

Making Mylar Preservation Rollers for Storing East Asian Scrolls

Hanging scrolls and handscrolls are two of the most common formats for East Asian paintings. Their flexible structures are designed to be unrolled for viewing and rolled up for compact storage.

Of great concern for preserving these formats is the damage caused by rolling the scroll around a rod with a small diameter. This problem typically results in severe creasing and pigment loss.



Two examples of paintings with damage due to being rolled around a small diameter roller rod.

A few methods have been devised to enlarge the diameter of scrolls when rolled to mitigate the problems caused by a small roller rod. The most common solution seen in the West is the wooden roller clamp. First created in Japan a century ago, it is usually known by its Japanese name of *futomaki soejiku*, or simply *futomaki*. The roller clamp is clamped around the roller rod (below left) before the scroll is rolled up for storage (below right). Ideally, this will at least double the diameter of the rolled scroll thereby reducing planar distortion and stress placed on the laminate structure.



The simple, functional solution of the roller clamp has the disadvantage of being made from paulownia wood, an acidic, off-gassing material. Also, it can be used incorrectly, is quite heavy, and is usually difficult and expensive to obtain in the West. With these functional, material, and cost concerns in mind, East Asian painting conservators at the Freer and Sackler Galleries have devised two alternative preservation rollers, one of Ethafoam and one of Mylar. The Mylar preservation roller is described here. The Ethafoam preservation roller is explained separately.



These modern preservation rollers are made of acid-free materials (left) or traditional wood (right). From left are conservation rollers made of: Mylar; Ethafoam with Stockinette; neutral paper tube with Japanese paper sling and scavenger insert; paulownia wood from Japan with closed ends; paulownia wood with open ends; and locally harvested paulownia wood for a roller made in the United States.

To adapt useful features of traditional wooden roller clamps to modern, inert conservation materials, we have designed a Mylar preservation roller. It is easily produced with inexpensive materials that are available in Western conservation facilities, and is comparatively foolproof to use. In addition, it aids in handling hanging scrolls safely, and improves display conditions for handscrolls.



Process for making a preservation roller:

The Mylar preservation roller is made with two thicknesses of Mylar (polyester sheeting) and acid-free double-sided tape. This preservation roller is most suitable for scrolls that measure up to three feet wide. For larger scrolls, the Ethafoam preservation roller is more stable and effective. Instructions for making an Ethafoam preservation roller are available separately on the Freer|Sackler website at ASIA.SI.EDU/RESEARCH/DCSR/EAPCS.ASP.

MATERIALS AND TOOLS NEEDED:

2 thicknesses of Mylar

Double-sided acid-free tape
(1/4 inch width)

Cutting mat

Straight edge

Weights

Mat knife

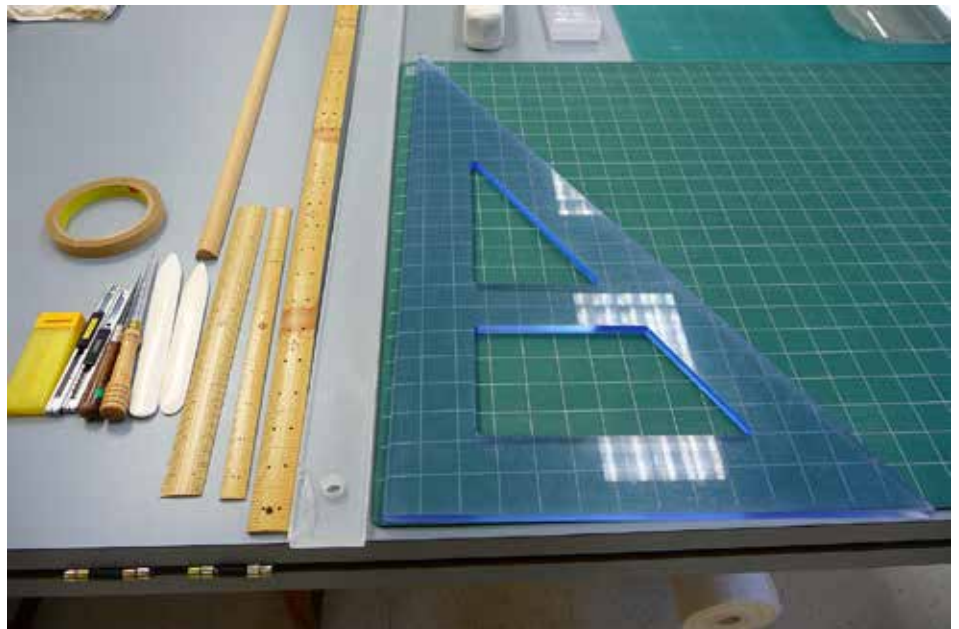
Ruler

Awl

Bone folder

Pencil

Square

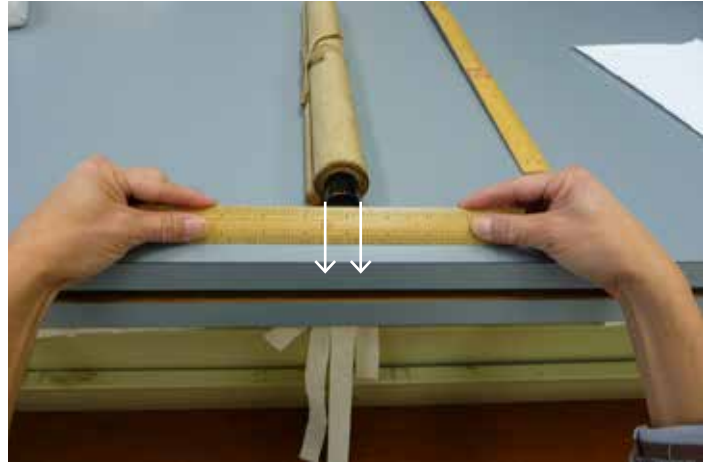


MEASURING THE SCROLL

Two measurements are necessary to fit the Mylar preservation roller to the scroll.



