1768B-.15SYS1 1768B-.15SYS3	QUICK START GUIDE (Draft)
Low Tension Lab Setup	Jun 2021

Figure 1. Low Tension Lab Setup (Model 1768B-.15SYS3).

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

UNPACKING

The 1768 Low Tension Lab Setup was thoroughly tested before shipment. When packed, it was in perfect working order. Unpack with care being sure to remove all packing material. Follow the instructions carefully in order to assure long, trouble-free service. Any damage found upon receipt should be reported immediately to the transport carrier for claim. It is important to save the shipping container and all evidence to support your claim. Be sure to read all operating instructions thoroughly before operating the unit.

WARRANTY & LIABILITY

Soilmoisture Equipment Corp. (SEC) warrants all products manufactured by SEC to be free from defects in materials and workmanship under normal use and service for twelve (12) months from the date of invoice. Soilmoisture Equipment Corp. (SEC) is not liable for any damages, actual or inferred, caused by misuse or improper handling of its products. SEC products are designed to be used solely as described in these product operating instructions by a knowledgeable and prudent individual under normal operating conditions in applications intended for use by this product.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Specifications

Hanging Water Column Range: 5 to 150 cmH_2O.
Resolution: 0.1 cmH_2O (0.01 kPa)
Plate Diameter: 10.75 inches.
Pan Diameter: 12.00 inches.
Pan Height: 4.00 inches.
Sand: 320 Mesh Silica Sand.
Sandbox Vacuum Application Range: Up to 300 cmH_2O (30 kPa).

System Options

1768B-.15SYS1:

1X Sandbox, 1X Hanging Water Column Stand, 1X Water Trap Jar, 1X Shelf

1768B-.15SYS3:

3X Sandbox, 3X Hanging Water Column Stand, 1X Water Trap Jar, 3X Shelf

Applications:

Model 1768, Low Tension Lab Setup is a system for creating the Moisture Retention Characteristics Curve. The curve has numerous applications in agricultural sciences, constructions engineering, mining, oil industry, environmental sciences and more. Soilmoisture Equipment Corp. has been manufacturing systems for creating Moisture Retention Curve since 1950s. Low Tension Lab is designed for moisture levels very close to saturation. Main applications include irrigation studies and also construction engineering research.

Vacuum method is recommended for tension levels smaller than 0.3 bar (30 kPa). Low Tension Lab is a Sandbox Tension Table connected to a Hanging Water Column. The system is ideal for extremely low levels of tension when soil moisture is close to saturation. The system lets user apply very small levels of tension (less than 150 kPa) with an exceptionally high level of resolution (0.01 kPa).

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

System Items (Model 1768B-.15SYS1)

Figure 2. Large items.

Item	Part Number, Qty, Name	Item	Part Number, Qty, Name
1	XLABBEAKER200PP, 1, BEAKER	12	1930K2, 1, WATER TRAP JAR, 1L
2	1768-001, 1, STAND BASE SUPPORT	13	0932W010, 1, SILICA FLOUR, 325 MESH, 10 LB
3	XFIELDTAPEMEASURE, 1, TAPE MEASURE	14	XPVCEXC1/8-1/4, 12FT, CLEAR PVC TUBING
4	1768-005, 2, STAND EXTENSION	15	1768-1000-01, 1, RESERVOIR TUBE
5	1768-009, 1, STAND END EXTENSION	16	1768-1000-02, 2, RESERVOIR END CAP
6	1275-002, 1, ALUMINIUM STAND BASE	17	1930, 1, LOCKING SYRINGE, 60 CC
7	1768-002, 1, STAND RISER	18	1768-004, 1, RESERVOIR CLAMP
8	1768-010, 20, FILTER PAPER	19	XFSMSS2420CAE04, 2, SET SCREW
9	0675D12TL, 1, TRANSPARENT LID FOR SATURATION PAN	20	XORING2-210, 4, O-RING, FOR RESERVOIR CAP, 1" OD
10	0675B0, 1, ZERO TENSION PLATE	21	XHWCL-2INCHCLIP, 3, Binder Clamp, 2"
11	0675D12X4, 1, SATURATION PAN	22	XLABSHELVINGPP, 1, LAB SHELVING (NOT SHOWN HERE)

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

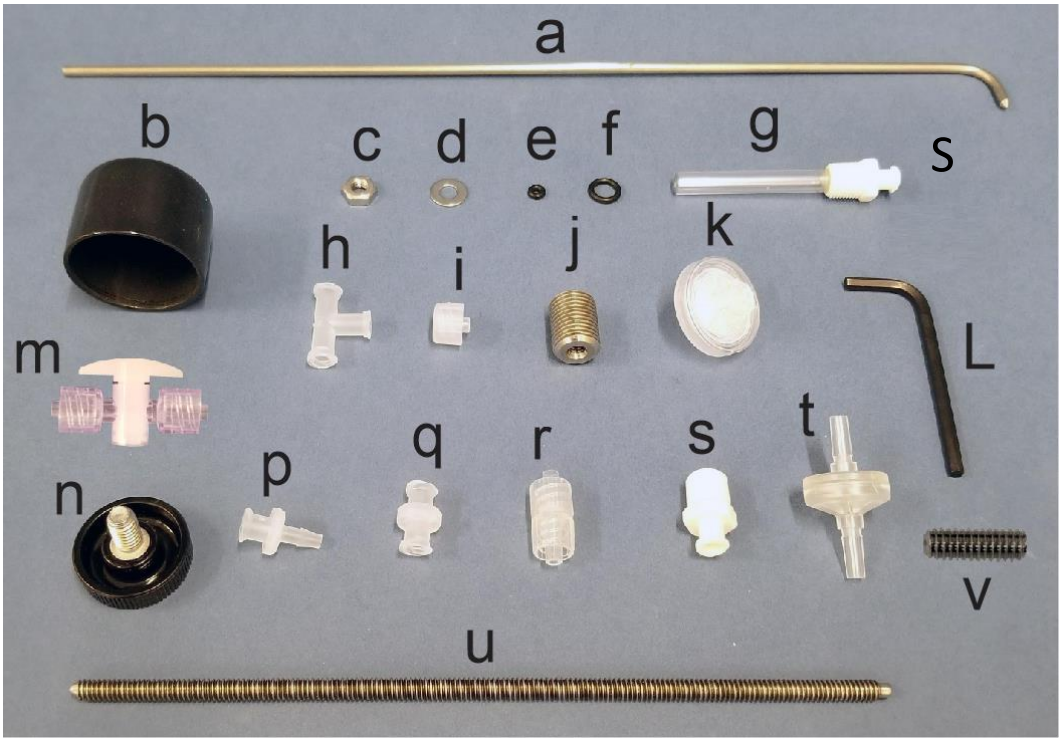


Figure 3. Small items.

