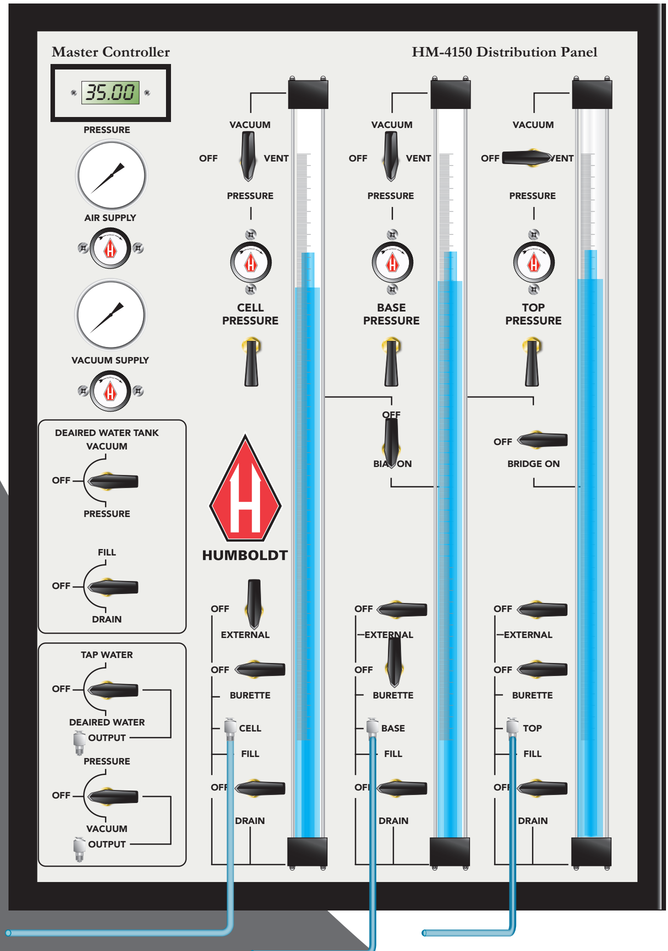
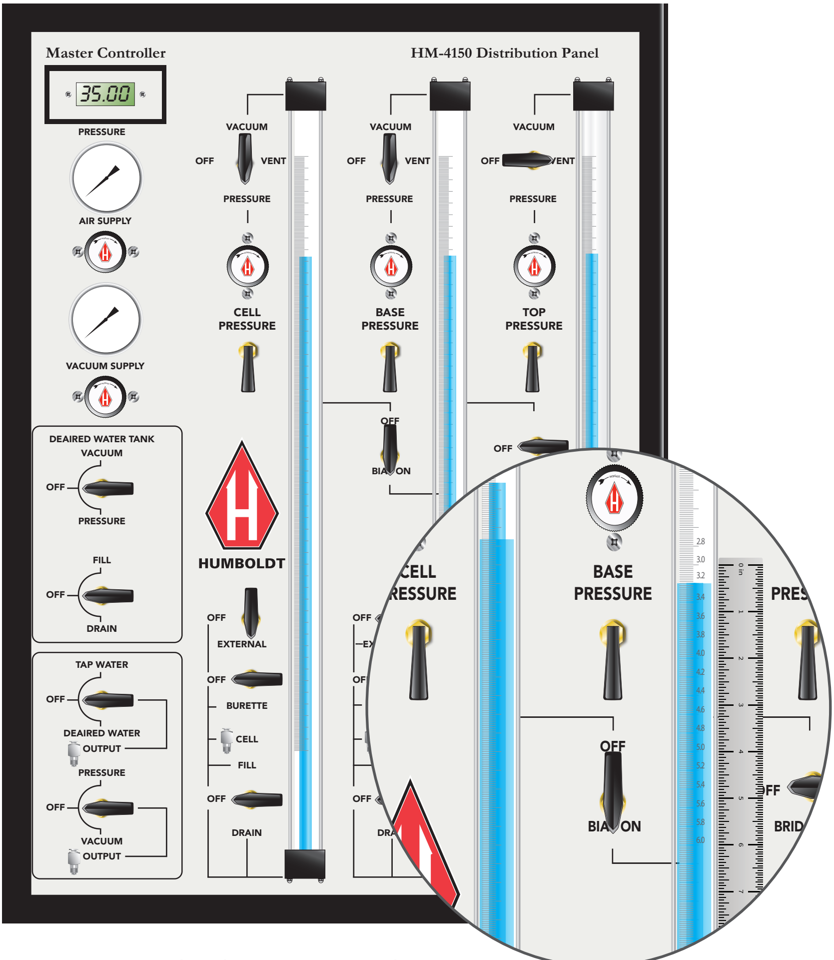
Constant Head Permeability Setup