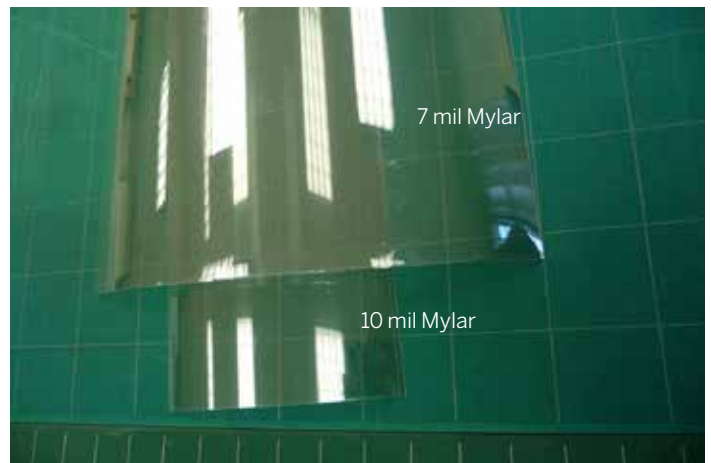
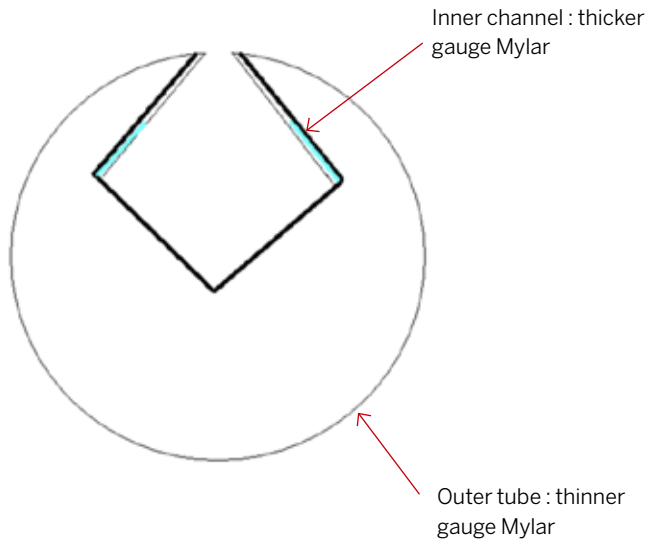
Measure the width of the scroll mounting excluding the scroll knobs. In this case, the scroll mounting is 2 feet 3 inches (27 inches) wide.



Measure the diameter of one scroll knob. In this case, the knob has a diameter of 2 inches.

CALCULATING MEASUREMENTS FOR THE TWO MYLAR SHEETS

Use two thicknesses of Mylar for one roller. Typically, a thinner and more flexible Mylar (5 or 7 mil) works well for the tube of the outer circumference. A thicker and stiffer Mylar (7 or 10 mil) is used to make the inner, folded channel that fits around the rod. Five and seven mil Mylar should be paired to make a roller for a smaller scroll (approximately 18 inches in width). Seven and ten mil Mylar should be paired for a larger scroll (up to three feet in width).



MEASURING MYLAR SHEETS

To start, both Mylar sheets must be slightly longer than the width of the rolled scroll and wide enough to accommodate it.

For the inner channel, the width of the thicker Mylar sheet is calculated as four times the diameter of the roller rod minus 1/4 inch allowance.

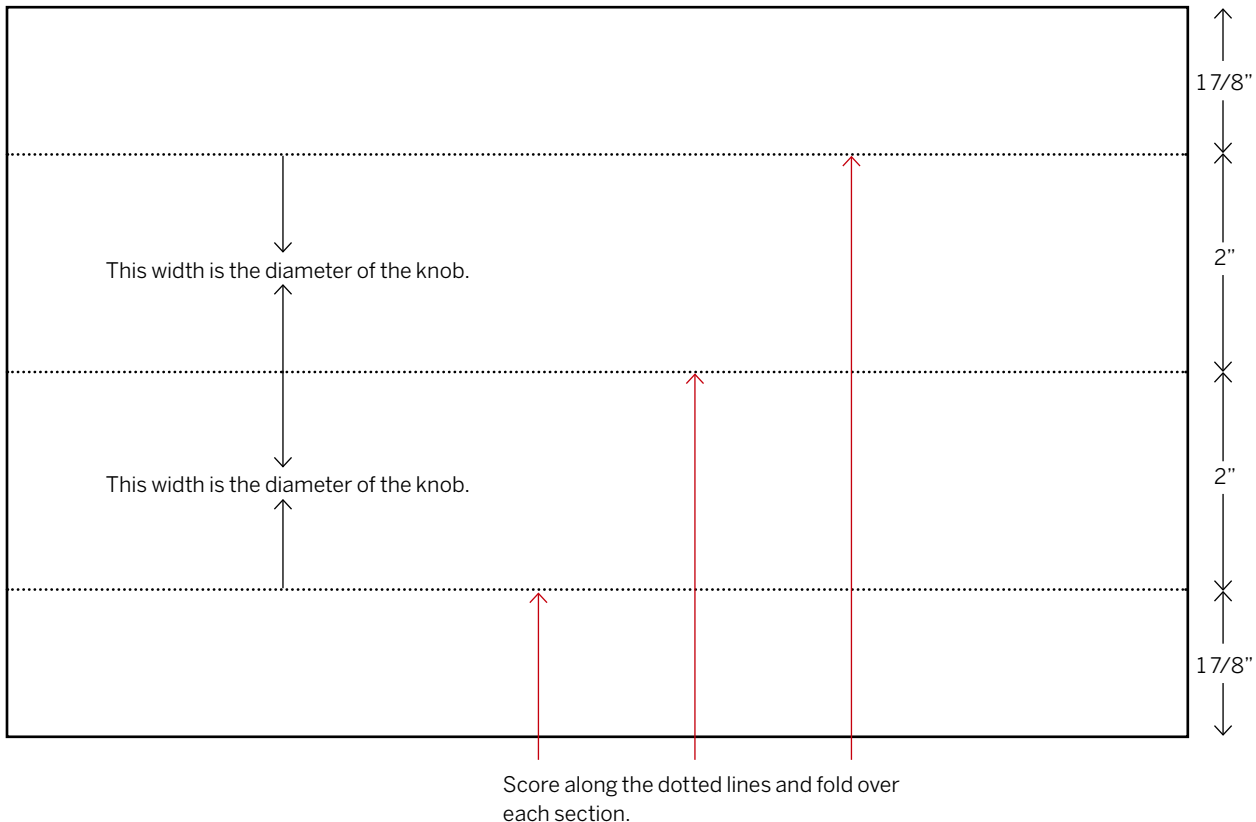
For example, for a roller rod with a 2-inch diameter:
 (2 inches X 4) – 1/4 inch = 7 3/4 inches (width of Mylar sheet)

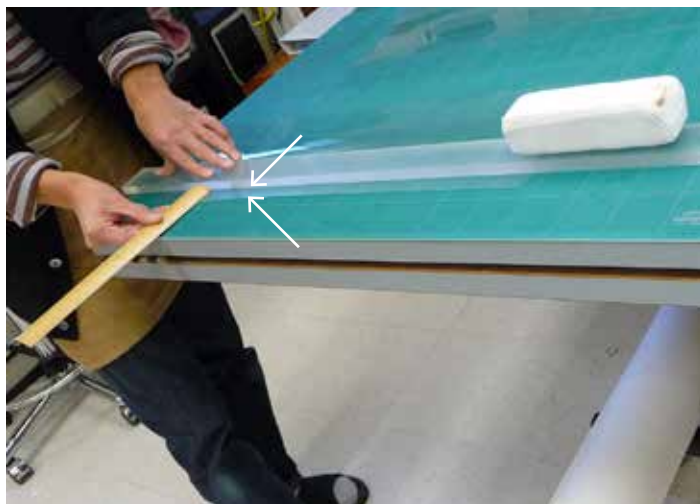
For the outer tube, the width of the thinner Mylar sheet is approximately 1 3/4 times the width of the inner (smaller) piece.