Item	Part Number, Qty, Name	Item	Part Number, Qty, Name
a	1768-008, 1, TENSION LEVEL INDICATOR	k	XCNLUHP-MFPVC, 3, WATER-STOP FILTER (PART OF 1930K2)
b	MZL132, 1, STAND END CAP	L	MSL106, 1, ALLEN WRENCH, 1/8”
c	XFNHX1024CAH, 2, HEX NUT	m	XCNLUSC-MMPC, 8, LUER STOPCOCK, MALE-MALE
d	XFWFW010CAR, 2, WASHER	n	MZL133 + XFBCH2420CAF00, 2, SCREW KNOB, ½” LONG
e	XORING2-004, 3, O-RING, FOR SET SCREW	p	XCNLU1/8B-FLPP, 8, FEMALE LUER TO 1/8” BARB
f	XORING2-010, 4, O-RING, FOR DRANAGE PORT	q	XCNLU-FFPP, 4, FEMALE-FEMALE LUER COPLING
g	1768-011, 3, DRANAGE TUBE	r	XCNLU-MMABS, 6, MALE-MALE LUER COPLING
h	XCNLUTEE-FFFPP, 3, LUER TEE, ALL FEMALE	s	XCNLU1/8NPT-FLNY, 7, FEMALE LURE TO MALE 1/8” NPT
i	XCNLUPLUG-MLPP, 3, LUER PLUG, MALE	t	XCNLUCV-MMPC, 2, CHECK VALVE, MALE-MALE LUER
j	1768-002, 1, STUD ADAPTOR	u	1400-001L06IN, 1, STAND STUD, 6”
		v	XFSMSS2420CAE12, Set Screw, 2, ¾” long

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Low Tension Lab in a Glance

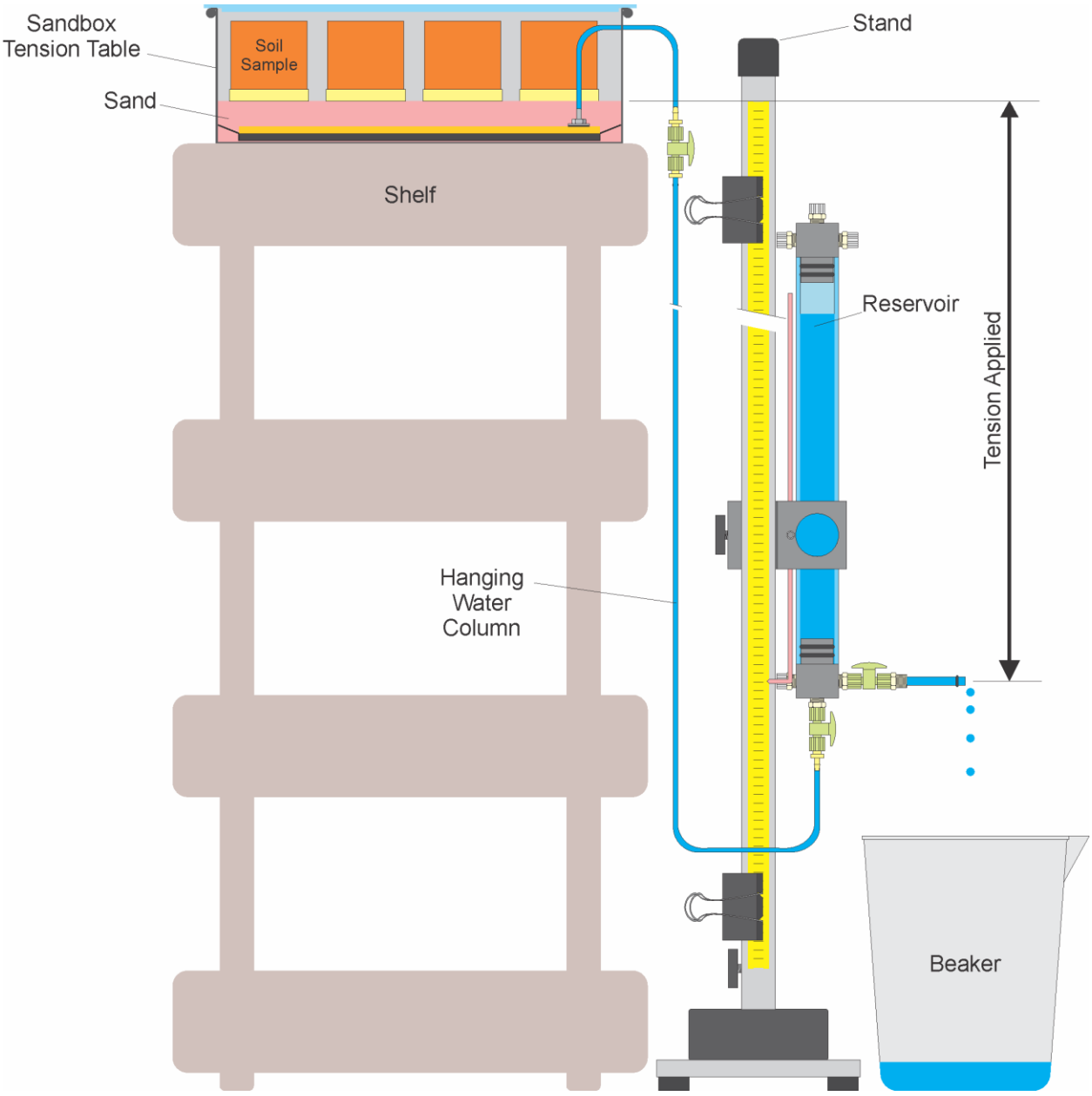


Figure 4. A Low-tension Lab Setup. The setup consists of a Sandbox Tension Table connected to a Hanging Water Column. The height difference between the surface of the saturated sand (shown in pink) and the dripping port of the Hanging Water Column determines the tension level applied.

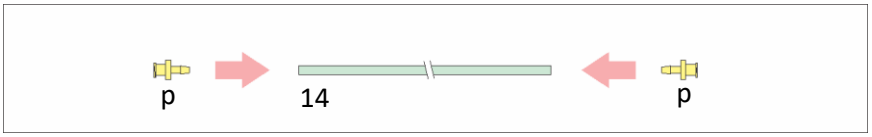
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Assembling the Shelf

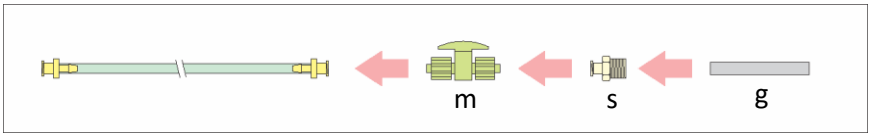
See the instructions inside the Lab Shelving Package.

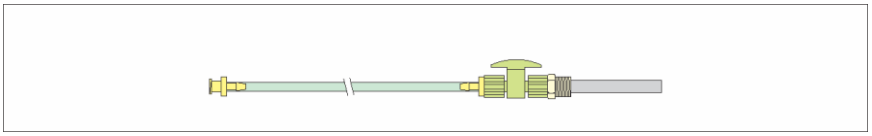
Assembling the Water Trap Jar

- *Water Suction Line:*

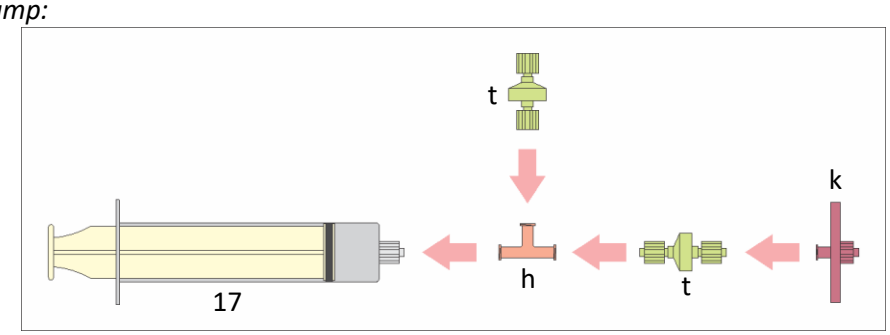


The Tubing is about 24 inches long.