Testing Equipment For Construction Materials

HUMBOLDT

1. Base and Top Burette cross-sectional Area (inflow and outflow) check /Verification



A. Determine the burette reading.

B. Measure the length of the known volume of the burette using a steel ruler.

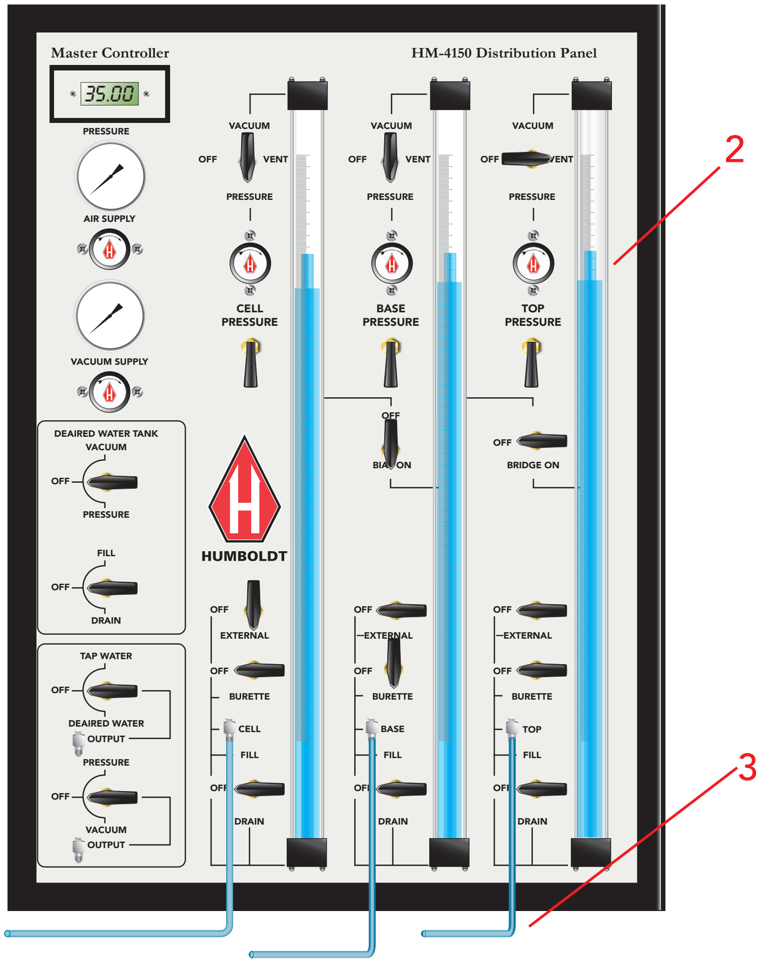
Example: In this example 2.00 CC is equal to 4.00 inches in length.

