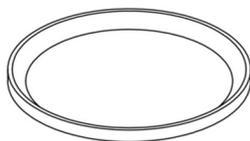


Loading sample into press

- ❑ Make sure all pieces are CLEAN before assembling:
 - ❑ Base plate and its holes
 - ❑ Top of pressure vessel
 - ❑ Inside of pressure vessel
 - ❑ Plate underneath the Griggs press
- ❑ Secure the top plate to the arbor press using the screws
- ❑ Attach pressure vessel to the top plate using short screws
- ❑ Lift pressure vessel up and insert base plate below
- ❑ Test position with brass piece to ensure that pressure vessel will go smoothly over the sample without causing it to tip
 - ❑ Get multiple opinions!
 - ❑ Tap gently to shift position
- ❑ Tighten screws on neck of arbor press to keep vessel hanging,
 - ❑ Make sure screws are engaged properly– they should be inside a groove on the neck of the arbor press rather than on one of the protruding teeth
- ❑ Run thermocouple through either right or left hole in cooling plate, using a card to keep sample together
- ❑ Straighten out end of thermocouple
- ❑ Double check sample before lowering pressure vessel!!!!!!
- ❑ Put paper circle around sample
- ❑ Spray setup with Teflon
- ❑ Loosen screws on arbor press and slowly lower pressure vessel over the sample
- ❑ Attach pressure vessel to base plate using long screws
- ❑ Unscrew top plate and lift it off pressure vessel
- ❑ Insert lead piece and sigma 3 packing ring
 - ❑ Sigma 3 packing ring should be pointing with the sharper end towards the top and the flat end towards the sample setup (see figure)

TOP



- ❑ Remove pressure vessel from arbor press using blue lift machine
 - ❑ Tape sample into place
 - ❑ Turn over and prepare thermocouple
 - ❑ Glue between two wires to prevent short-circuit
 - ❑ Tape the length of the thermocouple to prevent short-circuit between base plate and rig frame
 - ❑ Bend it into the groove on the base plate
- Turn pressure vessel back over slowly, and move forward into place

Getting Your Sample Into the Press

First: Make sure everything is **clean!** This includes checking the holes in the base plate, wiping down the base plate and the inside of the pressure vessel, and removing any tape residue from the flat load plate underneath the Griggs press.



After cleaning, bring the pressure vessel and the top plate over to the arbor press. Secure the top plate to the arbor press using the screws on the right-hand side and the back side. Make sure the tapered screw engages into the groove on the back side of the arbor press.

Then, attach the short screws from the pressure vessel to the top plate so that it can be lifted. Lift it up above the base of the arbor press and then insert the base plate below. Hold on tight to the arbor press so that nothing breaks!

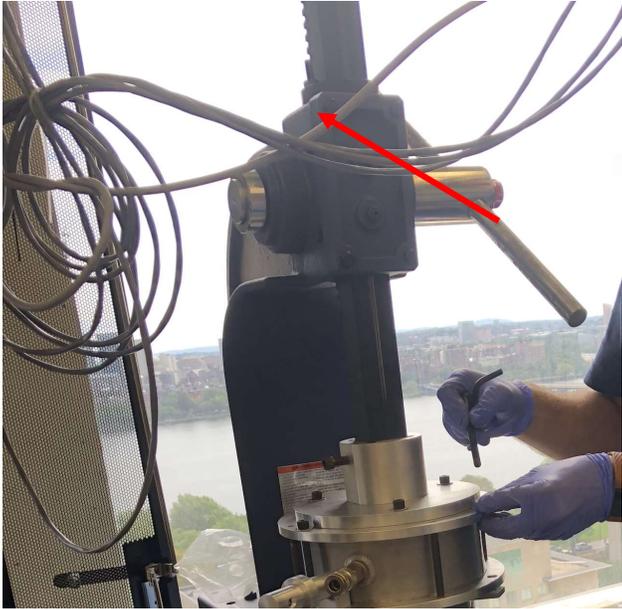


Place the brass piece on the base plate, and then slowly lower the pressure vessel from above.



This is a very important step, because it allows us to test whether the pressure vessel will fit smoothly around the sample or if it will hit at an angle. This step is best completed with a few other people around, so that at least one person can keep an eye fully on the brass piece while the other slowly lowers the pressure vessel. Make sure to look at the brass piece from many different angles to ensure that it is not tipping any one way or another, even slightly.

If it is tipping, gently tap the base plate with ~2 fingers in the direction in which it tips, then try again. Be patient at this stage! It will make your life easier later.



Next, fix the arbor press so that the pressure vessel hangs above the base plate by tightening the two screws on the neck inside a sawtooth.

This needs to be done very tightly, so that the pressure vessel does not fall and hurt you or your sample.

Use a card or other flat object to hold your sample setup in place as you thread the thermocouple wire through one of the holes in the cooling plate. Use either the right or the left hole – it won't matter which one you use, but leave the middle hole available for the base plate thermocouple. This can be a slow process, because you need to be careful not to bend the thermocouple too much or move the base plate from its carefully centered position. Some bending will have to occur to get it into place, but it's best to minimize the amount of movement for the wires.