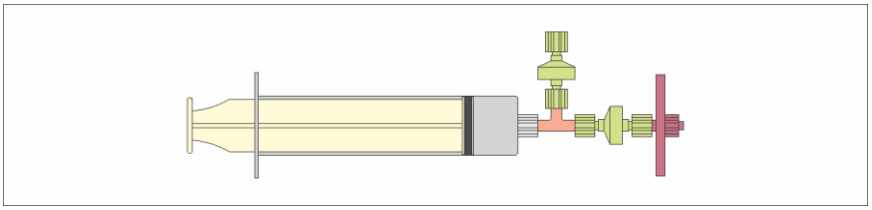
- *Syringe Pump:*



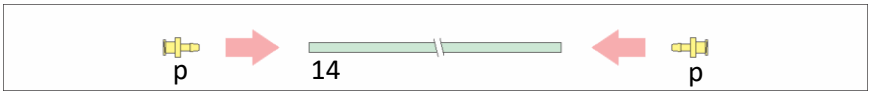
Pay close attention to the direction of the Luer Check Valves (*item t*).

The Water-Stop Filter (*item k*) might get plugged after being exposed to water vapor. You need to replace it at that point. The Syringe Pump will still work without the Water-Stop Filter.

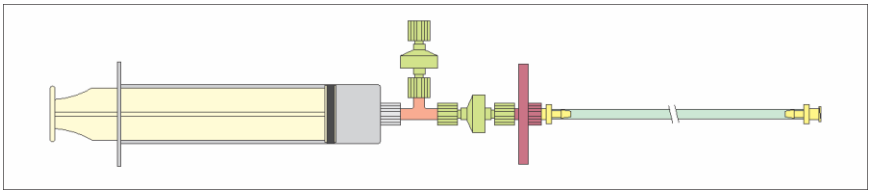
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com



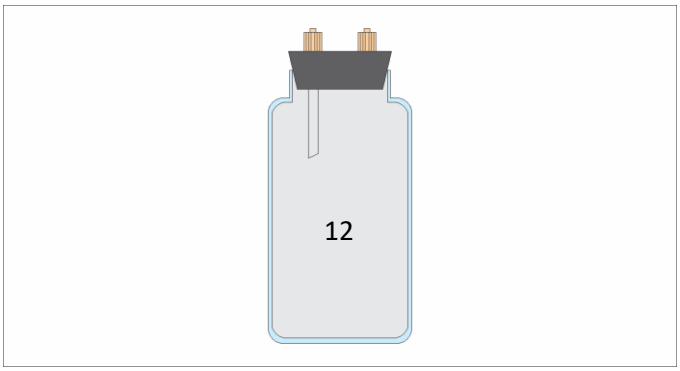
Syringe Vacuum Pump.



The tubing is about 12 inch long.

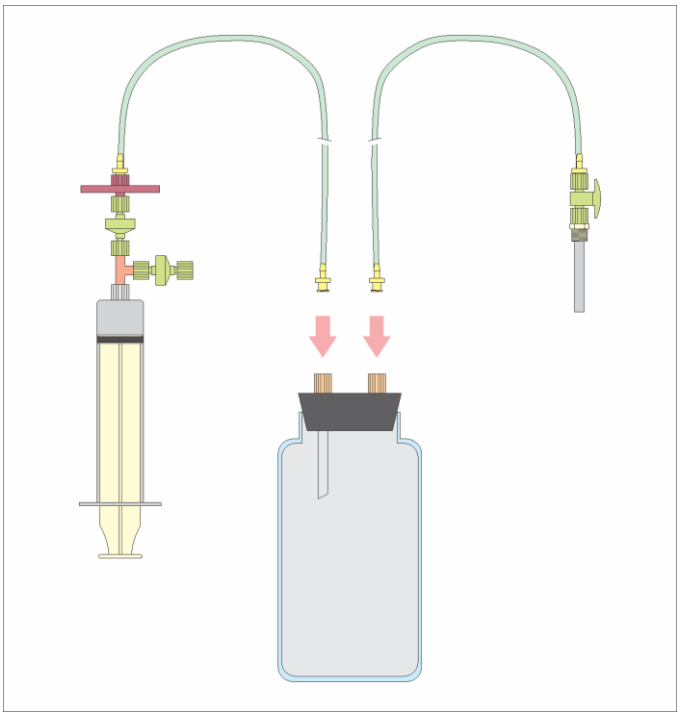


- *One-Liter Bottle (comes assembled)*



SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

- *Water Trap Assembly*



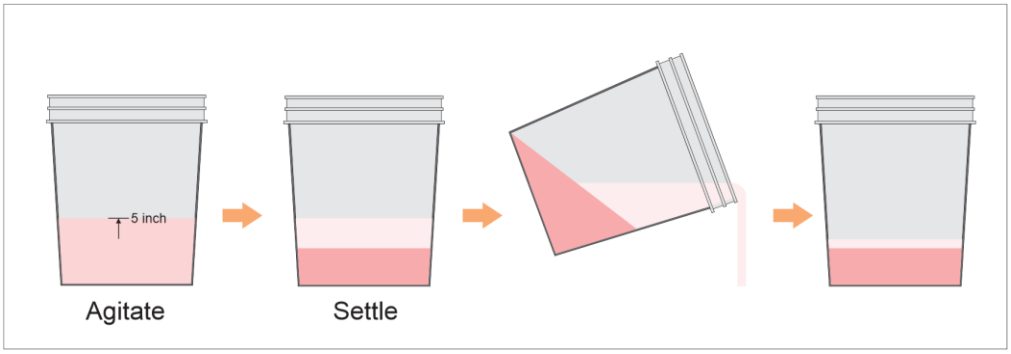
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Setting Up the Sandbox Tension Table

Washing the Sand

The sand included in the system is 325 mesh powdered sand. It is recommended to wash the sand first in order to eliminate the particles finer than sand.

- Wear a face mask before handling dry silica powder.
- Pour about 400 to 700 g dry silica powder in a 5-gallon bucket (the bucket is not included in the system).
- Add about 5 inches of water in 2 to 3 portions and mix. Agitate the mix completely. Then stop agitating and let the mix particles settle at the bottom of the column for about 20 minutes, then dump the murky water on top of the settled sand after one minute.

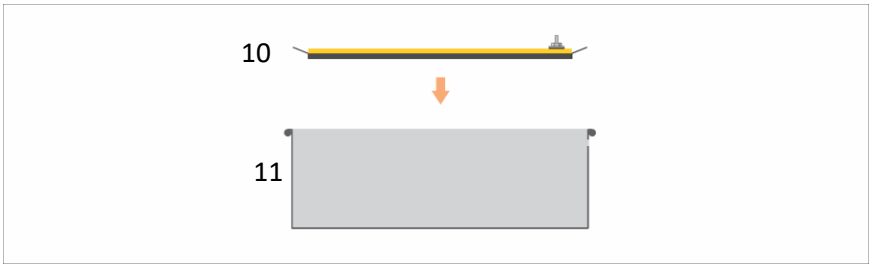


Note: do NOT dump the murky water in the drain. It might settle in the drainage pipes and plug them.