C. Convert the length into cm.

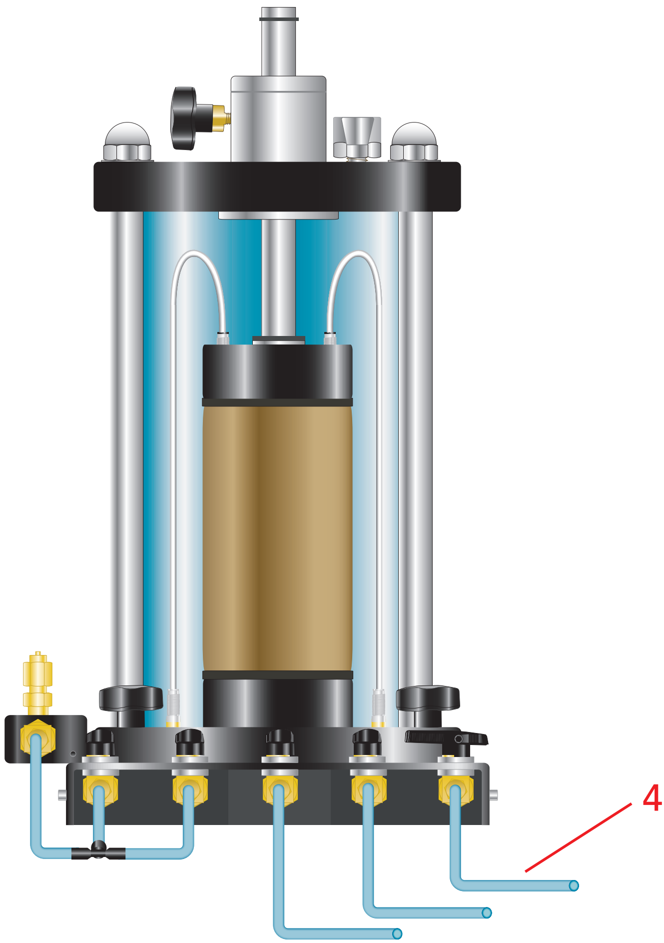
Example: (4.00 x 2.54) = 10.18 cm

D. The area of the burette equals the known volume, divided by the measured length.

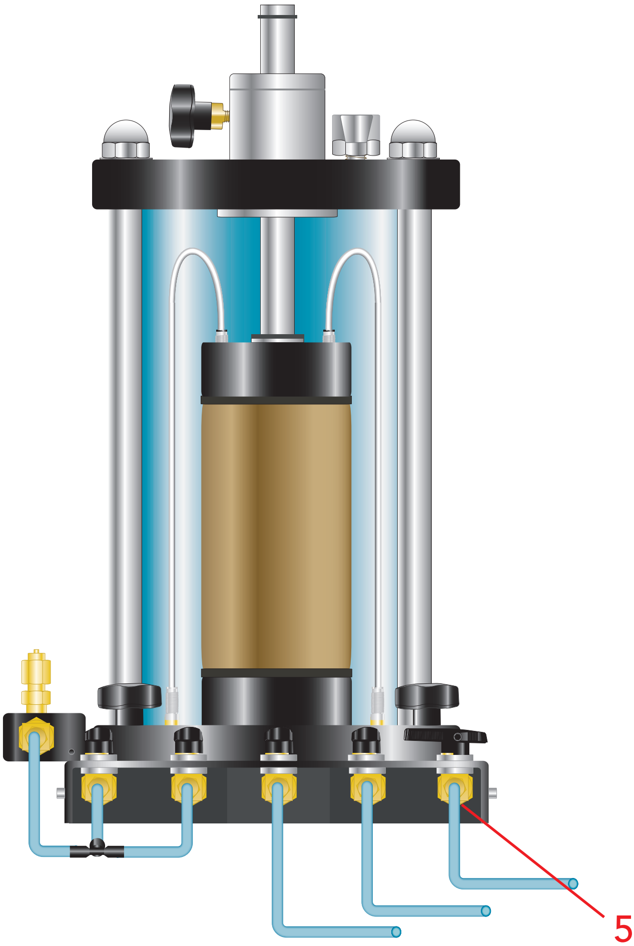
Example: Area = 2.00 divided by 10.18 cm = 0.196 cm



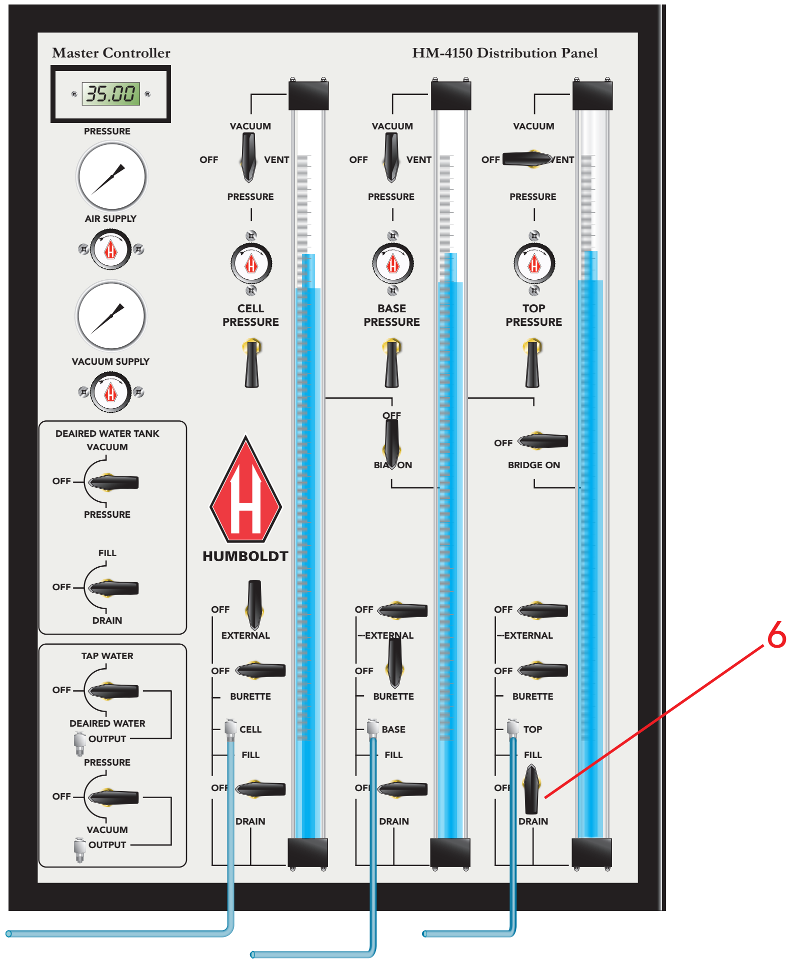
2. Fill the top burette, if it is not filled.
3. Connect the tubing to Top Burette Assembly (far right) on the pressure panel.



4. Connect the tubing from the Top Burette Assembly on the pressure panel to the Top Input on the right-hand side of the Triaxial cell.

