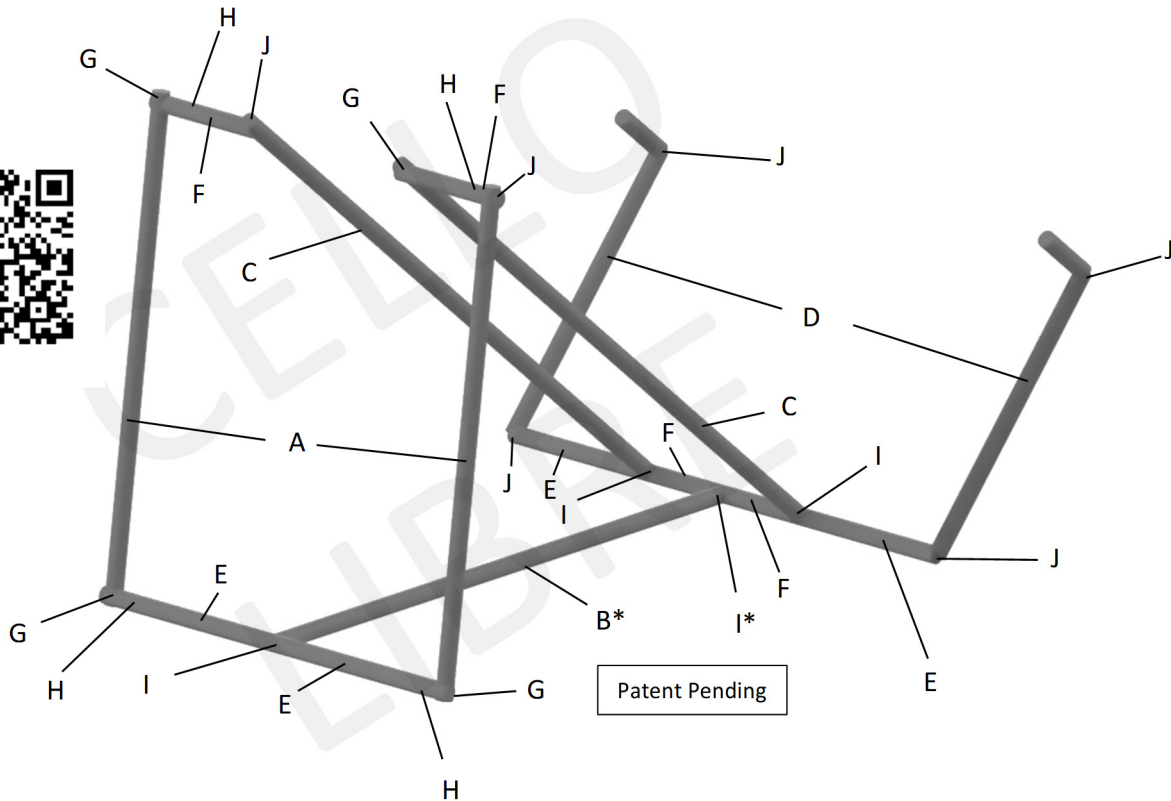


CELLO LIBRE™



Parts (average Home Depot prices):

10 feet of ½ inch PVC pipe (\$8-12)

PVC cutter (\$13-\$14)

PVC glue (not CPVC or any other kind) (\$5-\$8)

Four ½” “S x FIP” Elbow Fittings – threaded on one joint, smooth on the other (\$1-\$3)

Four ½” Adapter Fittings MPS x S (male joint threaded, female joint smooth) (\$1-\$3)

Four ½” Tee Fittings – (smooth on three joints) (\$1)

Six ½” Elbow fittings (smooth on both joints) (\$1)

Four feet (48”) of ¾” PVC pipe insulation (don’t get the ½” tubes, you need the bigger ones)

Good belt and strap system

INSTRUCTIONS

You will be working with ½-inch PVC pipe and related fittings. Do not buy a ¾” fitting expecting it to fit onto your ½” pipe. Gluing pipe and fittings together is quite easy, but you must work fast because the glue sets very quickly, and getting the parts apart after is nearly impossible. Measure twice, cut once. Same goes for gluing – practice your joining movement a couple of times before applying the glue. The glue can be messy to work with, so put something on the floor for easier clean-up.