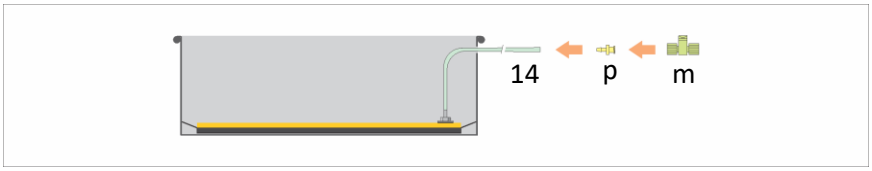
- Add water up to 5-inch mark again. Agitate the mix completely. Then let the mix particles settle at the bottom of the bucket for 20 minutes. Dump the murky water on top of the settled sand. Repeat washing the sand until the water on top of the sand is almost clear after one minute. Usually, 2 to 4 times of washing is enough.
- Once the sand is clear from fine particles, dump the extra water and leave enough water to have about one gallon of sand and water mix. The washed sand contains particles coarser than 10 micron and finer than 50 microns.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

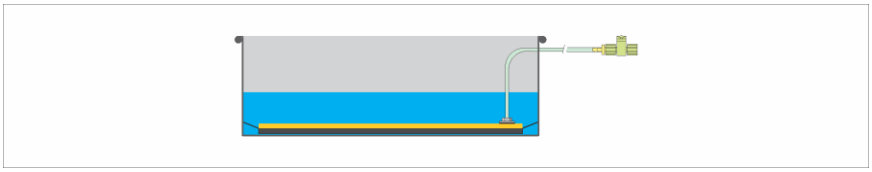
Setting Up the Sandbox:



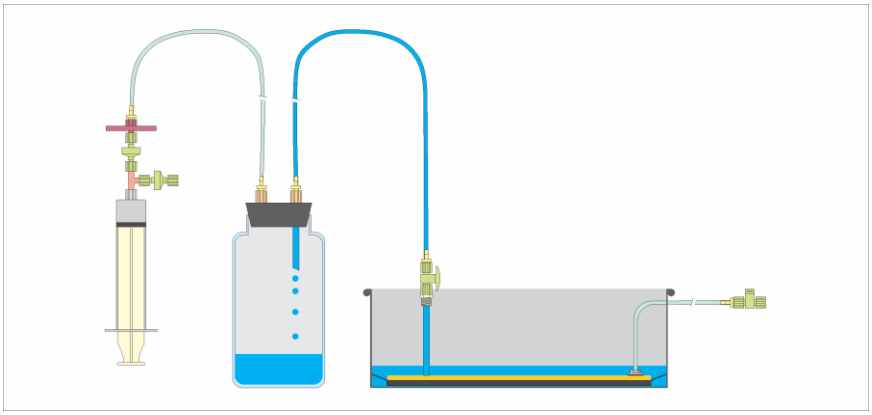
- Place the Zero-tension Plate inside the Saturation Pan.



- Connect about 20 cm of the Tubing (*item 14*) to the Plate port.
- Pass the tubing thru the small hole in the Saturation Pan's wall.
- Connect the Luer connection and the Stopcock according to the schematic above.



- Pour about 5 cm of water on top of the Zero-tension Pan. You'll notice that some air bubbles get trapped under the mesh screen of the Zero-tension Plate. The air bubbles should be removed.

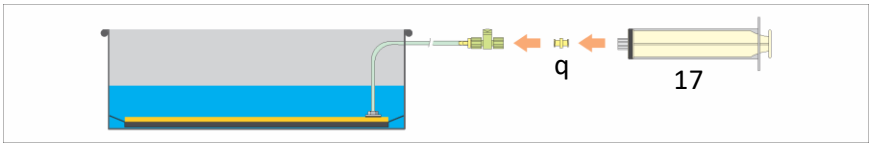


- Use the Syringe Pump to apply vacuum to the Water Trap Jar. Make sure that the Stopcock is closed.
- Now use the Water Trap Jar to suck-in all the air bubbles that are trapped under the mesh screen.

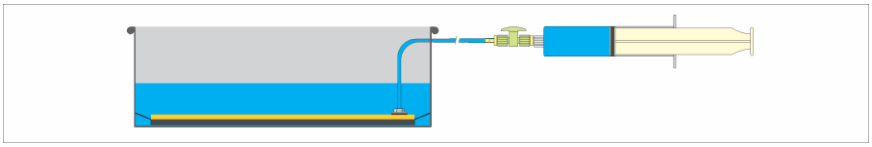
Note: Be extra careful not to damage or tear the mesh screen!

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

- Add more water if water height over the Zero-tension Plate drops below 1 cm.



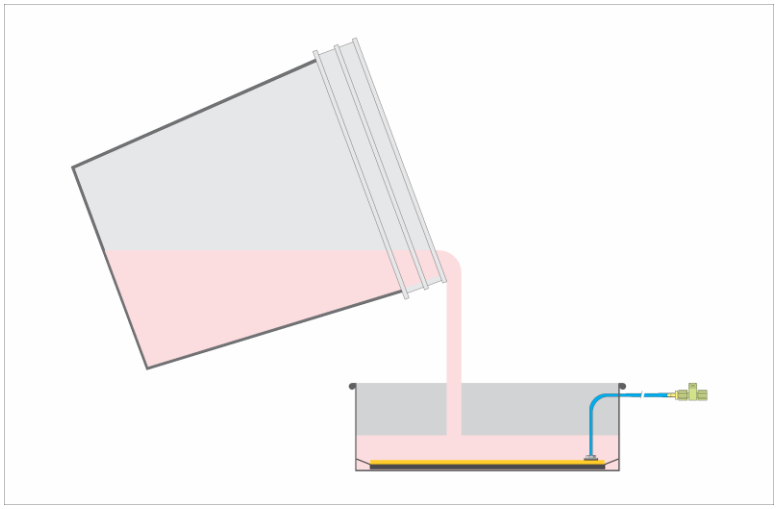
- Connect the Syringe to the Zero-tension Plate port.



- Open the Stopcock and slowly pull the Syringe plunger back. The goal here is to eliminate all bubbles trapped in the Zero-tension Plate and the Tubing. Close the Stopcock once all bubbles are eliminated.

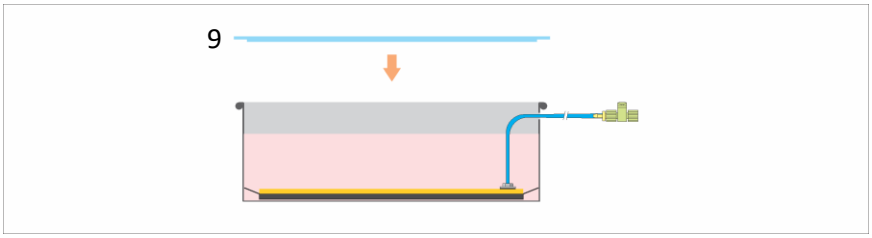
  Note: It is very important to eliminated all air bubbles trapped in the Zero-tension Plate and the Tubing. There should be no air bubbles in the system.
  Eliminating bubbles might seem tricky in the beginning. It takes some practice to find effective ways to get rid of air bubbles.

- Once all air bubbles are eliminated, place the Pan over its intended place (where it will not be moved for the duration of the measurement). This can be the Shelf included in the system, or any other stable place that is elevated enough for the target tension level. For example, if the target tension is 100 cmH_2O, the Pan needs to be elevated at least about 130 cm from the floor.

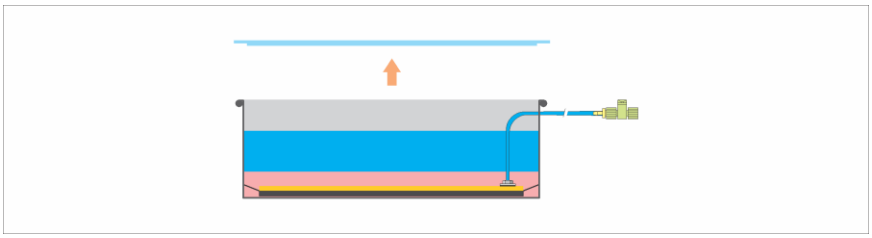


- Agitate the sand mix and pour it over the Zero-tension Plate. In case some sand remains in the Bucket, add more water, agitate the mix and pour it over the Zero-tension Plate.

