

Reeds

Things you need to order online from a bassoon place.

www.forrestsmusic.com

www.millermarketingco.com

www.mmimports.com

Mandrel: Reiger forming mandrel

Knife: Double-hollow ground. Make sure you buy the correct knife depending on if you are left- or right-handed

Plaque

Pliers: With wire cutter and hole for forming

Reamer: Spiral and diamond reamer

22-gauge brass wire

Drying Rack

Things you can find in town

Ruler: Needs inches and millimeters

Cyanoacrylate glue

Fine tipped Sharpie marker

Small steel files

A nail file (emory board or metal)

Sandpaper grit number should be high (i.e. 400, 600, 800) and waterproof.

X-Acto knife with blade refills

Butcher's twine

Crochet thread to wrap the reed

Easel made out of wooden dowel. It will be 1.25 inches in diameter. (Home Depot)

Reed construction

I want all of my students to be able to gouge, shape and profile from tube cane so that they will be able to save money. Since I expect them to make a lot of reeds, I would hate to press them financially. When first learning, they will learn from pieces that are already gouged, shaped, and profiled, but as the student becomes better at creating blanks, I will ask them to start from steps that are further back. I am assuming that the school will own a gouger, at least one shaper, and a profiler.

Notes about blanks: I use a modified shape, which has been affectionately called “Fat Fox.” To achieve Fat Fox, use a Fox 2 shaper. Shape one side of the cane. Before shaping the other side, shift the cane over in the shaper no more than 1 mm. The goal is to make a slightly wider shape. This shape is medium wide, but has a proportionally wide throat. This helps create the focus that often gets lost in wider shapes, but also has the depth of sound and stability that narrower shapes lack. It’s a very forgiving shape.

Pre-Trim

Place the piece of gauged/shaped/profiled cane on the easel. Use your X-acto knife to further define the collar. After using the X-acto, use a triangle file to create a larger line. Gently take your X-acto knife and peel back the bark to the newly defined collar you just created with the knife and file. Continue to smooth out the area that was just worked on with a nail file, followed by sand paper. The goal is to create a defined collar that forms a 90-degree angle with the back of the reed. If the cane ramps up too drastically at the back of the reed, the reed will have a higher chance of cracking in the forming process.

After defining the collar, use the ruler and fine tipped Sharpie to mark where your wires will go. From the butt end, the measurements go from the butt end.

Fourth wire: 2 mm

Third wire: 6 mm

Second wire: 15 mm

First wire: 25 mm

The last thing to do before forming the reed is scoring the cane. Scoring prevents large cracks in the forming process by relieving some of the tension built into the cane when forming it from a flat shape to a circular shape. Use the X-acto knife to create between 5 and 7 vertical lines through the bark of the cane. Make sure that you do not go too deep, because it will cut all of the way through the cane and might cause leaks in the tube. After the vertical lines, create horizontal lines and diagonal lines going in both directions. The idea is to weaken the bark enough to make the tube as round as possible without the entire piece of cane cracking, especially up into the blades.

Forming

Soak (place in a bowl of water, fully submerged) the piece of cane for 10 minutes.

Afterwards, take the cane out of the water. Fold the cane over a small, round surface (such as the back of a small file). Make sure that the cane is folded over in the middle.

The goal is to make sure the collars line up. If the collars do not line up, adjust the sides of the reeds over the circular surface until the collars match. The circle will give you the flexibility to adjust because it creates more space at the tip. When you have the collars

matched up, you can squeeze the tip of the reed flat. Next, file the sides of the tube. The goal is to file down the sides enough to take out the natural flair of the shape and to narrow the tube enough to fit on the average bocal. The modified shape, without any sort of changes, yields a tube that is too big. After filing, apply the first wire. Make sure the blades are lined up, especially by looking at them from the side. If a blade slips into another, you will create an uneven tension through the blades, which can lead to having an uneven tip opening later on. Often when applying the first wire, it is easy for the blades to accidentally slip, so be diligent. Wrap butcher's twine around the reed, ending with a slip knot. Submerge back in the water for one minute.

After one minute, take the reed wrapped in butcher's twine and insert the forming mandrel in the butt end of the reed. I recommend pushing the reed straight on and banking the mandrel on the surface of a table or against your sternum. **DO NOT TWIST.** This is a very important step. If you twist the reed onto the forming mandrel, you will slip the blades. When the reed does not go on the mandrel any further, take your pliers and mash the bottom of the reed to conform to the shape of the mandrel. You can go all the way around the bottom of the reed (over where the fourth and third wires would go), but you can only squeeze up and down the reed directly on the bark, but not on the sides. If you go further than the third wire on the sides of the reed, you are likely to create too much tension in the blades and crack the reed in half. As you continue to mash the tube to the mandrel, you will be able to push the reed further on the mandrel. Continue rounding out the tube with the pliers. You want to repeat these steps until the butt end of the reed is perfectly round and there are no gaps between the butt of the reed and the mandrel.

Slowly unwrap the butcher's twine. As you pass each mark you made with your Sharpie

for wires, apply the wire. When the string is completely off, you should have four wires on the reed. Take the reed off of the mandrel and set on a drying rack for at least 24 hours. If you have trouble taking the reed off of the mandrel, you may use your pliers to twist the reed back and forth off of the mandrel, as long as each twist is counteracted with a twist in the opposite direction.