When you buy the parts, make sure at the store that all threaded fittings work. Sometimes the threads are too tight, so you have to find the right combination of elbow and adapter that will thread together as close as possible to one full 360-degree rotation. It may take some hunting.

Feel free to cut the 10-foot PVC pipe in half with the PVC cutter at the store after paying for it, and you will have two manageable 5-foot lengths. The PVC cutter is easy to use, just be careful with the sharp bit. You pull it apart and the blade goes up, you lay the PVC pipe in the cutter’s jaws and pump the handle. The blade will ratchet down through the PVC and slice it like butter.

To begin assembly, I use a sharpie and measuring tape, and mark off all parts **except B** on the pipe before any cutting. You will find that you used up most of the PVC, and will have a bit left over, which will be your custom B (I’ll explain later). Cut the PVC insulation with scissors into six-inch segments and don’t undo its ‘seam’ – you will thread it onto the PVC pipes during assembly.

Put the Cello Libre together without gluing anything first. Follow the chart for fittings, start wherever you like, and you will find it’s like Lego. The hardest part of the assembly will be the threaded bits: thread the adapter by hand into the elbow as far as it will go, and then make a quarter-turn backwards (1/3 of a turn if you needed pliers to get the two unstuck). That’s your ‘point zero’ for all four joints. Two will rotate clockwise, two counterclockwise, when the Libre is folded.

When assembling, you might need to force some of the parts together. If this happens, a pair of pliers will be handy to take the thing apart later for gluing. Don’t forget to thread the insulation onto the right bits. See points 4 and Once assembled unglued, it’s your opportunity to customize the Cello Libre.

My preferred endpin angle is not necessarily yours. Remember I said to leave B? It’s time to measure your cello lean angle. You can always use my 50 degrees, and if you find it’s too horizontal and want the cello at a steeper angle, you can cut B shorter. If you want a more horizontal cello angle than mine, you can use the entire remaining piece of PVC and dial it in from there.

If you have a friend and want to try it before gluing, grab your cello and have the friend hold the Cello Libre to your body below your waist. Lift and support your cello in the position you'd have it when sitting down and have your friend slowly raise the Cello Libre until the cello is supported by the two arms "D" at the end of the hypotenuse. The cello should make contact with the insulation only, and not PVC.

The Cello Libre should sit on the floor on all four corners. If there is a wobble, just try to twist the fittings together a bit so the bits fall into place. Once all looks good, just start gluing joint by joint. When you glue, make sure you coat either the outside of the pipe **or** inside the fitting you're working with, and make sure that you insert the pipe into the fitting as far as it will go. Have a paper towel ready for cleaning up.

Cut PVC into the following segments:

A = two segments of 13.5"

B = one segment 15.75" **See instructions**

C = two segments 19.25"

D = two segments 6.5"

E = four segments 4"

F = four segments 1"

For assembly:

G = four threaded elbows

H = four adapter fittings

I = four tee fittings

J = six elbow fittings

Detailed gluing instructions:

- 1) Remember 'point zero' for the threaded bits? Make sure they are at point zero, and glue F and H (X2), and E and H (X2).
- 2) Glue A and J.
- 3) Glue C and J, and C and G.
- 4) Thread three six-inch lengths of PVC insulation on each C and cap off with I (do not glue I yet). You might need to trim the insulation for length.
- 5) Glue F and I* (X2), and front I and E (X2).
- 6) Glue one J to each D.
- 7) Glue rear I and B. Do **not** glue B to forward I.
- 8) Assemble everything without gluing, and make sure the assembly sits snugly on the floor.
- 9) The J and E joint is the most important one. If that joint is not well-glued, your cello might slip out. It won't be a sudden slip, but a bummer nonetheless. Eyeball a 90-degree

angle to C with one arm D as best as possible, glue J and E well, then match the second arm's position on the first arm.

10) Thread one six-inch length of PVC insulation on each D.

11) Glue tip Js to Ds so they point up (see picture)

12) Glue A and G (X3).

13) Glue rear I to E (X2).

14) Glue F and J (X2).

15) Glue C and I (X2), and F and I (X2).

Once assembled, carefully suspend something 4-5lb off the end of each arm D to test the bits that matter most.