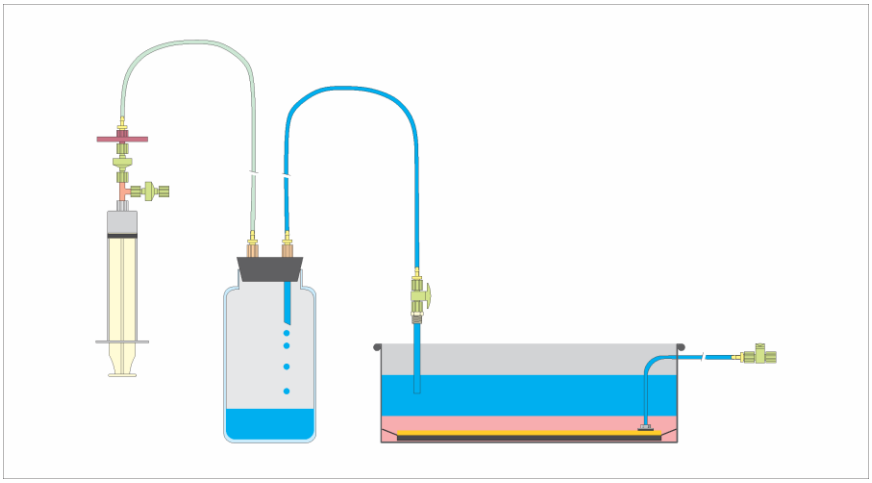
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com



- Put the transparent Lid on the Pan and let the sand settle for a day.

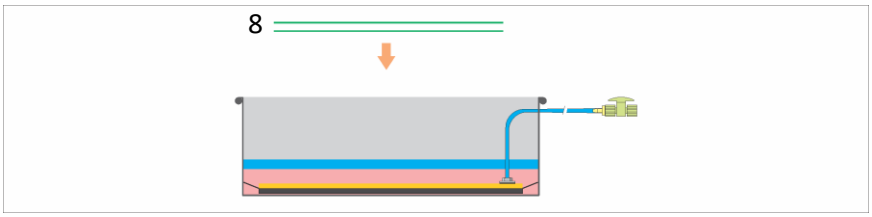


- The sand will settle and create an even and level layer over the Plate. The sand surface might be cracked around the perimeter of the Plate or other places. That is normal. You can get rid of the cracks later. Take off the Lid

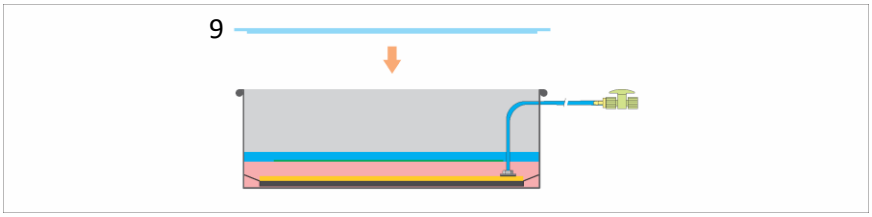


- Using the Syringe Pump, apply vacuum to the Water Trap Jar and evacuate the extra water on top of the sand layer. Leave about 0.5 cm of water on top of the sand surface.
- If there are any cracks use a spatula or your hand to level them off with the sand surface.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com



- Place two paper filters over the sand surface. Make sure that no air bubble is trapped under the paper filters.

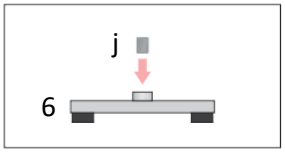


- Place the Lid over the Pan. Now your, Sandbox Tension Table is ready to use.

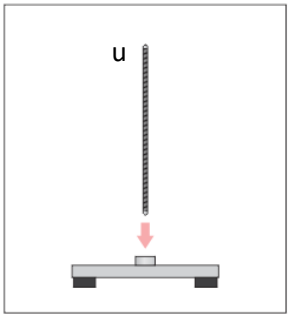
Assembling the Hanging Water Column Stand

Assembling the Stand

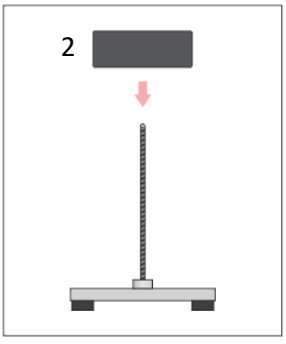
- Screw the Stud Adaptor in the Stand Base



- Screw the Stud in the Stud Adaptor

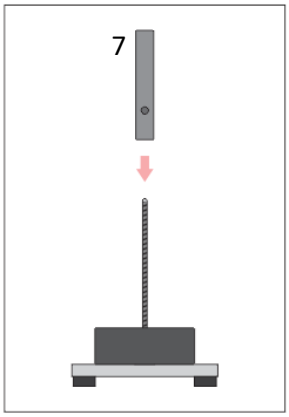


- Place the Base Support over the Base. Make sure that the square recess on the Base Support is facing up.

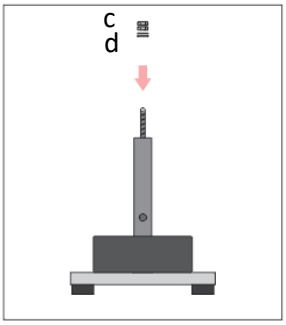


SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

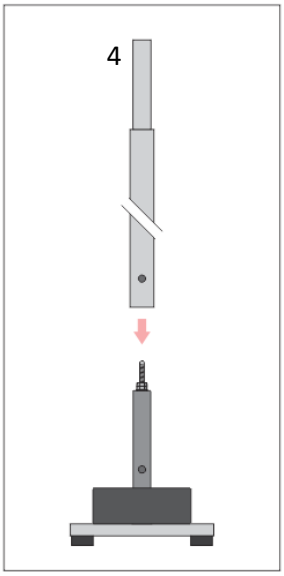
- Place the Riser over the Base Support. Make sure that the Riser is right-side up (see the schematic). The bottom of the Riser sits inside the Base Support square recess.



- Place two Washers (*item d*) over the Stud.
- Screw two Hex-nuts (*item c*) over on the Stud. Tighten the first nut first and then the second one. The second nut prevents the first one from loosening over time.

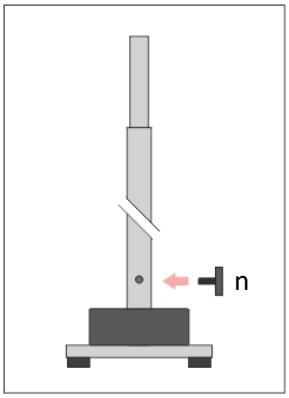


- Place a Stand Extension over the Raiser. Note that the kit includes two Stand Extensions (*items 4*) that are longer than the third one (*item 5*). Use one of the two longer Extensions for this step.

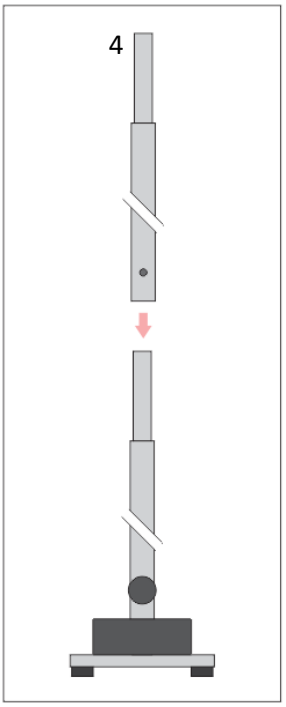


SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

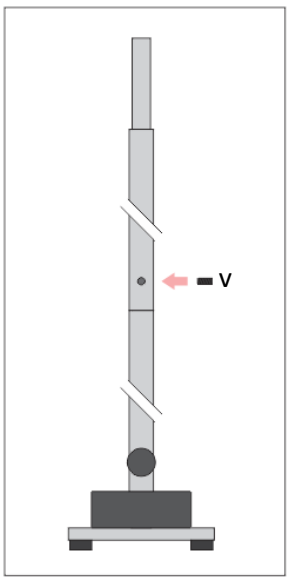
- Secure the Extension to the Stand Base using a Screw Knob.



