In this article I will talk about a user-friendly solution to one of the most common needs when it comes to housing books and documents. I will share a couple of tips for retrofitting ready-made archival enclosures with custom spacers. Spacers can provide a more exact fit and therefore a safer archival enclosure for your unique objects. As a conservator for Special Collections at the Iowa State University Library, I am intending this article to benefit members of the public and archivists from small institutions, when hiring a conservator is not in the budget.

The three things everyone wants in their archival box are usually: acid neutral or buffered material that passes the PAT (Photographic Activity Test)\(^1\), proper fit, and ease of assembly. Many commercially available ready-made archival boxes fit that requirement. The problem is that readymade boxes come in predetermined sizes, while rare books and documents do not. Obviously, you should not force your items into a box that is too small for them, which means that you are likely to place them into a box that is too large. However, leaving an empty space in the box around your items can result in damage and condition problems. Freestanding document folders may slump and become curled and misshapen. Books may shift around when the box is taken on and off the shelf, which can cause abrasion to the cover.

The solution to this problem needs to be low cost and should not require highly specialized skills. One such solution involves making custom spacers. Spacers can be made in a variety of ways, using many different materials. You can really get creative with their design and function. The following two examples illustrate simple techniques and hopefully provide a handful of helpful ideas that offer a slightly new way of thinking about things.

**Spacer for a standing document box: Avoid the slump!**

If you have a document box that is not completely filled with freestanding file folders, you can fill that extra room with a handmade spacer or buy a package of ready-made customizable spacers. (fig. 1)

A good way to fill the empty space is to make your own spacer using scraps of corrugated E-flute or B-flute archival board.

A fluted board (fig. 2) consists of a sheet of corrugated paper board that is sandwiched between two sheets of solid paper board. E-Flute board is 1/16” thick, with more flutes per square inch. B-flute board is 1/8” thick, with a larger flute size. Fluted

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\(^1\)The Photographic Activity Test, or PAT, is an international standard test (ISO18916) for evaluating photo-storage and display products. Developed by IPI, this test explores interactions between photographic images and the enclosures in which they are stored. The PAT is routinely used to test papers, adhesives, inks, glass and framing components, sleevings, labels, photo albums, scrapbooking supplies and embellishments, as well as other materials upon request. This test can be performed on products in development as well as on materials already in use in collections. (Venosa, 2016) [https://www.imagepermanenceinstitute.org/testing/pat](https://www.imagepermanenceinstitute.org/testing/pat)
board is lightweight and easy to crease and fold using a bone folder and a ruler. (fig. 3)

It is easiest to crease and fold the board along the flutes, parallel to the faint lines that are visible on the reverse side of the board. You can make a crease by placing your bone folder alongside the ruler and gently pressing the tip of the bone folder against the surface of the board. Then run the bone folder up and down against the edge of the ruler. If you press down too hard, you might make a hole in the top layer of the board. The trick is to apply enough pressure to make an indentation, but not so much pressure that you puncture the surface. Once you have made a crease, you can bend the board at the crease line, encouraging it to fold.

**Making a Crease Line Along the Side of the Ruler**

If you do not have a large enough piece of board with flutes running in the correct orientation, you may choose to crease and fold across the flutes, perpendicular to the faint lines on the board. It is not as easy as creasing along the flute lines, as you will have to apply more pressure to make a crease and work harder to create a sharp fold. (fig. 4)

The documents should be stored in the box in the “landscape” orientation, so the height will be the shorter dimension. Choose a piece of fluted board that will be long enough to accommodate the following: width of the box + 2 x the depth of the box + ~4”.

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First, measure and mark the height of the document stack. Cut off extra board using a sharp utility knife or a board shear if you have access to one. (fig. 5)

Place your piece of board on top of the box so that you can see where the interior starts and ends. Line it up so that the amount of board on either side of the box is approximately the same. Transfer the interior width measurement onto the board. Score, crease and fold the board at the marks. (fig. 6)

Line up your document stack against the side of the box. Measure with a long strip of paper as illustrated in the photo above. The formula for this step is as follows: depth of spacer = depth of box – thickness of document stack. Mark out the depth measurement on either side of the width measurement. (fig. 7)

Line up your document stack against the side of the box. Measure with a long strip of paper as illustrated on the right. The formula for this step is as follows: depth of spacer = depth of box – thickness of document stack. Mark out the depth measurement on either side of the width measurement.

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Completed spacer inside the document box. The file folder with the documents is standing upright. (fig. 8)

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Spacer for a Flat Archival Storage Box

Another housing issue that people commonly run into is when there is a fragile book in an archival flat storage box that is almost the right size but not exact. The book may shift around when the box is taken on and off the shelf, which can result in damage to the binding and the corners of the boards. (fig. 9)

In the example at right (fig. 10), I have two volumes of a manuscript stored in the same box because they are a part of the same title. However, this type of box modification is usually made for a single book within a box. The two books in my example are of the same height and width, so they fit perfectly one on top of another. They fit inside the box in a similar way that a single book would.