In this case, the measurement is:
 7 3/4 inches X 1.75 = 15 1/2 inches (approximate width of Mylar sheet)

MARKING THE MYLAR SHEET FOR THE INNER CHANNEL

The four-sided channel is measured and scored to fit around the roller rod. The two inner sections are the same width as the diameter of the roller rod (in this case, 2 inches). The two outer sections are the width of the rod minus 1/8 inch (to fit inside the overlapping edges of the Mylar tube sections). For these, the measurement is 1 7/8 inches.

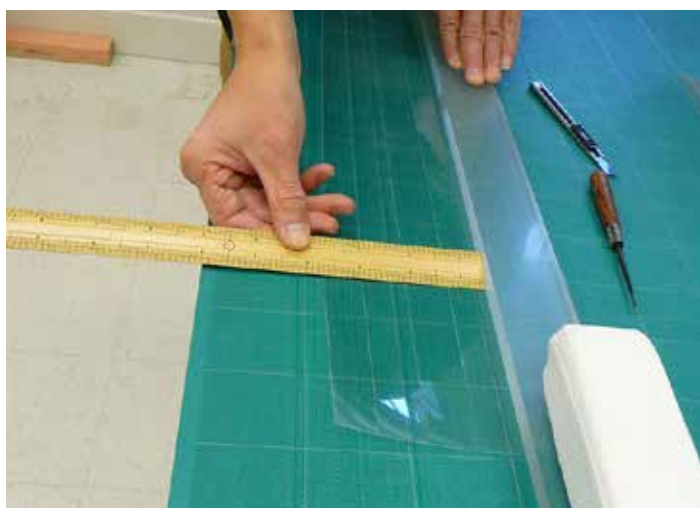




Using a straight edge, weight, and ruler, measure the first section of the inner channel (1 7/8 inches wide).



With an awl, score the Mylar along the straight edge a few times. Score firmly to ensure a sharp edge when the Mylar is later folded.

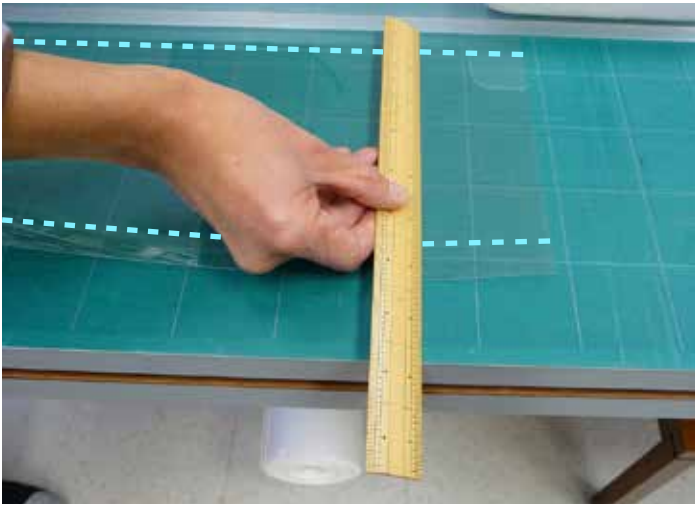


Repeat this process two more times, making both sections 2 inches wide. Measure and score along both lines.

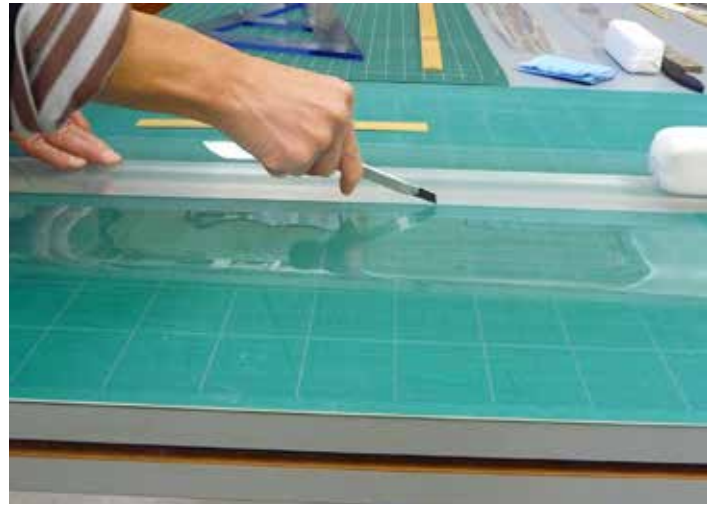


The final section will again be 1 7/8" wide. Trim off excess Mylar from the last section, if necessary.

MEASURING THE MYLAR FOR THE OUTER TUBE



For the thinner Mylar sheet that is 15 1/2 inches wide, measure and score a 2 inch section along the right side. Measure the middle section (11 1/2 inches) from there and score again.