- Place the second longer Extension on top of the first one. Make sure that the screw holes are on the same side (see the schematic).

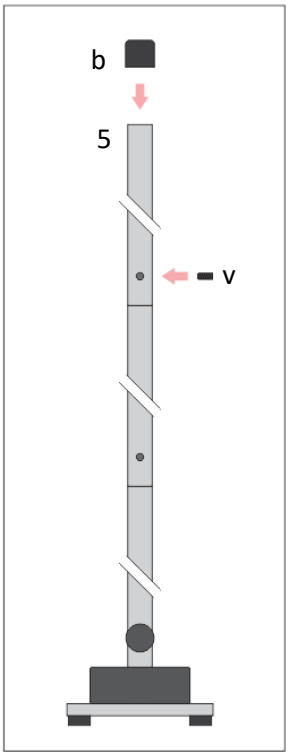


- Secure the second Extension to the first one using a Set Screw.



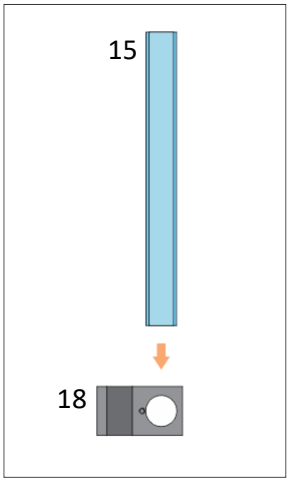
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

- Place the third Extension (*item 5*) over the second one. Make sure that the screw hole is on the same side as the others. Make sure that the Extension is right-side up (see the schematic).
- Secure the third extension to the second extension using a Set Screw.
- Put the Stand End Cap on top of the Stand.



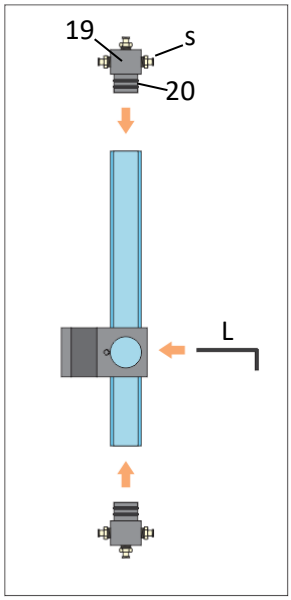
- ***Assembling the Reservoir***

Insert the Reservoir Tube inside the Reservoir Clamp.



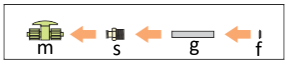
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

- Secure the Reservoir Tube to the Reservoir Clamp using the Set-screw (*item 19*) that is already in the Reservoir Clamp. Note that there are two Set Screws implemented in the Reservoir Clamp. The Set-screw that secures the Tube in place is not visible in this schematic.
  Also, note that there is a small O-ring between the Set-screw and the Reservoir Tube. Make sure it is in place. Otherwise, the Set-screw will scratch the Tube.
  It does not matter if the if the Clamp is fixed a little higher or lower to the Tube. We recommend fixing the Reservoir Clamp closer to the bottom of the Reservoir Tube (see the schematic).

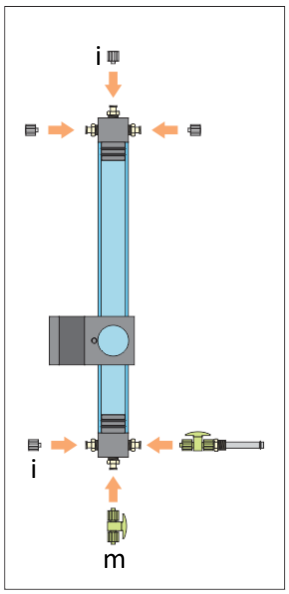


Insert the Reservoir End Caps into the Reservoir Tube (the End Cap is *items 16* plus *20* plus *S*, already assembled). Make sure that the side ports of the End Caps are parallel to the side of the Reservoir Clamp side (see the schematic).

- Assemble the Drainage Port Assembly (see the schematic)



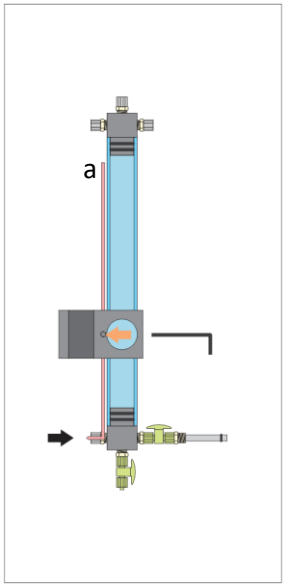
- The Reservoir has six ports, three on each End Cap. Not all of them are usually needed. Use Luer Male Plugs (*item i*) to plug all ports on the top End Cap.



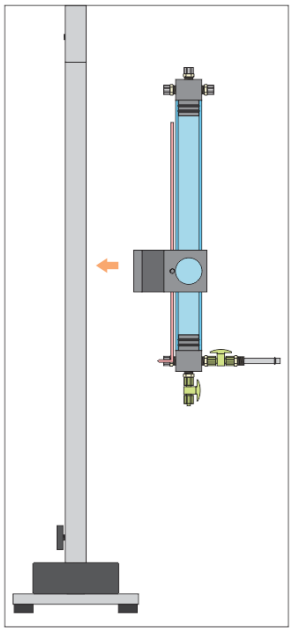
- Connect a Luer Stopcock to the port on the bottom of the Reservoir. This port is used to connect the Reservoir to Sandbox Tension Table.
- Connect the Drainage Port Assembly to one of the ports on the side of the bottom End Cap. Plug the other port with a Luer Male Plug.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

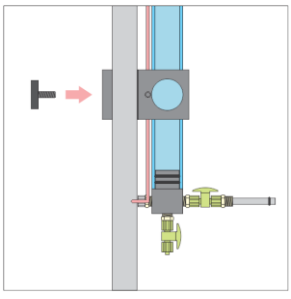
- Insert the Tension Level Indicator in the small hole on the bottom of the Reservoir Clamp.
- Adjust the horizontal part of the Indicator at the center of the side port of the bottom End Cap (see the black arrow in the schematic). Make sure that the horizontal part of the Indicator is parallel with the side of the Reservoir Clamp.
- Secure the Indicator in place by tightening the Set-screw implemented in the Reservoir Clamp. The Set-screw is shown in the schematic. Use the Allen Wrench included in the system to tighten the Set-screw.



- Attach the Reservoir to the Stand. This requires a special maneuver because the Indicator gets in the way.
  Once the Reservoir is attached to the Stand, slide the Reservoir close to the bottom of the Stand. Leave enough room for the Beaker (*item 1*) to be placed under the Drainage Port. The Beaker collects water drained out of the Drainage Port.
  The exact height of the Reservoir will be adjusted later.

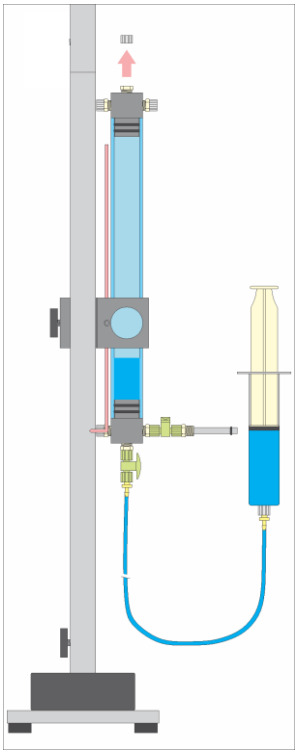


- Secure the Reservoir to the Stand using a Screw Knob.

