application as a precoated mending tissue with unmatched invisibility (fig. 1). For example, once precoated with an adhesive such as Klucel G, this tissue is ideal for reinforcing weak areas in paper caused by iron gall ink corrosion without obscuring the writing and for mending tears in transparent papers with minimal show-through. The tissue is the NAJ (National Archives of Japan) Toned *Tengucho* manufactured by Hidaka and is also offered in four other weights by Hiromi Paper of California.

### PREPARATION

Transforming this diaphanous material into a useful mending tissue by precoating it with an adhesive is no more (or less!) difficult than for heavier weight tissues. At the WPC, precoated tissue preparation is a group activity and begins with labelling Mylar D support sheets measuring 8 ½ × 11 in. with tissue grammage, type, vendor, and date using a permanent pen. Next, the tissue can be efficiently cut from the roll in approximately 8 × 10 in. sheets by folding the tissue onto itself repeatedly, creasing sharply with a bone folder as one progresses, and cutting along the folds with a Japanese paper knife. In this way, a few cuts yield many similar-sized sheets.

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For an aqueous adhesive coating, the WPC uses a dilute mixture of wheat starch paste and methyl cellulose. Approximately 8 mL of adhesive is needed per sheet of precoated tissue. Cooked Aytex P wheat starch paste is strained and diluted to “pourable yogurt” consistency with deionized water and mixed with an equal volume of 2.5% A4M methyl cellulose. This mixture is then diluted with the same volume of deionized water to arrive at the final, ready-to-use consistency.

For a nonaqueous adhesive coating (ethanol activated), the WPC prepares a quantity of 5% Klucel G in deionized water (weight/volume). Again, approximately 8 mL of adhesive is required per sheet of tissue. For example, to make 20 sheets of 8 × 10 in. mending tissue, 160 mL of adhesive is needed (8 mL × 20 = 160 mL). Weigh out 8 g of Klucel G powder and slowly mix this into about half the water. When all the powder has been added, fill the container to the 160-mL mark. Let mixture sit overnight to allow the powder to fully gel and for air bubbles to disperse.

### ASSEMBLY

Paste out a continuous and even layer of adhesive mixture onto a labelled Mylar sheet with a Japanese pasting brush presoaked in deionized water. Spray a generous mist of deionized water over the coated Mylar until the adhesive is glossy and margins look frosted with water droplets. Drop the dry tissue sheet onto the Mylar by holding tissue from diagonally opposite corners in a “hammock” shape and allow the bottom of the hammock to touch the adhesive first in the center (fig. 2). If done correctly, the rest of the sheet will roll itself down and out to the edges completely. Avoid touching or tamping the tissue as this will push adhesive through to the front of the tissue. Set aside on a flat surface to dry overnight.

### MENDING

In most circumstances, both the aqueous and nonaqueous versions of this precoated tissue are best applied by wetting it up first and then placing it on the object to avoid



Fig. 1. Strip of 1.6g tissue precoated with 5% Klucel G on a dollar bill. Note hole in tissue caused by tweezers at the edge.

creating tidelines or blurring soluble media. Cut mending strips ( $1/8 \times 3/4$  in. is often a useful size) and small shapes by cutting cleanly through the precoated tissue and partially into the Mylar support sheet using a scalpel blade. With the tip of the blade, scrape up a corner of the mending strip up and peel up the strip using a curved-tip tweezers (fig. 3). This tissue coated with Klucel G is particularly reluctant



Fig. 2. A liberal spray of water on the adhesive coating just prior to dropping the tissue minimizes the chance of wrinkles.



Fig. 3. Lifting a precut mending strip from Mylar support with tweezers: more difficult than it looks.

to come away from the Mylar. Keeping hold of the strip with the tweezers, lay it into the wetting fluid puddled on a dark-colored glazed tile for a second. Then place tissue on object. Tamp down with a brush or lightly burnish down through smooth Hollytex or blotter. Dry under a blotter square, plexi plaque, and weight.

For the aqueous version, it is recommended to add ethanol to the deionized water to create a drier wetting fluid (up to 50/50 mix) to keep this fine tissue from collapsing upon itself before it is placed on the object. Should this happen (and it does!), discard and use a new strip. Because the nonaqueous tissue is wetted in straight ethanol, there is less sagging and manipulation is easier.

#### STORAGE

At the WPC, staff file sheets of precoated tissue in vertical hanging file folders. In theory, these sheets should keep indefinitely, and staff are currently using some weights of tissue prepared years ago. The sheets are organized by increasing grammage. Until a lighter and more useful paper appears, the  $1.6g/m^2$  tissue is at the front!

#### ACKNOWLEDGMENTS

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REFERENCES

- Baker, C. 1990. Polyester screening material: uses in the paper conservation lab. *Paper Conservation News*. 55: 11.  
Pataki, A. 2009. Remoistenable tissue preparation and its practical aspects. *Restaurator*. 30 (1/2): 50-69.

SOURCES OF MATERIALS

NAJ Toned Tengucho (Hidaka) 1.6g/m<sup>2</sup> rolls (19" × 5 m)  
Hiromi Paper Inc.

Aytex P wheat starch paste, A4M methyl cellulose, and Klucel G hydroxypropylcellulose  
Talas

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