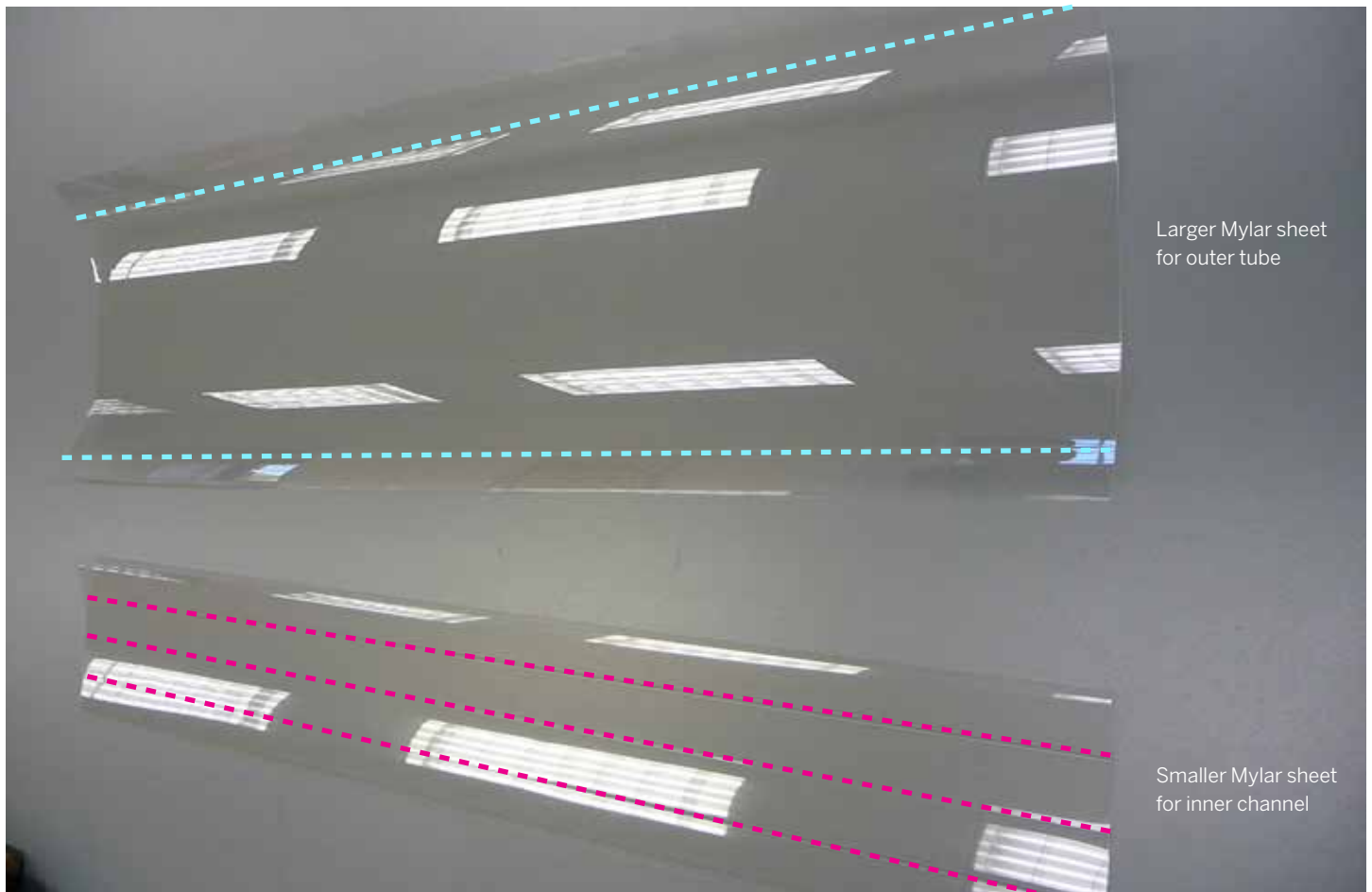


The third section (along the opposite edge) will be 2 inches wide. Trim off any excess Mylar along the edge of the sheet.



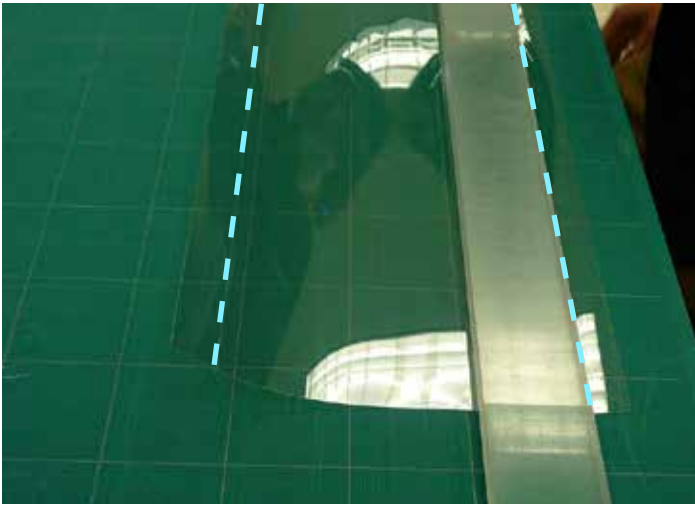
After each piece of Mylar has been marked and trimmed, wipe both sides with a clean cloth to remove any dust that remains from scoring the Mylar.

RESULTS THUS FAR

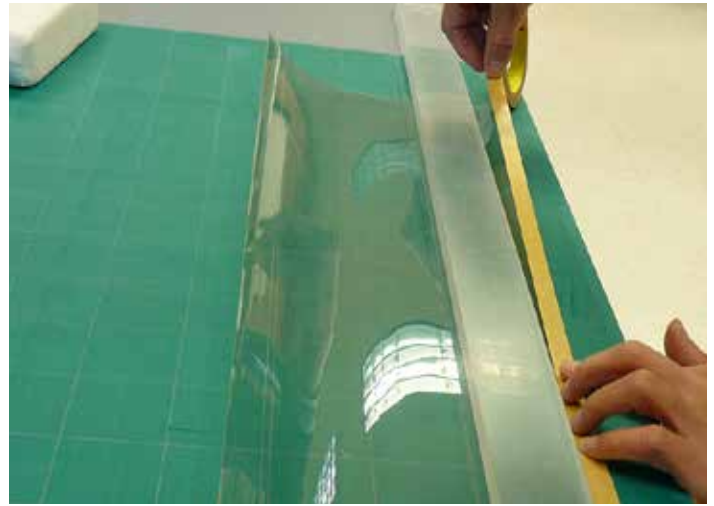


The two pieces of Mylar should look like this. The blue lines indicate the scored lines in the larger thinner sheet. The pink lines indicate the scored lines in the smaller heavier sheet.

APPLYING DOUBLE-SIDED TAPE TO THE MYLAR



Place the larger piece of Mylar on the table with the scored lines facing up. Align the ruler with the scored line. The ruler holds the Mylar sheet in place and provides a guide line for applying the double-sided tape.



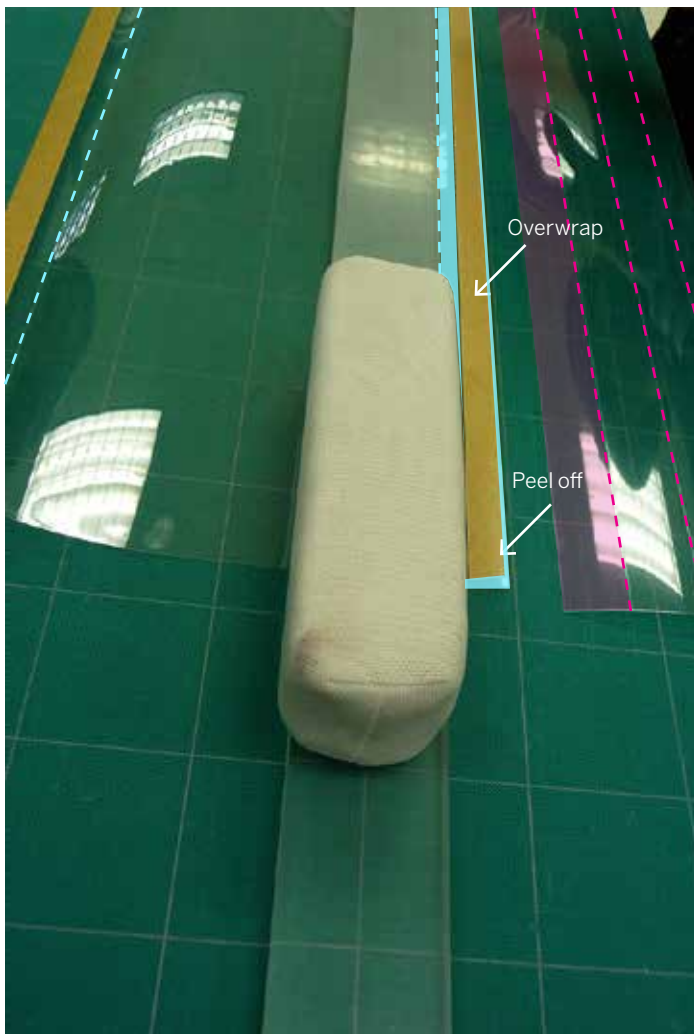
While unrolling the tape, adhesive-side down, align the edge of the tape along the edge of the Mylar with one hand while smoothing the tape into place with the other hand.