Wrapping

After the reed has dried on the drying rack for at least 24 hours, it is ready to be wrapped. Start by putting the reed back on the mandrel. Tighten the bottom three wires because as the cane dries, it contracts and the wires do not form to the cane anymore. As a precautionary measure, measure the wires again because they often slip when they loosen. There are multiple ways to seal the bottom of the tube. Traditionally, people use thread and glue to wrap the reed. A lot of people forego thread for just hot glue the same area, or even just use nail polish. Personally, I use crochet thread and super glue because I like the stability that is created in the tube and I like how fast the thread dries. Very rarely does the thread become undone, which is a common problem with using other types of glue. The easiest way to wrap a reed is to wrap the reed three times around with thread underneath the third wire, and then alternating going under and over the third wire until the recognizable turban is created. Make sure the string is taut in order to have greater success. Honestly, how the reed does not matter too much, but the tautness of the string is important to the structure of the tube. After the turban is established, continue wrapping the thread up to the second wire. Use a slipknot to create an end to the thread, and then use super glue on the wrapping. As a warning, super glue is incredibly fast drying. It is easy to accidentally glue fingers together/ the reed to the mandrel/ the reed to your pants/

etc. Before gluing the reed, make sure that the reed is a little loose on the mandrel for easy of taking off after gluing. You will thank yourself for this later. Place the reed back on the drying rack for at least 10 minutes. It should not take longer than that for the string to dry, but there is no disadvantage to letting it sit for longer.

Finishing

The first thing to do is replace the first wire. This first wire was the same wire that was placed before forming, so it is still stuck in the flat shape it started in. As the cane became more circular, the wire would not follow the same shape. Having a wire that does not conform to the shape of the tube is ineffective. After replacing the first wire, mark where the tip will be cut on the blades. Place the ruler on top of the first wire and mark 28 mm from the first wire. After the initial cut mark is placed, soak the reed. It is important for the reed to be soaked before clipping the tip because the blades would be likely crack if manipulated while dry.

Cut the tip of the reed. This can be done multiple ways, depending on materials and budget. The cheapest way would be with a razor blade and a cutting block. The disadvantage to this method is that it is easy to cut the tip lopsided. Specific bassoon tip cutters are more accurate yet very expensive. I personally use a Craftsman tool I found at a hardware store. It is handheld, have replaceable blades, and has a flat surface that it cuts against. I highly recommend being creative!

The finishing process for bassoon reeds is very complex and often based on variables such as errors in the forming process and the natural features of the cane (since it is an organic material). For continuity, I draw on the reed where I plan to scrape to eliminate a lot of the guesswork involved. Everything that occurs on one side of the reed needs to

happen on the other side of the reed. When work on the blades of the reed, use a plaque to prevent the pressure of the knife from cracking the blades. The basic steps to finish a reed are as follows:

- 1). Scrape the top 2 mm of the reed to create a thinner tip. This line goes straight across the reed. Afterwards, use sandpaper to smooth out the work done.
- 2). Create a line from 5 mm down on the blade on the rails up to the center of the tip, creating triangles. Scrape this area, tapering the pressure towards the tip. You will find that if you scrape too hard towards the tip you will rip the corners off of the reed. Proceed to sand over the work you have done to get rid of ridges creates.
- 3). Take a nail file and gently take down the rails. One wants the to taper from the back of the reed (thickest) to the tip of the reed. Because of the knife work we have done so far, the first 5 mm of the reed will be significantly thinner than the rest. Create an even taper from back to front, leaving the rails at the back at least three quarters of a millimeter thick.
- 4). Take cane out of the front two-thirds in the channels. The channels are between the rails (the absolute edges of the reed) and the spine (the middle 3-4 mm). Take your knife and blending forward, constantly considering the taper that we are going for with the reed. Common problems with the channels are creating trenches with the knife and the knife chattering and digging into the cane. Make sure the knife is sharp. When a knife is dull, it requires more effort by the hand to scrape, and that is what creates digs into the cane. Sharp knives gently take cane off of the reed. To avoid the infamous trench, try going across the cane instead of up and down to taper the removal of cane across. The spine should be the thickest part of the cane, and tapered towards the rails.

5). Try crowing the reed (while wet). If the reed makes noise of any sort, wonderful! That means the reed is vibrating. If air rushes through the reed and does not vibrate the blades, try to take an equal/proportional amount of cane off of both of the blades. The entire system would need to be light. I would suggest doing this step with sand paper and files, to make sure that the knife does not favor specific portions of the reed. Additionally, sandpaper and files lead to gently smoothing out the reed, which is always an important part of reed making. A smooth reed is a happy reed. Digs and bumps lead to obstruction of vibrations through the blades, which mean there are unnecessary response issues.

Diagram of a reed



The red represents the rails. The yellow represent the four wires (which includes the third wire under the green thread). The cream color at the tip of the reed is the first scrape done in the finishing process. The tan includes the triangles and taking down the channels. The channels surround the spine, which is represented in a dark brown.