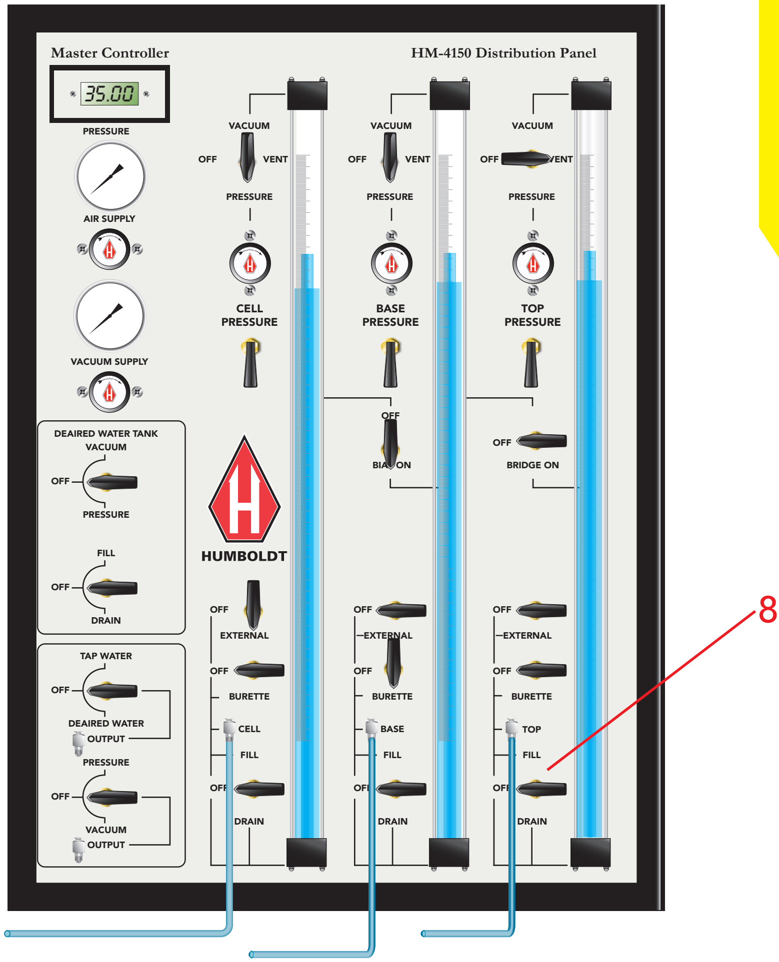


5. Loosen the nut holding the tubing on the Top Input valve of the Triaxial cell.

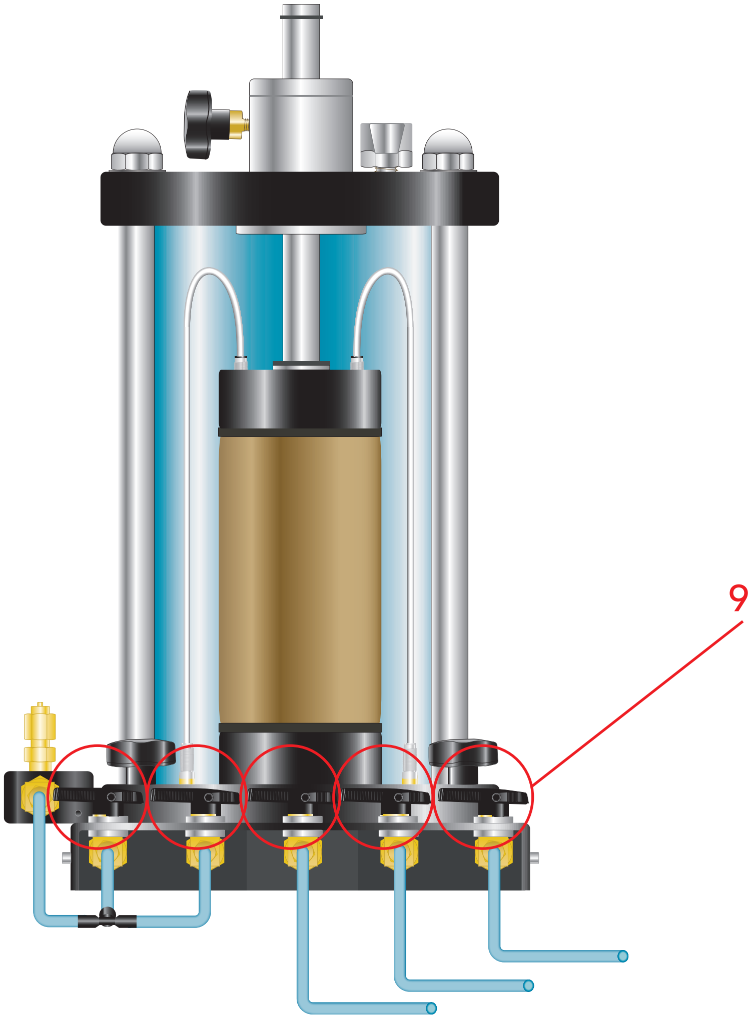


6. Turn the Top Pressure burette assembly's Fill/Drain valve to the Fill position, and allow the water to drain, which flushes the Top Input valve of the triaxial cell (Step 5).

