A Padded Storage Box for Microscope Condensers

Revision 1

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Revision History		
Revision	**Description of Changes**	**Date**
1	*** Initial release ***	May 24, 2018

Introduction

Any serious microscope hobbyist who has been involved in the hobby for any length of time likely owns a fair amount of microscope equipment. Even a relative newcomer to the hobby who only owns a single microscope will, if they remain in the hobby and their interest becomes serious, eventually find themselves with multiple objectives, eyepieces, condensers, and so on, for their microscope. And much as they may not think so now, once the fever really kicks in, there will come a day when there will be multiple microscopes in their microscope room[1]. By this time, the hobbyist's vast and ever-expanding collection of equipment will represent a significant monetary investment, and proper storage of this equipment, to protect it from physical damage, dust, and humidity, should be considered vital. The storage solution presented here works well for condensers, but you're on your own with the rest of the equipment.

Supplies Needed

The various supplies needed to construct the condenser storage box are described below.

The Vaultz Box

This project starts with a Vaultz VZ01171 locking storage box for 4" X 6" index cards. This box, which is available for $12 or so from both Wal-Mart and Amazon, is a sturdy box with a locking latch which is perfect for storing a pair of microscope condensers.

Polyethylene Foam

To protect your fragile condensers from physical damage, the interior of the Vaultz box should be lined with closed-cell polyethylene foam. Closed-cell foam is ideal here, as it will not absorb or trap moisture. Polyethylene is a good material choice, since it will provide physical protection for many years without shedding particles that might otherwise find their way onto the condenser optics. Closed-cell polyethylene foam is available in various sizes and thicknesses.

Rubber Feet

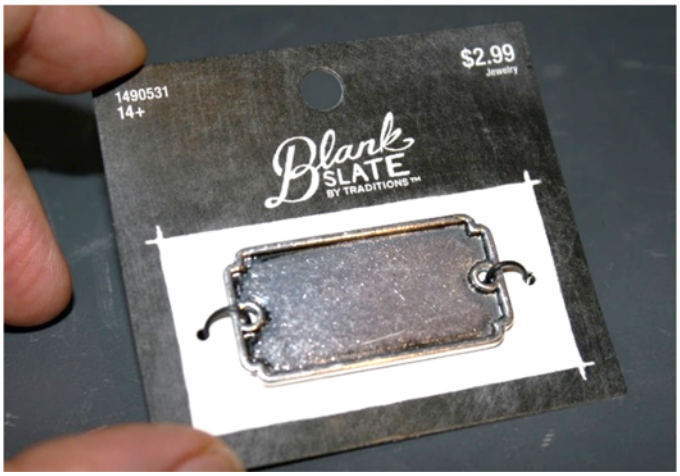
To prevent the condenser storage box from sliding around and scratching your work surface, four adhesive-backed rubber feet will be needed for the bottom of the Vaultz case. These are available from Amazon, in many sizes and shapes, as well as from your local hardware store.

Hot-Melt Glue and Gun

If desired, you can use hot-melt adhesive to secure the polyethylene foam pieces into the interior of the Vaultz box. Note however that if the foam pieces are cut to the proper size, they will remain in place without needing any adhesive, thereby allowing you the option to someday remove the foam and reuse the Vaultz box for something else.

Labeling Plate

There are no surfaces on the exterior of the Vaultz box suitable for the application of an adhesive-backed label, since the aluminum edge pieces of the box are fluted, and the side, top, and bottom panels are textured. To provide a suitable place to apply an adhesive-backed label, obtain a decorative metal labeling plate as shown below. This item was purchased for $2.99 from Hobby Lobby.



Two-Part Epoxy

A five-minute two-part epoxy will be needed to secure the decorative metal labeling plate to the exterior of the Vaultz box.

[1] That's right. You will have a dedicated microscope room.