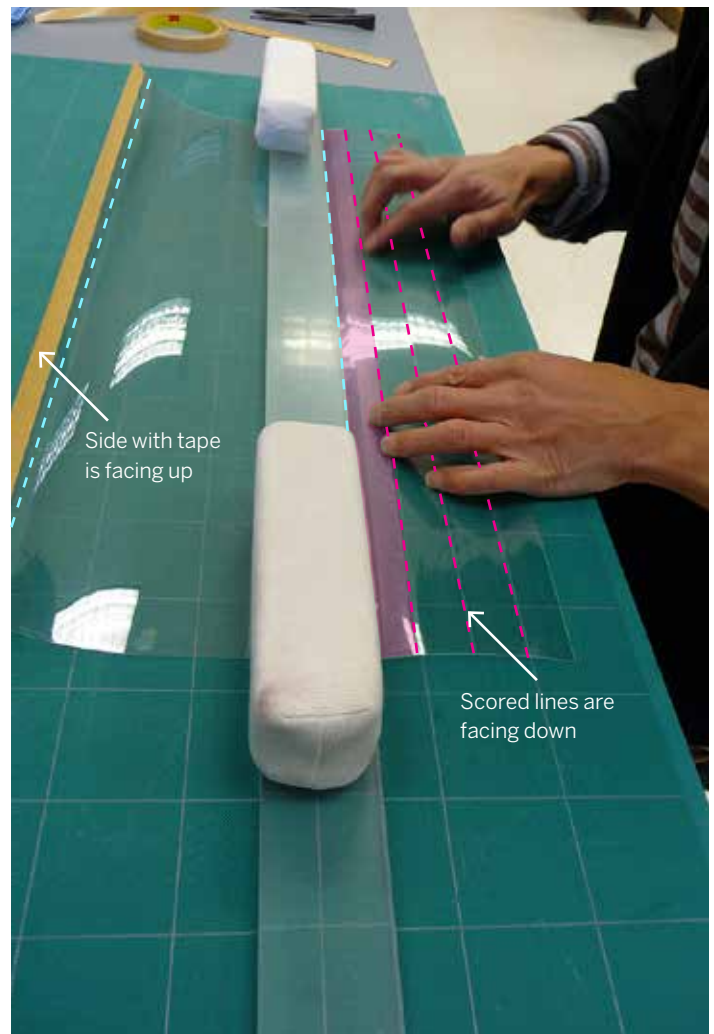
It is important to recess the edge of the adhesive tape inside the edge of the Mylar approximately 1/16 to 1/32 of an inch. This prevents the adhesive from bleeding when the second sheet of Mylar is applied over it.

Repeat this process to adhere a second piece of double-sided tape along the opposite edge of the larger Mylar sheet.

JOINING THE TWO SHEETS OF MYLAR

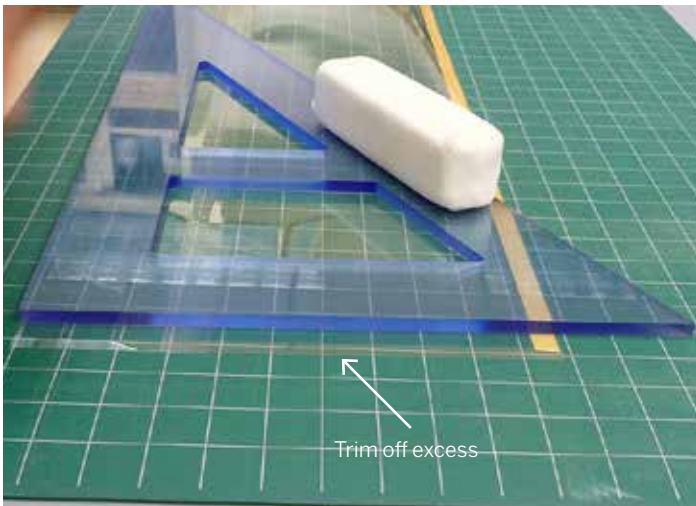


Again, align the straight edge along the scored line of the larger (thinner) Mylar sheet with the adhesive side of the tape facing up. Secure both ends of the straight edge with a weight. Peel off the paper backing of the double-sided tape.

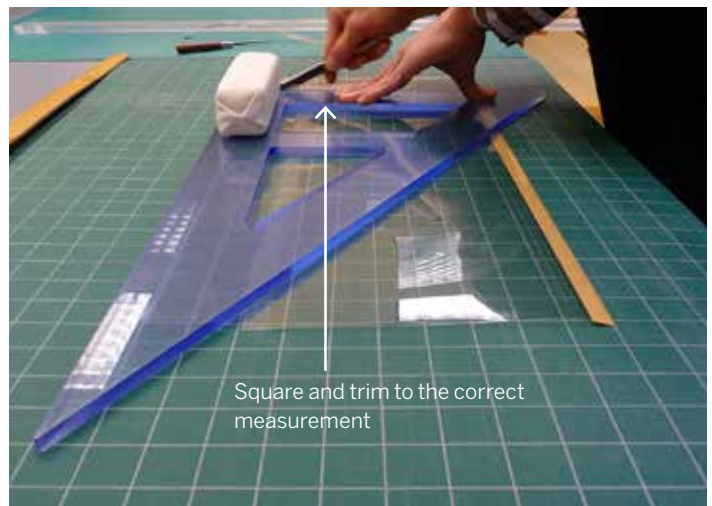


Hold the smaller (thicker) sheet of Mylar scored-side down. Using the straight edge as a guide, align the edge of the Mylar sheet along the straight edge over the double-sided tape. Press firmly along the joint to ensure secure adhesion.