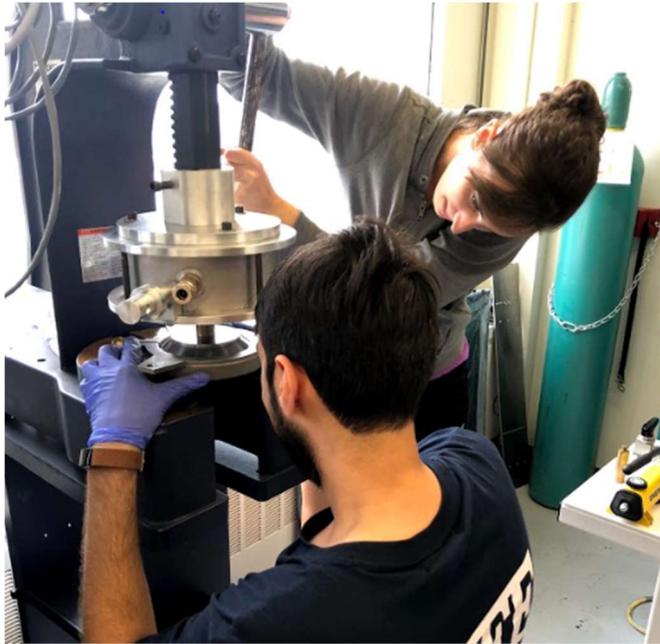
Hold the thermocouple below to straighten it out, but do not apply too much force or torque so as not to displace anything inside the sample (toddler not required – but helps ☺).



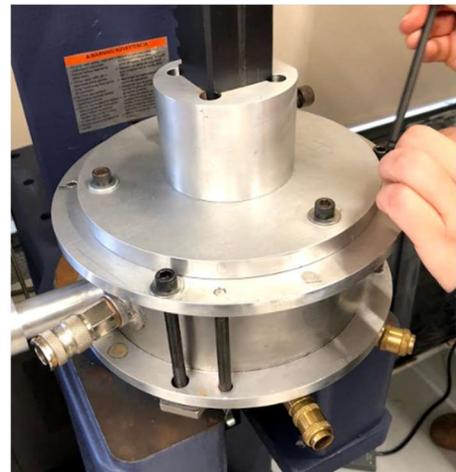
Once the thermocouple and sample setup are in place, take a look. Make sure everything is flush, or as flush as possible. If something is off, **this is your last chance to fix it. After this point, you will not be able to access your sample setup to make any changes.** If you are satisfied with your setup, fit the paper around the sample and spray everything with Teflon. The paper is crucial, because it keeps the electrical circuit where we want it during heating so that the sample will heat but not the pressure vessel. **Do not forget the blue paper!** The Teflon minimizes sticking and will make it easier to press the sample out after pressurizing. Try not to breathe it in.



Loosen the screws around the neck of the arbor press, and slowly lower the pressure vessel over the sample. Again, it's best to have multiple people around to help confirm that the sample is not being moved while the pressure vessel is lowering, although it should go smoothly if nothing has changed since doing the same to the brass pillar.



Attach the long screws between the pressure vessel and the base plate, but do not screw each one fully on its own one-by-one! Go one to two turns at once for each screw, making your way around the pressure vessel a few times before all the screws are tightened. This will stop the pressure vessel from leaning preferentially to any one side. Unscrew the top plate and lift it slowly off of the pressure vessel. Now that the top of your sample is exposed, you can fit the lead piece into the top. If it is having a difficult time fitting in, use the arbor press to push it down. Once the lead piece is in, put the sigma 3 packing ring on top of it with (the flat side has to lie on the lead)





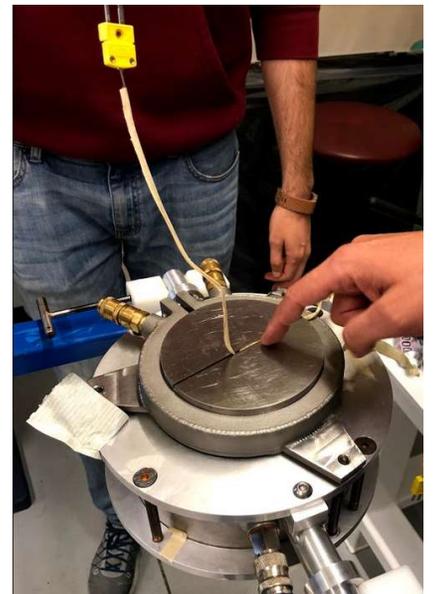
Approach the arbor press with the blue lift machine (affectionately, "C-3PO"). Make sure that its arms are lower than the pressure vessel's while you position them underneath, and then slowly lift it to grab those arms. Use the T-pins to hold the pressure vessel in place, then wheel it back away from the arbor press.

Tape everything down with duck and masking tapes. You'll be turning the pressure vessel upside down, so it needs to be secure to avoid everything falling out and breaking.



Turn the pressure vessel over slowly. The thermocouple will be sticking straight out of the base plate. Put glue in between the two ends of the thermocouple so that the wires will not touch each other (this would ruin the circuit and not allow us to read the temperature inside the experiment!).

Tape and bend the thermocouple, so that it will sit flat but the casing of the thermocouple does not interact with the base plate directly.



Flip the pressure vessel back over, slowly and carefully. Move the blue lift forward and adjust the height of the arms such that the pressure vessel is slightly above the black part of the rig, but not so far above that it would hit the top part. Move it slowly into place, and release it from the blue lift.