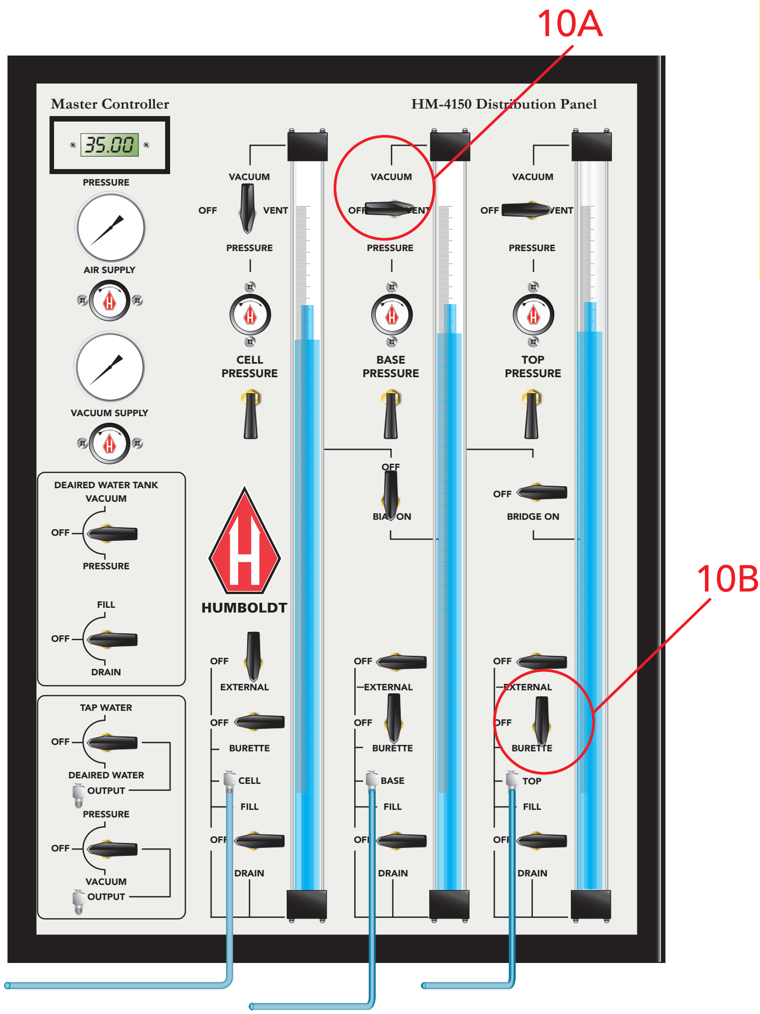
7. Then, Tighten the nut we loosened in Step 5.



8. Turn the Top Pressure Burette assembly's Fill/Drain valve to the off position.

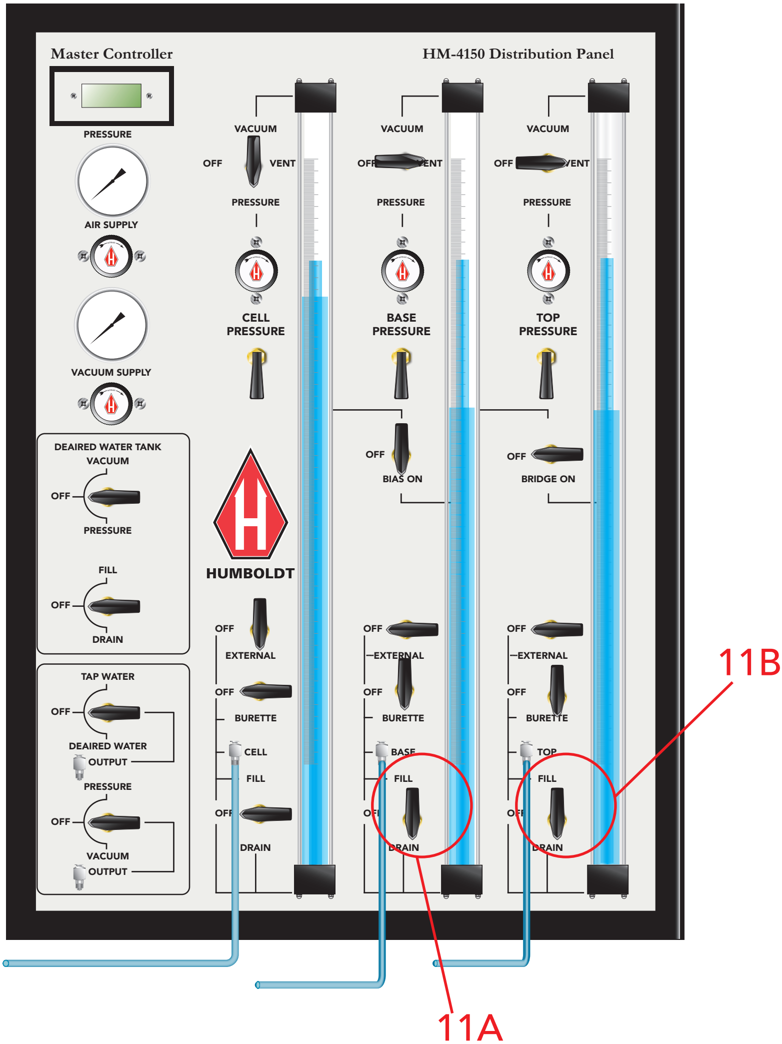


9. Close all of the valves on the Triaxial cell.



10A. Turn the Base Pressure Valve to the Vent position.