TRIMMING THE LENGTH OF THE MYLAR PRESERVATION ROLLER TO THE WIDTH OF THE SCROLL MOUNTING



Using a square, trim one end of the preservation roller to be square with the long edge.



Using the measurement of the width of the scroll taken earlier, trim the length of the preservation roller to the width of the scroll mounting.

CONFIRMING THE MEASUREMENT

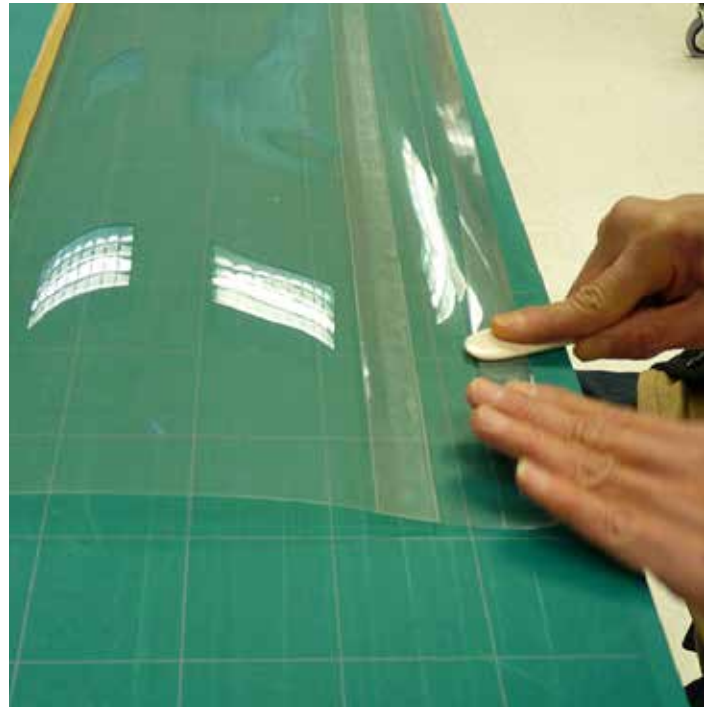


Compare the length of the joined Mylar sheet with the width of the scroll mounting to confirm they are the same.

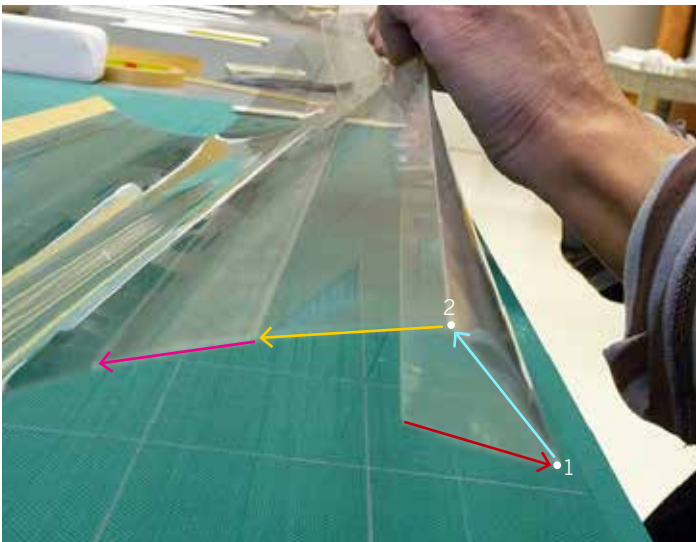
FOLDING THE MYLAR SHEETING



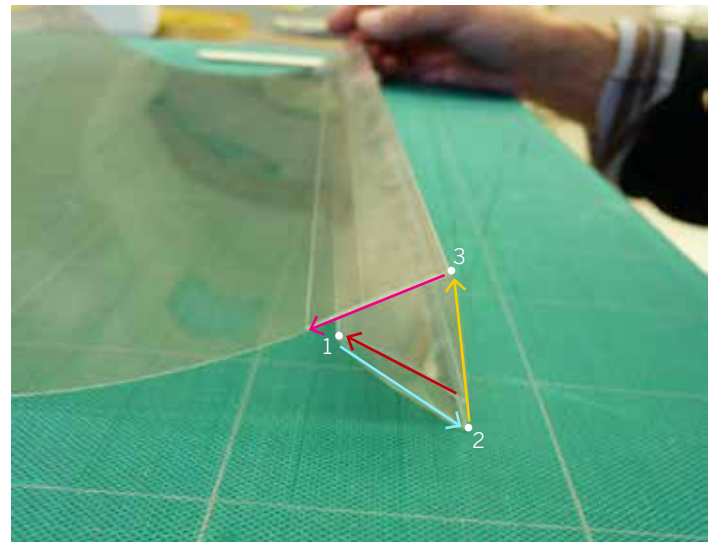
Align the Mylar sheet with the thicker section (inner channel) facing toward you. Start folding the first narrow section along the scored line by using your fingers. Press along the fold with the heel of your hands.



Next, run a bone folder along the fold to make a deep, sharp crease.

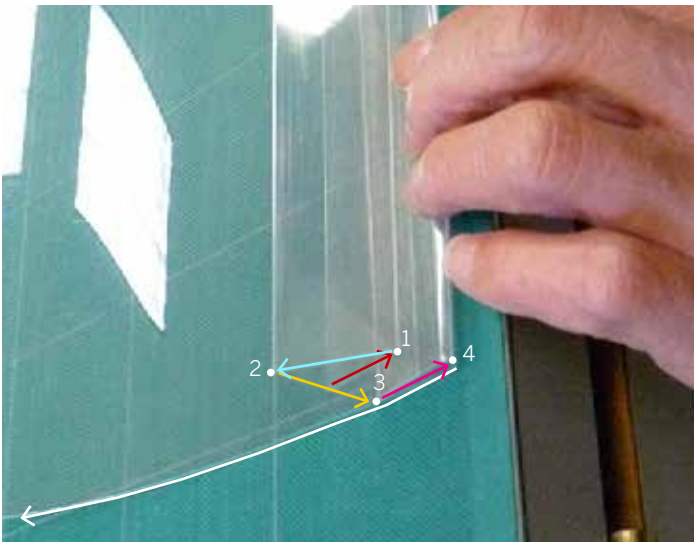


Move to the next scored line and fold over in the same direction using the same method.