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You can easily construct your own spacer for a better fit, and there are several options in terms of materials you can use. This particular example features double-sided tape and scraps of the E-flute board. (fig. 11)

If the book is too thin to fill the depth of the box, you will need to build a platform on which the book can sit. Cut pieces of corrugated board to fill the entire bottom of the box. Keep stacking the pieces until the following applies: book + platform = depth of box. (fig. 12)

You can simply eyeball the interior measurements of the box by holding the board up to the box, as with the document box spacer. Or you can measure the interior dimensions more precisely using a strip of paper. This technique might prove helpful if the box has a lip around the perimeter of the interior.

First take measurements of the book by making a template of it on a piece of paper. Cut out the template and place it inside the box. (fig. 13)

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Cut pieces of board to the size of the interior of the box. If you have a large platform to build, you can save board by making only the top 2-3 layers of the platform full-sized. The rest of the layers can form two stacks of smaller pieces. (fig. 15)

Now that you have filled up the empty space at the bottom of the box, you need to attend to the extra space around the sides.

Depending on how thick or narrow your spacers need to be, it may be more convenient to stack the pieces side by side or one on top of another. In this case, the empty space in the box is narrow and deep, so the pieces are stacked side-by-side. As a result, the cut sides of the board fragments will be facing up when you open the box. You don’t want the spacers to fit too tightly against the book, since that will cause abrasion when the spacers are removed and replaced. It’s safer to leave about 1/8” of free space between the book and the spacer. (fig. 16)
I tend to use double-sided tape sparingly when laminating the board pieces together. You don't need to cover the entire length. But you do need to smooth your bone folder over the surface of the paper carrier before you peel it off. You want to ensure that the tape is fully adhered. It's best not to place tape too close to the edges of the board pieces that you are laminating. If you leave about 1/8" of space between the edges of the tape and the edges of the board, you will minimize the risk of any tape adhesive coming in contact with the book. (fig. 17)

A more economical option for adhering the pieces together is to use PVA. However, there are a few rules to follow when using PVA. The glued pieces need to be kept under weight until they are dry because wet or damp board will warp quickly. After the glue is dry, the pieces will need to off-gas for at least 2 weeks before the enclosure can be used to house an object.

In some cases spacers are adhered into the box permanently. In the case that I have illustrated, spacers can be taken in and out of the box. (fig. 18)

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An important question to consider is: How hard are the spacers to take out? It’s best to assess this before you laminate the pieces together. This type of flat storage box has a bit of give in both the height and the width dimensions because the walls are a little bit bowed and the board is not completely rigid. It’s easy to slip your fingers around the spacers and to pull them out. If you find that they are hard to take out, you will need to add finger holes. Again, the finger holes have to be cut before you laminate the board pieces together. Here are two versions of finger holes: one for spacers where the pieces are stacked side by side (Version 1) and the other for spacers where the pieces are stacked one on top of another (Version 2). The finger holes should be made in 2-3 layers of board so that they have enough depth to accommodate your fingers. (fig. 19)

If you are making spacer Version 2 and you are concerned that the cut edges of the board pieces will abrade the sides of your book, you can wrap the spacer in archival craft paper, interleaving paper or Tyvek, like gift-wrapping, using double-sided tape to close the ends. If you are planning to wrap your spacers in paper, you may need to compensate for the thickness of the wrapping paper in the initial measuring. You would also have to forego the finger holes in that case.

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The second option is to wrap the book itself in heavy-weight archival craft paper, like Permalife® or 60# to 80# Mohawk, or in Tyvek. (fig. 20)

A paper wrapper will not add significant bulk but you may want to take the extra thickness of the wrapper into account when measuring for the thickness of the spacers. Adding that extra layer of protection may be particularly helpful if the book exhibits red rot\(^2\). (fig. 21)

In conclusion, the two types of spacers and the wrapper that are featured in this article may help you to enhance your preservation approach, when dealing with housing your collections. Custom spacers can prevent collection objects from shifting or slumping within their archival enclosures. Spacers and wrappers can help minimize the kinds of damage that a book can suffer during handling, like soiling, abrasion, curling, creasing and general wear-and-tear.

There are many unique ways to make spacers. Using the same measuring techniques described here, you might explore other archival materials like Ethafoam®, both in sheet and block form, as well as sheets of Volara® foam. Another benefit to making your own spacers is that it’s a great way to recycle scraps of archival materials that you don’t want to throw away so readily.

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\(^2\)Red rot is a type of leather deterioration that manifests itself in a powdery offset of reddish leather dust. When handling a binding with red rot, you may inadvertently transfer the dusty residue onto the textblock.

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**Selected Resources**

- PAT (Photographic Activity Test), Image Permanence Institute (IPI), 2016
  https://www.imagepermanenceinstitute.org/testing/pat

- U.S. National Archives and Records Administration, Preservation Division, Storage and Handling, Housing Enclosures for Archival Records, 2015

- Northeast Document Conservation Center (NEDCC), Storage Enclosures for Books and Artifacts on Paper,
  https://www.nedcc.org/free-resources/preservation-leaflets/4.-storage-and-handling/4.4-storage-enclosures-for-books-and-artifacts-on-paper


See our selection of archival boxes...

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