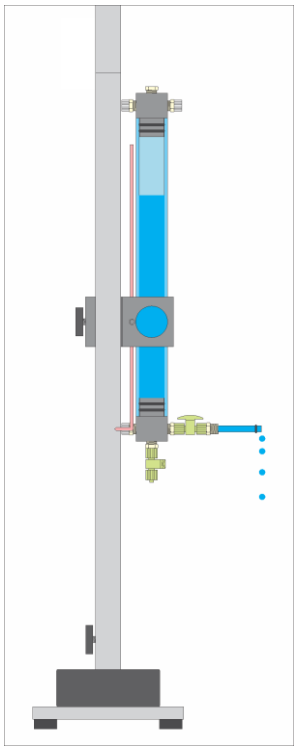


SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

- Open the top Luer Plug for vent (see the schematic).
- Fill the Syringe with water and fill the Reservoir using the Syringe.



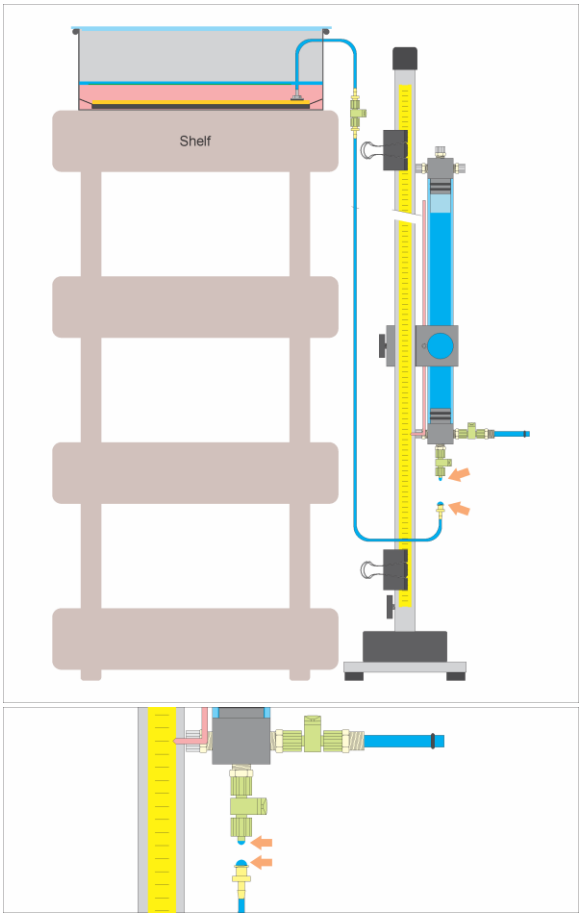
- Open the Drainage Stopcock for a few seconds and let water drain out. Then close the Stopcock. The goal of this step is to fill the drainage path with water and eliminate any potential trapped air bubbles.
  Secure the Luer Plug back to the port on top of the Reservoir.



SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Connecting the Sandbox Tension Table to the Hanging Water Column

The goal of this step is to connect the Sandbox to the Reservoir and avoid trapping air bubbles in the Tubing.



- Open the Sandbox Stopcock to fill the Tubing with water. There should be no air bubbles in the Tubing. Hold the end of the tubing upward and try to sustain a droplet of water on top of the Luer connection (see the schematic). Then close the Sandbox Stopcock.
- Open the Reservoir bottom Stopcock slowly until a drop of water hangs from it. Then close the Stopcock.
- Connect the Tubing to the Stopcock trying to avoid trapping air bubbles inside the Tubing.

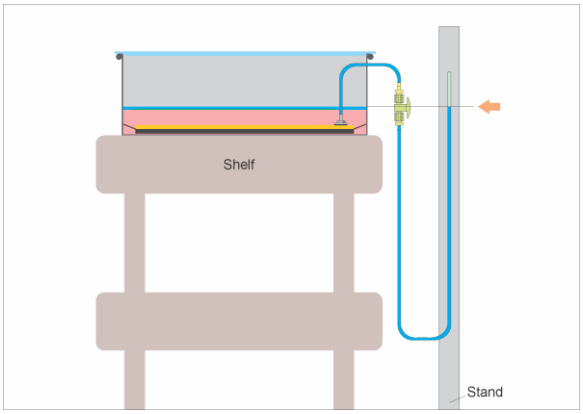
SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Marking the Zero-tension Level (Zero Point) on the Stand

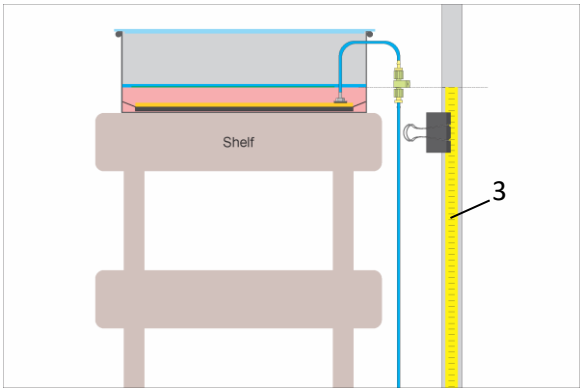
Zero Point is the height of the surface of the saturated sand marked on the Stand. It is a point of reference for determining the applied tension level on the Stand (more explanation later).

Determining the Zero Point on the stand is a very important step. Please note that before performing this step the Stand needs to be placed in a stable place, preferably as laterally close to the Sandbox as possible. After this step, the Sandbox and the Stand should not be moved as it might change the Zero Point on the Stand. If the Stand and/or Sandbox are moved, this step needs to be done again.

Note: Do NOT move the Stand and/or the Sandbox after performing this step!



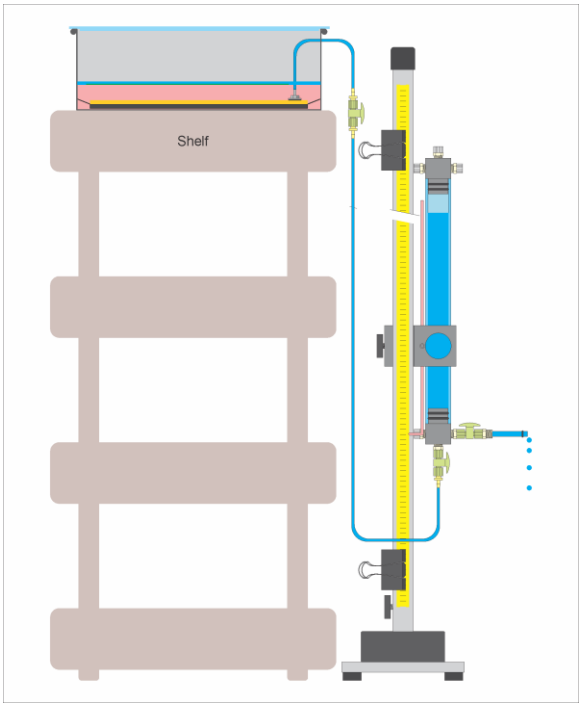
- Before performing this step there should about 5 to 10 mm of free water standing over the sand surface.
- Cut about 2.5 meter of the Tuning and insert a Luer-barbed connection (*item p*) in each end of it.
- Hold the end of the Tubing against the Stand and at a height that you think is higher than the water surface in the Pan (see the schematic).
- Open the Sandbox Stopcock. Since there is free water in the pan, water stars to flow thru the Tubing due to gravity. Gently add more water over the sand if the free water height falls below 5 mm.
- Wait until water level in the tubing levels off with the height of water surface in the Pan (it is shown in the schematic). Using a pencil, mark the water surface height on the Stand.
- Now measure the depth of free water in the pan (the height difference between the water surface and the sand surface) and mark the height of the sand surface on the Stand. For example, if the free water surface in the pan is 3 mm higher than the sand surface, then put a mark 3 mm below the water level mark on the Stand. The new mark indicates the Zero Point (see the schematic).