Black Silicone RTV

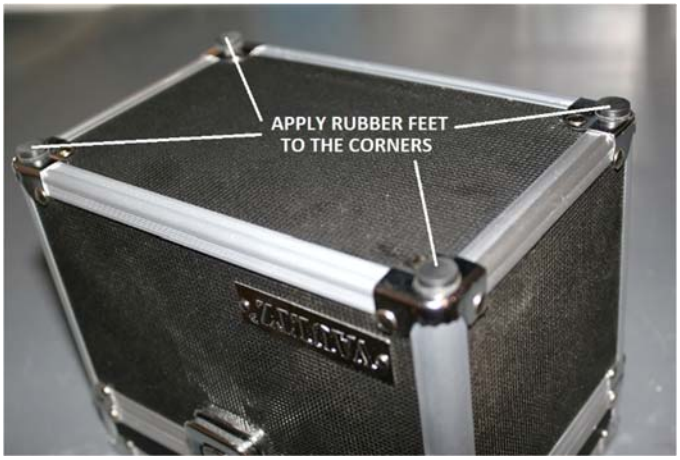
Black silicone RTV will be used to secure the polyethylene foam center divider into place in the Vaultz box. Black silicone RTV is frequently sold as gasket material in auto-parts stores. Item #90024 from Harbor Freight (harborfreight.com) is a 3-ounce tube of black silicone RTV which sells for $3.99.

Tools Needed

The only tools needed to construct the condenser storage box are a straight-edge ruler, a utility knife with a sharp blade, and a hot-melt glue gun (optional).

Stick the Rubber Feet onto the Bottom

Peel the protective paper backing from the adhesive side of the four rubber feet and carefully apply these onto the four chrome-steel corner protectors on the bottom of the Vaultz box.



Cutting the Foam

Use a utility knife with a sharp blade and a straight-edge to cut the foam. Do not try to cut through the entire thickness of the foam with a single cut. Make a few passes, instead. Carefully cut the following seven pieces of polyethylene foam:

Top and Bottom Foam Pieces

Cut two identical 6-3/8” X 4” X 1” foam pieces for the top and bottom of the box.

Left-Side and Right-Side Foam Pieces

Cut two identical 3-1/8” X 2-3/4” X 3/8” foam pieces for the left-hand and right-hand side walls of the box.

Front and Rear Foam Pieces

Cut a 6-3/8” X 2-3/4”” X 1/2” foam piece for the front wall of the box. Cut a 6-3/8” X 2-3/8”” X 1/2” foam piece for the rear wall of the box.

Center Divider Foam Piece

Cut a 3-1/8”” X 2-3/8” X 1/2” foam piece for the center divider of the box.

Installing the Foam into the Box

The various foam pieces should be slightly oversized, as compared to the inner dimensions of the box, and therefore should fit snugly into place without the need for any adhesive (except for the center divider, which will be secured in place with RTV silicone adhesive).

Install the Top Foam Piece

Test the fit of one of the 6-3/8” X 4” X 1” foam pieces in the lid of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. The resulting foam piece should be just large enough for it to remain in place without any adhesive. If you would like to glue the foam piece in place, apply hot-melt adhesive to the inside of the lid before pressing the foam piece in place.

Install the Bottom Foam Piece

Test the fit of the remaining 6-3/8” X 4” X 1” foam piece in the bottom of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. The resulting foam piece should be just large enough for it to remain in place without any adhesive. If you would like to glue the foam piece in place, apply hot-melt adhesive to the bottom of the box before pressing the foam piece in place.

Install the Rear Foam Piece

Test the fit of the 6-3/8” X 2-3/8” X 1/2” foam piece in the rear wall of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. The resulting foam piece should be just large enough for it to remain in place without any adhesive. If you would like to glue the foam piece in place, apply hot-melt adhesive to the rear wall of the box before pressing the foam piece in place.

Install the Front Foam Piece

Test the fit of the 6-3/8” X 2-3/4” X 1/2” foam piece in the front wall of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. The resulting foam piece should be just large enough for it to remain in place without any adhesive. If you would like to glue the foam piece in place, apply hot-melt adhesive to the front wall of the box before pressing the foam piece in place.