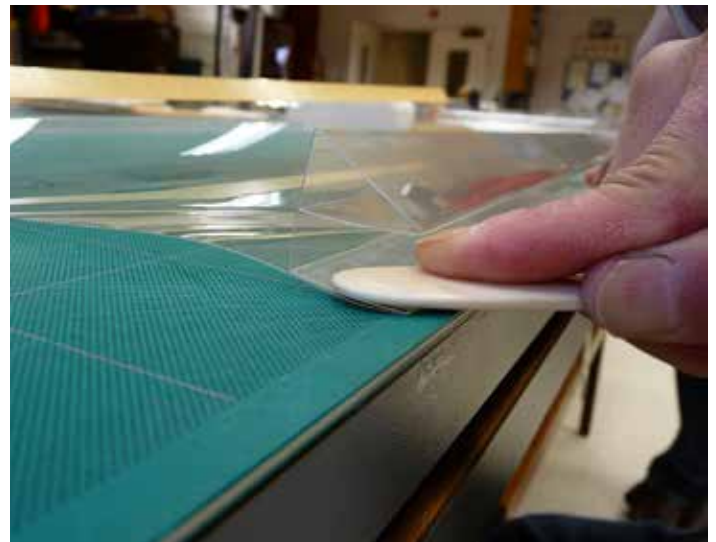
The numbered arrows in the photos indicate the direction and order for folding. Repeat this process for the third fold.

FOLDING THE MYLAR AT THE SEAM OF THE TWO SHEETS



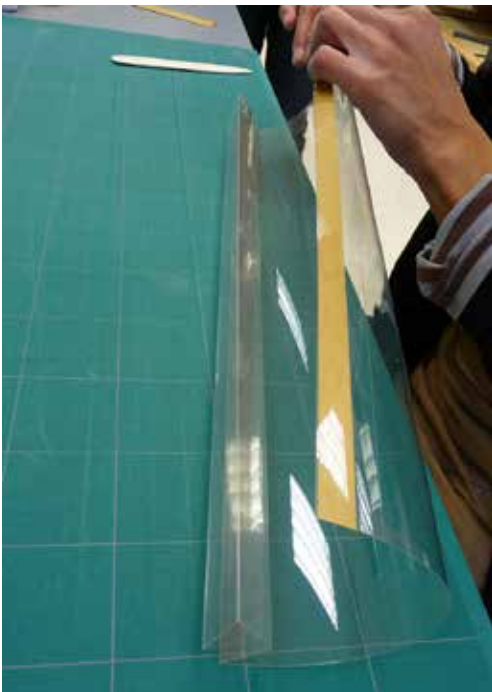
The next fold is at the seam between the two sheets of Mylar. This fold is made in the opposite direction of the previous folds.

The direction and order of the folds are indicated by the numbered arrows in the photo.

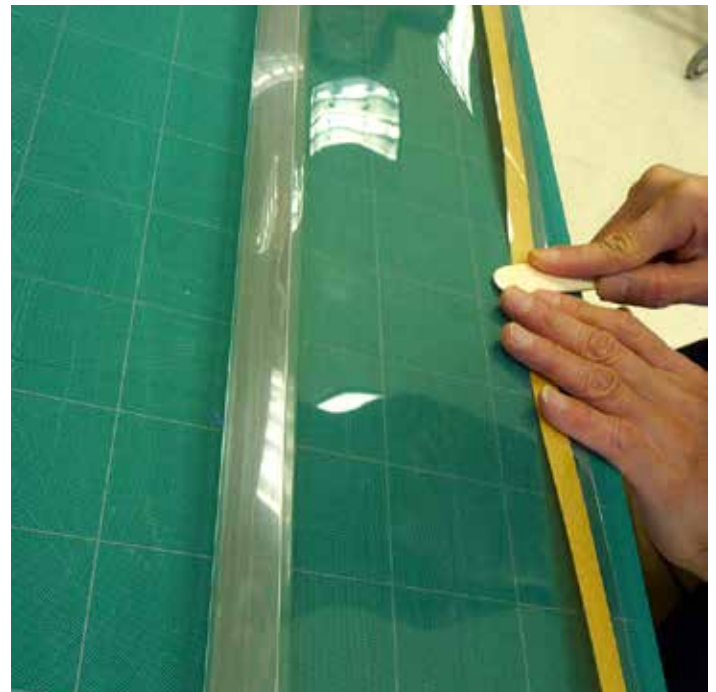


As before, run the bone folder along the fold to ensure a sharp crease.

FINAL FOLD

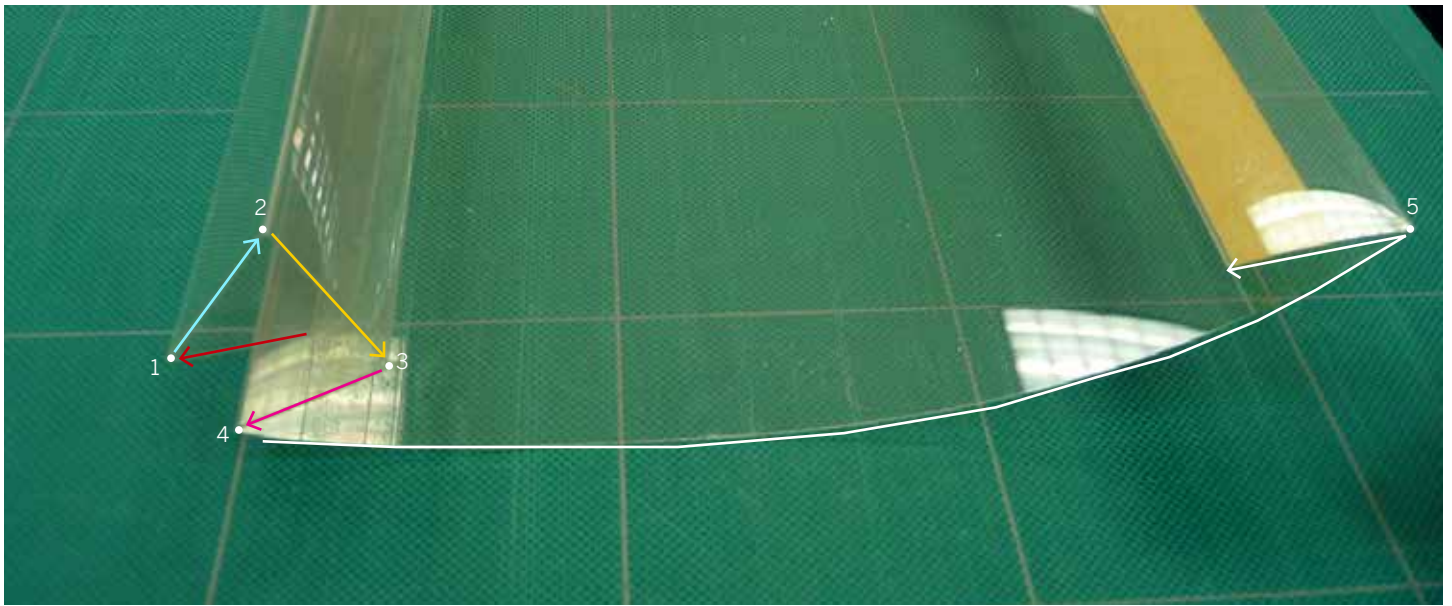


Spin the Mylar sheet around. Fold along the remaining scored line of the Mylar sheet.