- Hold the zero number of the Measuring Tape on the Zero Point on the Stand. Now attach the Tape to the Stand using a Binder Clamp included in the system.
- Use another Binder Clamp to Secure the Tape to the bottom of the Stand. Use the third Binder Clamp in the middle of the Tape if needed.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Testing the System, Eliminating the Air Bubbles



- Adjust the Reservoir about 1 meter lower than the Sandbox.

- Open the Sandbox Stopcock. Open the two Stopcocks of the Reservoir and see if water flows freely out of the Reservoir Drain Port.

  Observe the Tubing, the Stopcocks and the Reservoir for potential air bubbles. Eliminate the air bubbles that you think might reduce the water flow significantly. A few small air bubbles (about the size of the tip of a needle) are usually fine. Bubbles that fill the whole inside-diameter of the Tubing should definitely be eliminated.

  Note that during this step, there should always be about 5 to 10 mm of water standing over the sand surface in the Sandbox. If the Sandbox runs out of free water, water stops flowing and you won't be able to test the system. If that happens, carefully add more water over the sand trying to not disturb the sand surface.

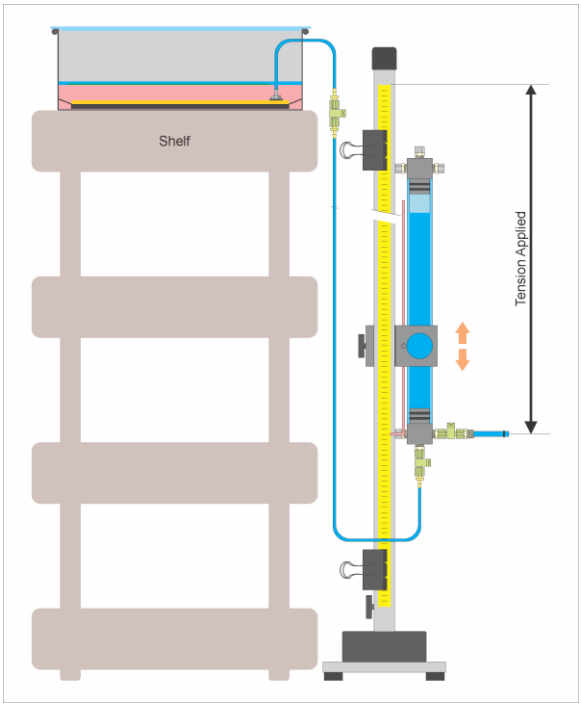
Testing the System

Once the system is bubble-free, let the system drain water until there is no free water ponding over the sand. At this point, water should stop draining and there should be no air in the tubing.

In case that the sand layer leaks air, air gets into the Tubing. This happens if there is a through crack in the sand layer. In that case, the Sandbox is not functional and needs to be setup again.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

Adjusting the Tension Level

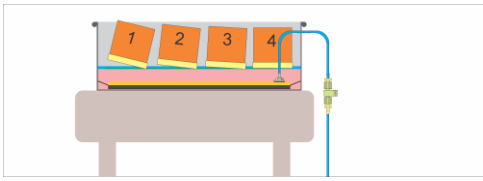


The numbers on the Tape represent the tension level applied. For example, the zero on the Tap represents zero tension. Also, 10 cm mark on the Tape represents 10 cmH2O of tension (about 10 millibar of tension).

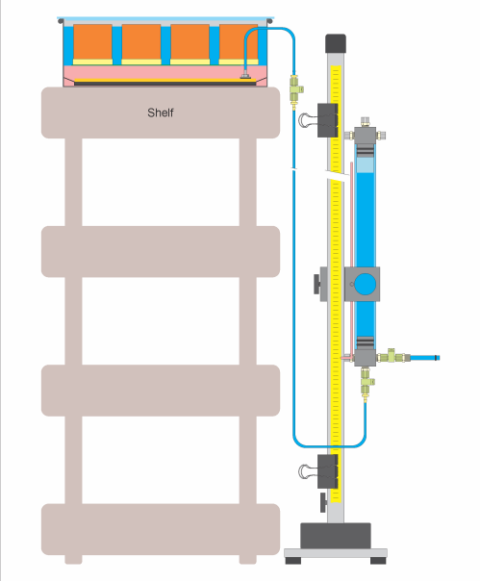
- Hold the Reservoir Tube with one hand and unscrew the Reservoir Knob with the other hand until you can slide the Reservoir up and down along the Stand.
- Slide the Reservoir up/down until the Indicator is against the target tension level. For instance, if the target level is 50 cmH2O, the Indicator needs to be against the 50 cm mark on the Tape. This means that the height difference between the surface of the sand and the drainage port is 50 cm.
- Secure the Reservoir Knob once the tension level is adjusted.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

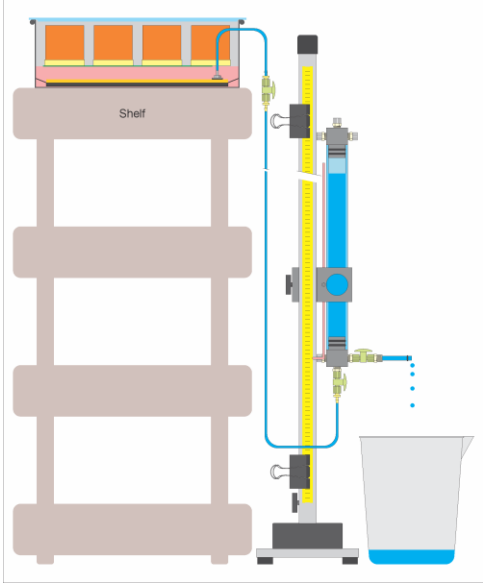
Saturating the Soil Samples



- Before placing the Soil Samples other the sand layer, make sure that there is about 2 mm of free water ponding over the sand.
- When placing the Samples over the sand, make sure that no air bubble is trapped under the Samples (see the steps in the schematic).



- Gently add more water to the Pan. Make sure the water level is not higher than the Samples (perhaps about 2 mm lower than the top of the Samples).
- Put the Lid on top of the Pan to minimize evaporation.
- Wait until the Samples are saturated. Add more water if water subsides significantly. Depending on the soil type, saturating soil samples might take from several minutes (sand) to several days (clay).



- Once the Samples are saturated, use the Water Trap Jar to evacuate the free water in the Pan. Do not worry if you can't evacuate all free water. The rest will be drained by the system.
- Put the Lid over the Pan to minimize evaporation from the samples.
- Open the Stopcocks to start tension application to the Samples.
- Wait until water stops draining from the Sandbox. Depending on the soil type, this may take several hours (sand) to several days (clay). When water stops draining, the Sample has come to equilibrium with the tension level applied.

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com

With dealers throughout the world,

you have convenience of purchase and assurance

of after sales service.

 0898-1768 (06/2021)

SOILMOISTURE EQUIPMENT CORP. P.O. Box 30025, Santa Barbara, CA 93130 U.S.A.
Phone: (805) 964-3525 - Fax: (805) 683-2189 - Email: sales@soilmoisture.com Website: http://www.soilmoisture.com