Install the Right-Hand Foam Piece

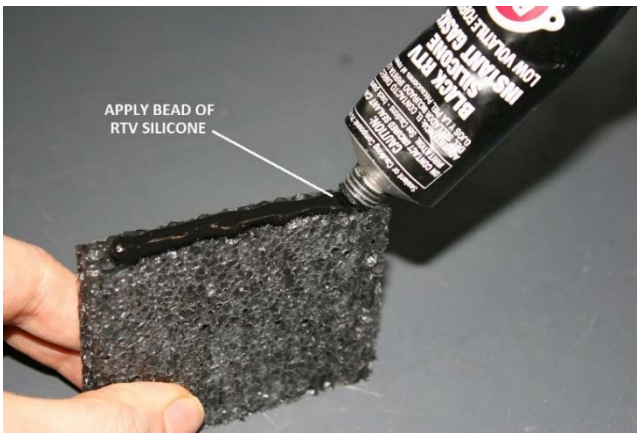
Test the fit of one of the 3-1/8” X 2-3/4” X 3/8” foam pieces in the right-hand side wall of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. The resulting foam piece should be just large enough for it to remain in place without any adhesive. If you would like to glue the foam piece in place, apply hot-melt adhesive to the right-hand side wall of the box before pressing the foam piece in place.

Install the Left-Hand Foam Piece

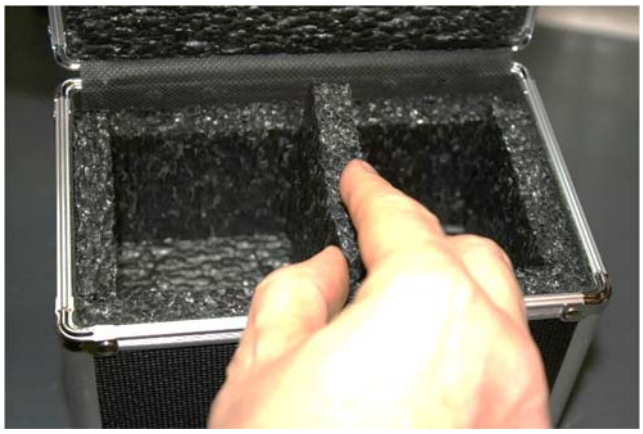
Test the fit of the remaining 3-1/8” X 2-3/4” X 3/8” foam piece in the left-hand side wall of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. The resulting foam piece should be just large enough for it to remain in place without any adhesive. If you would like to glue the foam piece in place, apply hot-melt adhesive to the left-hand side wall of the box before pressing the foam piece in place.

Install the Center Divider Foam Piece

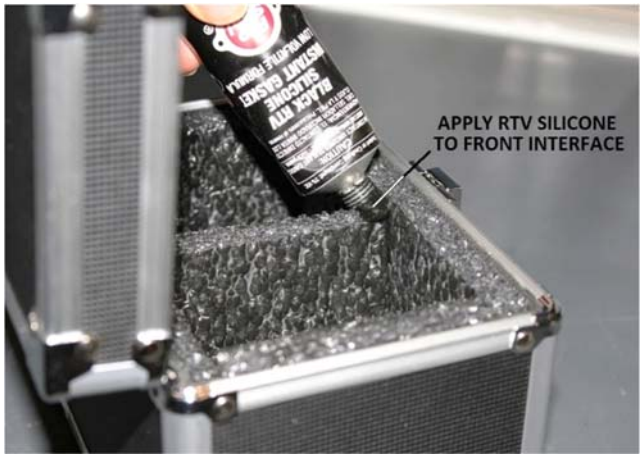
Test the fit of the 3-1/2” X 2-3/8” X 1/2” foam piece in the center of the Vaultz box, and if necessary, trim this piece to the proper size to obtain a good fit. Apply a bead of black silicone RTV onto the bottom edge of the center divider.



Press the center divider into place in the center of the Vaultz box, with the silicone bead facing down. Remove any RTV that squeezes out from the bottom edge.