Sharply crease the fold. This will make it much easier to complete the preservation roller.

VERIFYING FOLDS



When folding is complete, the mylar sheet should look like this.

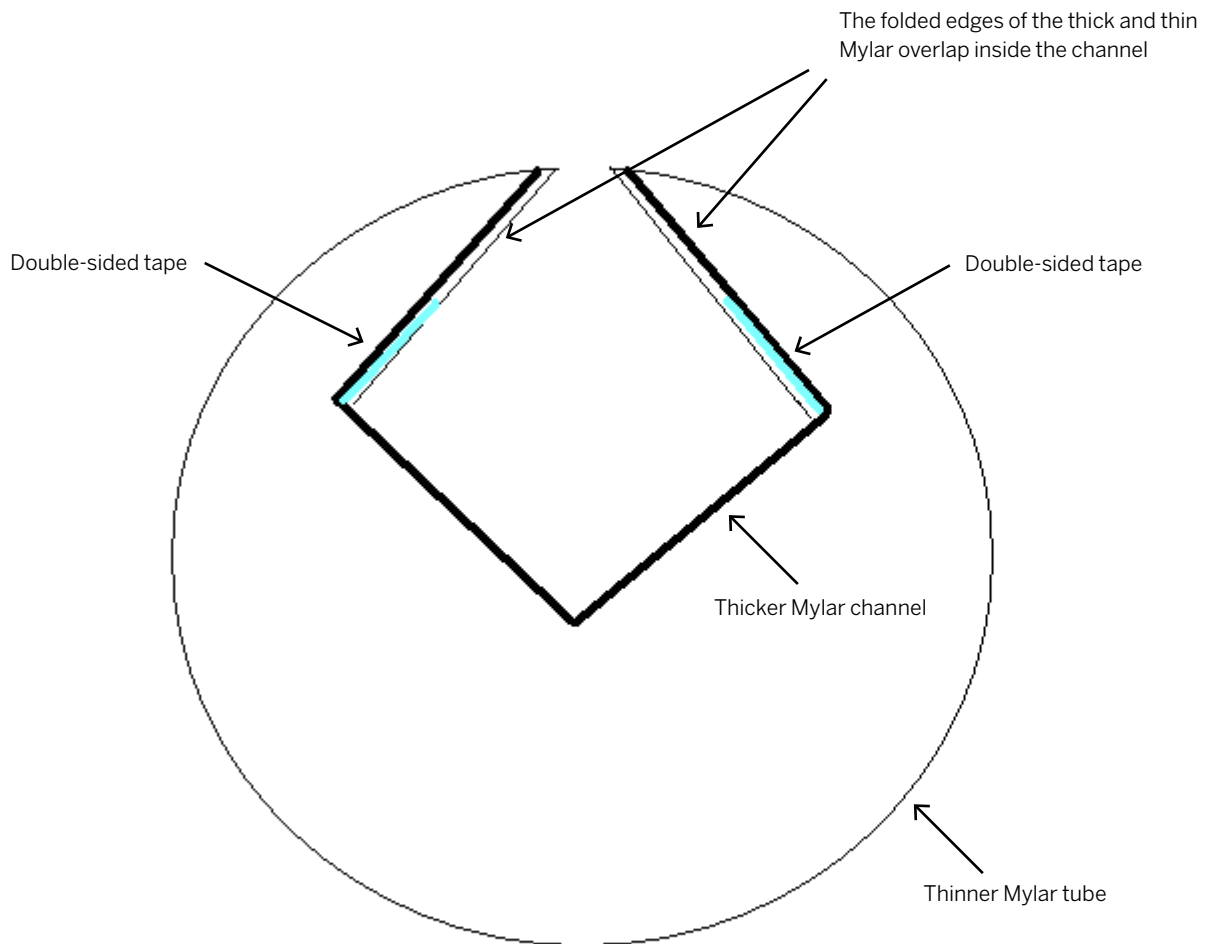
COMPLETING THE SHAPE OF THE PRESERVATION ROLLER



Align the Mylar sheet along the edge of the table. The edge with paper-covered double-sided tape should be closest to you and face up. Place a ruler on top of the Mylar and align its edge with the fold next to the double-sided tape. Place weights on both ends of the ruler for stability. Peel off the paper covering the double-sided tape.



Curl the Mylar sheet over itself and overlap the two folded edges completely. Check that the joint overlaps evenly as you work your way along the seam. Press firmly with your fingers. Run over the seam again with the bone folder to ensure secure adhesion.



This is an end view of how the completed preservation roller should look.

Note that the inside channel forms a diamond shape with an opening along the top.

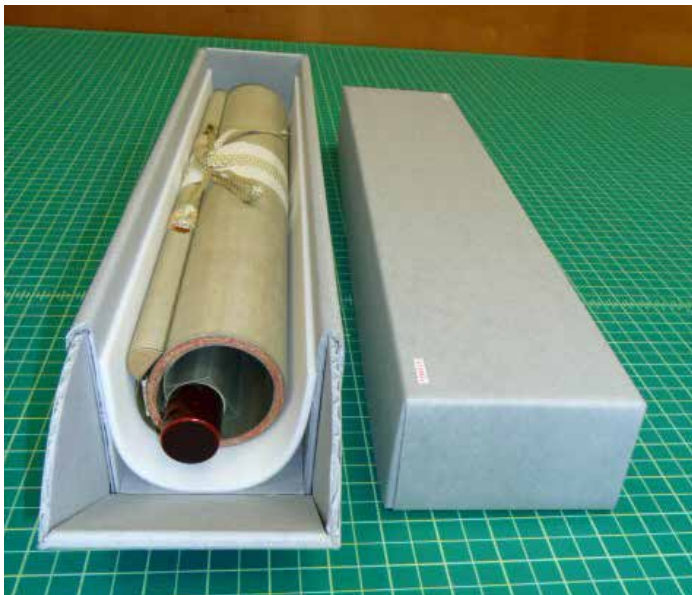
USING THE COMPLETED MYLAR PRESERVATION ROLLER

When placing the preservation roller over the roller rod at the bottom of the mounting, make certain that the preservaton roller is centered on the mounting.





Once the scroll is completely rolled up, secure it with the tying cord.



Store the rolled scroll in a box with lid.

For more information about safe handling procedures and instructions to make the blue board storage box shown here and the Ethafoam Preservation Roller, please see our **Online Resources** on the Freer|Sackler website:

[ASIA.SI.EDU/RESEARCH/DCSR/EAPCS.ASP](http://asia.si.edu/research/dcsr/eapcs.asp)