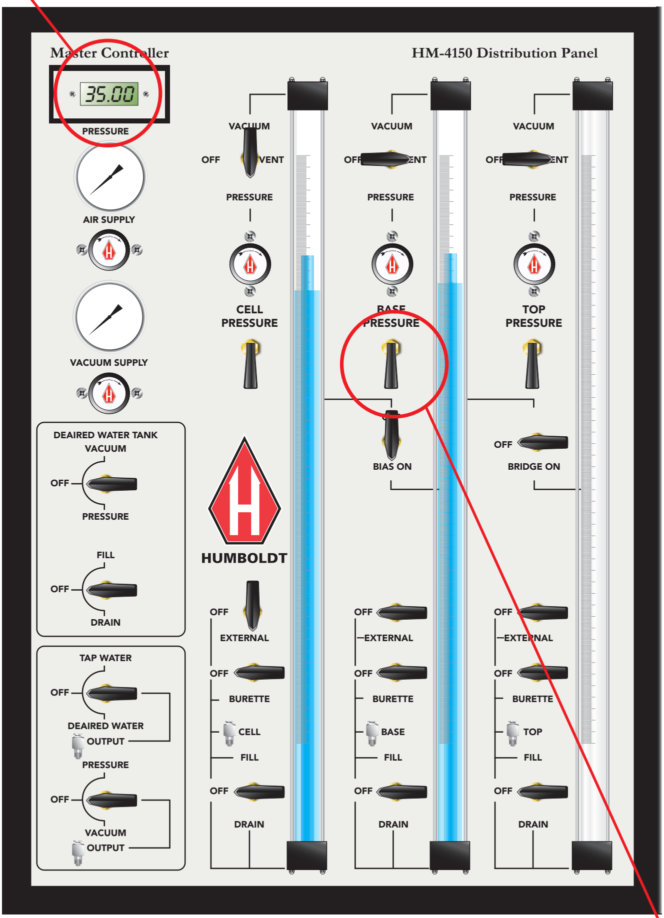
10B. Turn the External/Burette Valve for the Top Pressure Burette to the Burette position.



11A. Slowly Turn the Base Fill/Drain valve to the Fill or Drain position to make the water level in the Burette at approximately mid-height, then turn the Fill/Drain valve to the OFF position.

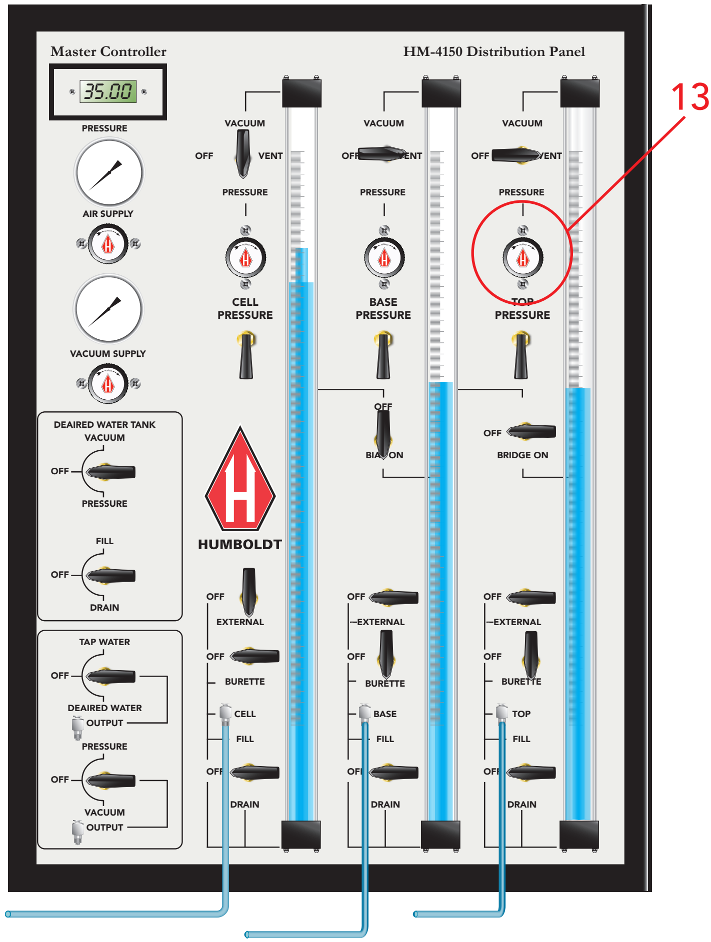
11B. Slowly Turn the Top Fill/Drain valve to the Fill or Drain position to make the water level in the Burette at approximately mid-height, then turn the Fill/Drain valve to the OFF position.