Carefully apply silicone RTV to the vertical interface where the center divider contacts the top of the front foam piece.



Use your finger to evenly spread the RTV silicone and to remove any excess.

Carefully apply silicone RTV to the vertical interface where the center divider contacts the top of the rear foam piece.

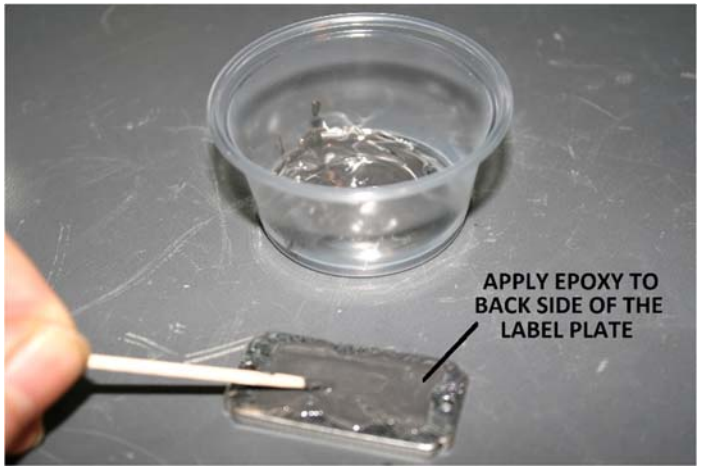
Use your finger to evenly spread the RTV silicone and to remove any excess.

Allow the Adhesive to Cure

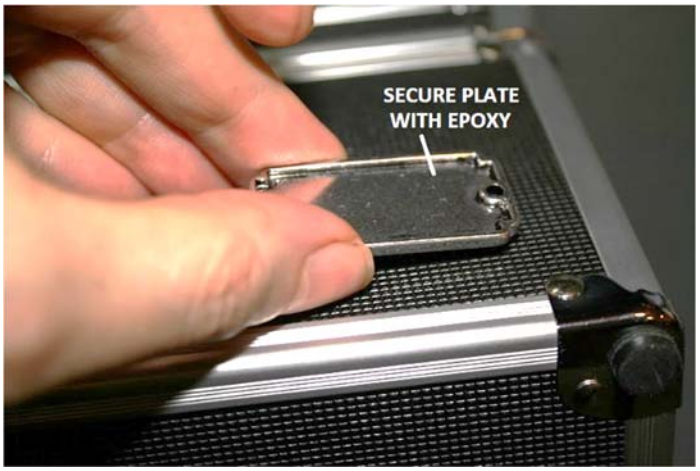
After 24 hours, the box can be handled, but the box should not be used to store your condensers until the RTV silicone has had sufficient time to fully cure. Store the box for at least a week with the lid open to allow the RTV silicone to cure. Verify that it has fully cured by closing the box lid for a while, then re-opening it to see if there is any detectable acetic-acid smell from the silicone RTV inside the box. Once the RTV silicone has fully cured, there will be no detectable smell of acetic acid.

Labeling the Box

In order to secure the decorative metal labeling plate to the exterior of the Vaultz box, mix and apply a five-minute two-part epoxy onto the back side of the metal labeling plate.



Next, lay the Vaultz box on its back and carefully align and place the metal labeling plate onto the front of the box, in a suitable location for the adhesive-backed label. Leave the Vaultz box on its back until the epoxy has sufficiently cured such that the labeling plate will not move once the box is returned to its upright position.



After the epoxy has sufficiently cured, apply an adhesive-backed label to identify the contents of the storage box, trimming the label as necessary for good fit and appearance.

Using the Box

The condenser storage box is now ready for use. If you will be storing your condensers in a basement or other place where humidity might be a concern, just toss a silica-gel desiccant packet into each side of the box with the condensers before closing the lid. The desiccant will absorb any excess humidity, thereby protecting the condensers from corrosion and fungus growth. Be sure to replace or recharge the desiccant packets periodically to provide continued humidity protection for your condensers.

How to Contact the Author

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