Use of a Volumetric (Transfer) Pipette

A transfer pipette is used for transferring a precisely measured volume of a solution from the stock container into the desired container. A 25 mL volumetric pipette of the type you have will deliver 25.00 $\pm$ 0.03 mL. Check that the tip of the pipette is not chipped before using it.

1. Clean and dry the suction bulb, if necessary.

A suction bulb is used to fill the pipette. You must not use your mouth. When a bulb is used properly, solution is not drawn up into it and it does not become wet or contaminated. Since novice users do, however, occasionally draw liquids up into the bulb, you must check whether the one you have is clean and dry. Remove the white plastic piece. If it is wet or dirty, rinse it with deionized water and wipe it dry with a quarter-section of paper towel. Shake the bulb part. If there is any sign of liquid or solid residue in the bulb, rinse it out and shake it as dry as possible. Put the two pieces back together and the bulb is ready to use. Any solid residue in the bulb could drop down into the pipette during the filling procedure and contaminate the solution being transferred.

2. Rinse the pipette with some of the solution being transferred.

Pour 5 to 10 mL of the stock solution into a clean 100 mL beaker and rinse the beaker with it. Discard the rinsings and shake out the beaker in the sink. Repeat this rinsing two more times if the beaker was not dry to start with. Pour about 30 mL of stock solution into the beaker and cover it with a clean watch glass.

Rinse down the full outside length of the tapered end of the pipette with deionized water and wipe it dry with a section of paper towel. Use the paper towel also to draw out (by capillary action) the droplet of water that may have entered the tip of the pipette.

In this operation you need to develop dexterity in the use of the suction bulb. Hold the bulb in your left hand, the pipette in your right hand. Note that the white plastic part of the bulb is tapered on the interior. Thus, it fits all sizes of pipettes. If it is scored, there may be air leakage, which will make it difficult to use. A shallow scratch is not a problem if you hold the bulb firmly on the pipette. If it is too deeply scored to use, get a replacement piece.

Insert the pipette into the solution in the beaker. (The pipette was rinsed and wiped in order not to contaminate or dilute the stock solution at this point). Using the suction bulb, draw up enough solution so that about 1 cm depth is present in the bulb part of the pipette. Use your right index finger to close the top of the pipette to hold the solution from draining out. Remove the pipette from the beaker and put the watch glass back. Hold the pipette horizontally and rotate it so the solution rinses the entire inner surface of the glass bulb. Avoid touching the tip of the pipette. Invert the pipette, remove your finger quickly, and let the rinsings drain into the sink. Turn the pipe upright and wipe the top end dry with a section of paper towel. Repeat this rinsing once more (twice, if the pipette was not dry inside to start with).

If droplets or rivulets of liquid form on the inner walls of the pipette while it is draining, it needs cleaning to remove the grease. Pour a solution of detergent into the pipette and shake it well. Rinse well, first tap water, then with deionized water. If this solves the problem, rinse with the solution to be transferred as above. If it doesn't, check with your demonstrator.

3. Fill the pipette.

Pour enough solution into the beaker to fill the pipette and leave some 10 mL over. Squeeze the suction bulb in your left hand as flat as it is comfortable to do without exertion. Press it firmly on the top end of the pipette. Insert the pipette tip into the beaker and slowly draw the solution up.

The tip of the pipette should be well below the surface of the liquid so air is not drawn up. If that does happen, solution rushes up the pipette and into the bulb; then when you instinctively react by squeezing the bulb, the solution returns back into the pipette and the beaker. Thus, any solid residue or liquid in the bulb (including the water you rinsed it with) contaminates the solution. It must be discarded and the whole system (beaker, pipette and suction bulb) must be rinsed again. If this happens too often you will run out of stock solution, so don't let it happen.

Draw the liquid to a level of about 4 cm above the mark. Deftly remove the bulb and slip your right index finger over the end of the pipette. This takes some practice. If the liquid falls below the mark before you get your finger in place, try again. By all means do not draw liquid into the bulb. The rate of flow, up or down can be slowed to some extent by resting the pipette lightly on the bottom of the beaker. But don't bear down on it or grind it on the beaker or you will chip the tip and have to buy a new pipette.

Allow the liquid to drain until the bottom of the meniscus is level with the mark. Touch the pipette tip against the side of the beaker in order to remove the partial clinging drop. Cover the beaker again.

4. Drain the pipette.

Insert the full pipette into the receiving vessel. Allow the liquid to drain by gravity. Don't blow it out. After draining is complete, wait about 5 seconds to let the inner walls drain, then touch off the tip to remove the clinging droplet.

If a further transfer is to be made, proceed to do so by repeating steps 3 and 4. When you are finished, wipe off the tip of the pipette and set it aside until clean up time. If you need to use this pipette again during the next hour or two with the same solution, it is ready to use. Wiping the tip at this point removes adhering solution, which would otherwise evaporate and leave a contaminating residue.

5. Clean-up.

To clean the pipette at the end of the day, rinse down the inside with deionized water, and also the outside on the tip part. Let it drain completely before storing it away in your drawer.