12A

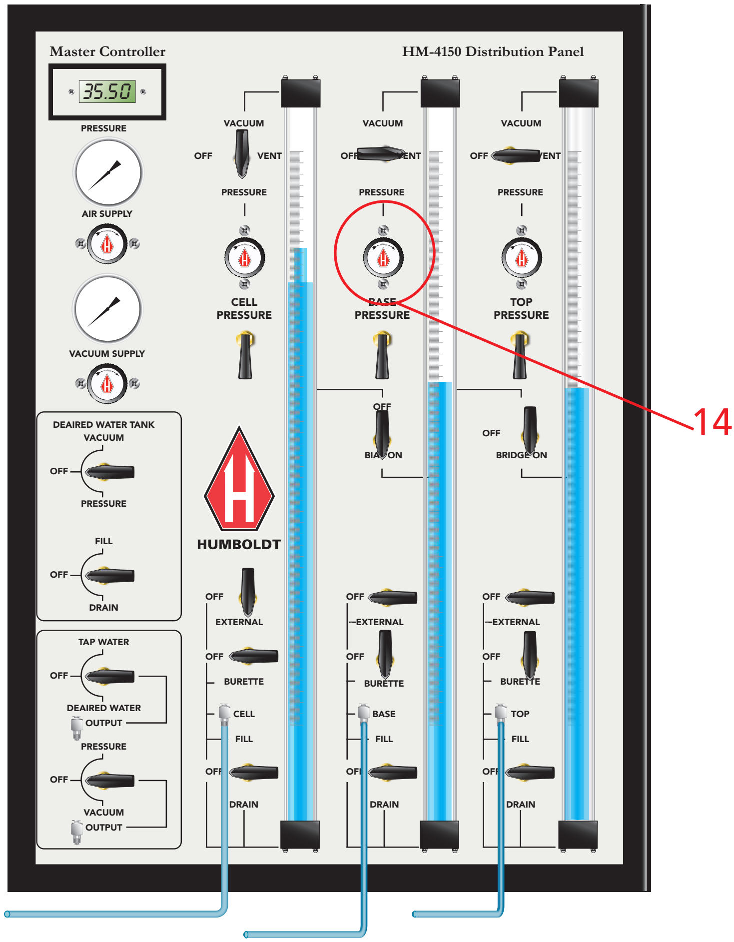


12B

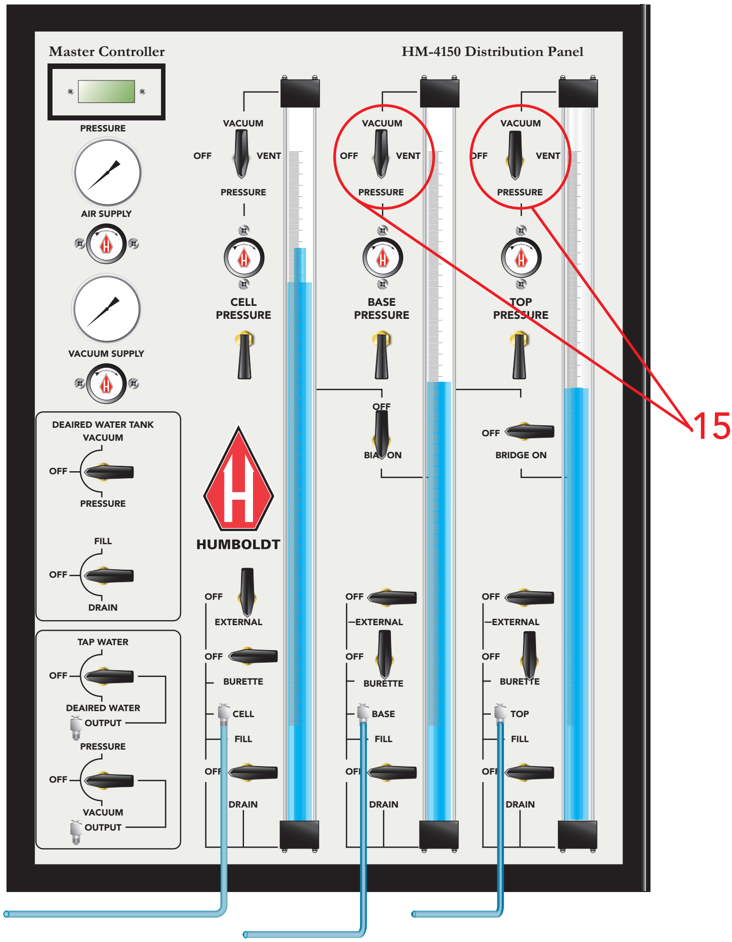
Flip this toggle up, which will reveal the Base Pressure in the Pressure window (12A) located at the top left corner of the HM-4150 Panel.



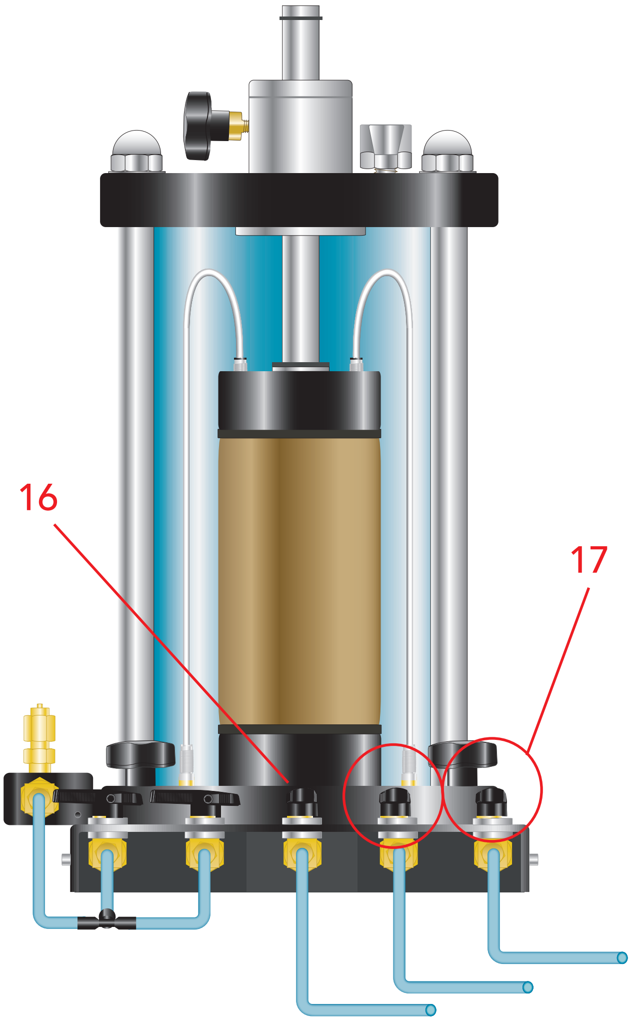
13. Now adjust the Top Pressure to match the Base Pressure.



14. When the two pressures match, go back to the Base Pressure and increase it by 0.5 psi.

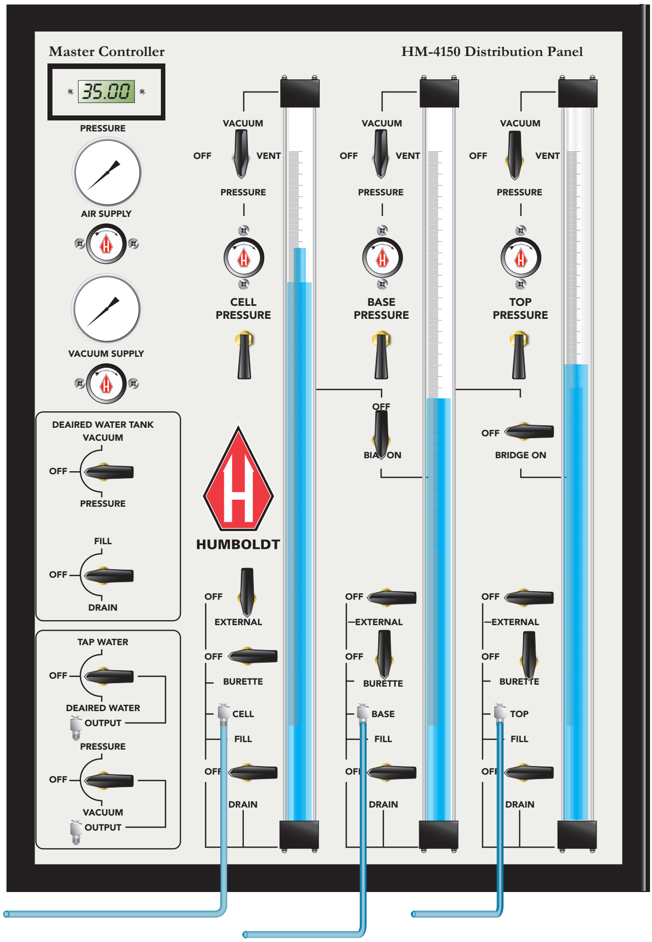


15. Turn the Base Pressure and the Top Pressure valves to Pressure position.



16. Open The Cell valve located in the middle of the Triaxial cell.

17. Open the Top and Base Valves of the Triaxial cell located on the right-hand side of the Triaxial cell.



18. Allow the top and Base Burettes to stabilize for 5 -10 minutes and then take a Burette reading.

19. Start a timer and take the Burette reading for both the Base and the Top.

20. The Base Burette should go down and Top Burette should rise.

21. When Base Burette drops to about 0.3 CC, record the time expired, and the level readings of the base and the top burettes.

22. Continue recording the levels in the burettes.

23. Compute the inflow to the outflow ratio.

24. After computing four consecutive ratios of inflow to outflow between 0.75 and 1.25, you can now compute the Permeability.

25. Permeability K (cm/sec.) =

Δ Q(cc) * L(cm) / (Δ t(sec.)* h (0.5 psi* 70.38 cm)* A)

K = hydraulic conductivity, cm/s

ΔQ = quantity of flow for given time interval Δt, taken as the average of inflow and outflow, cm^3

L = length of specimen, cm

A = cross-sectional area of specimen, cm^2

tΔ = interval of time, s, over which the flow ΔQ occurs (t2 – t1), time

t1 = at start of permeation trial, date: hr:min:sec

t2 = time at end of permeation trial, date: hr:min:sec

Δh = average head loss across the permeameter/specimen ((Δh1 + Δh2)/2), cm of water

Δh1 = head loss across the permeameter/specimen at t1, cm of water

Δh2 = head loss across the permeameter/specimen at t2, cm of water

a_{in} = cross-sectional area of the reservoir containing the influent/inflow liquid, cm^2

a_{out} = cross-sectional area of the reservoir containing the effluent/outflow liquid, cm^2

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Testing Equipment For Construction Materials
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To Perform Falling Head, Rising Tail Permeability

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