

MAKING A HYDROMETER FROM A BERAL PIPET FOR USE IN DENSITY DETERMINATIONS OF SUGAR SOLUTIONS

by

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Materials

Beral pipet

scissors

masonry sand (in a container)

water

Bunsen burner or candle

tongs

2 hydrometer jars (prescription drug vial of approx. 60 mL capacity)

metric rule cut from an overhead transparency sheet

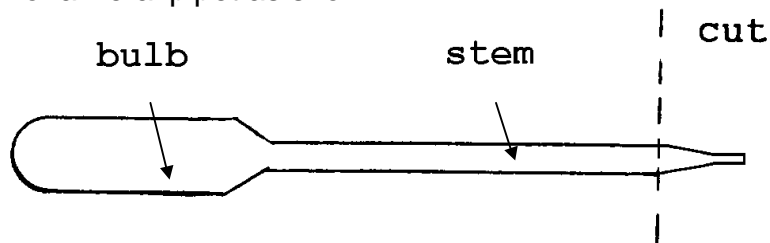
“Zap-a-Gap” super glue or Elmer’s heavy grip cement

file

labels

Procedure

Cut the tip off of a Beral pipet as shown.



Fill the pipet bulb approximately 3/4 full of the type of sand used by bricklayers. (You can probably obtain this sand at any construction site at no cost.) Sieve the sand through wire gauze or screen wire to get uniformity of size and to remove debris prior to filling the pipet. Make sure the sand is dry. Place the pipet, stem up, in a hydrometer jar filled with water. (Some of the water will overflow when the pipet is placed in the vial.) The stem of the pipet should extend about 1.5-3 cm below the surface of the liquid. Adjust the position of the pipet by adding or removing sand until it floats as indicated. Next, fill a second hydrometer jar with 15% sucrose solution and place the pipet (with the sand in it) in the sucrose solution. The bulb of the pipet should be completely submerged in the solution. If it is not, add enough sand so that it is.

The stem of the Beral pipet is faintly cloudy. Place the end of the stem near the flame of a candle or Bunsen burner. When the plastic at the end of the stem becomes noticeably transparent, clamp the end with tongs to seal the stem. Check to see

whether the pipet is sealed by immersing the entire pipet in water. If bubbles appear, the stem is not sealed.

Using a copier, make an overhead transparency of the sheet of centimeter rulers **included**. Cut each ruler so that it is 6½ cm long. Trim the long edges of the ruler to minimize its size. Position a plastic ruler against the stem of a sealed Beral pipet so that the larger numbers on the ruler are at the bulb end of the stem. Affix the ruler to the stem using super glue. After considerable experimentation, we find that the “Zap-A-Gap CA+” brand of super glue works better than any other adhesive.* You should scar or rough up the stem of the pipet with a file prior to applying the glue in order to get the best adhesion.

* This brand of super glue can be found in craft or hobby shops. It is manufactured by Pacer Technology, 9420 Santa Anita Avenue, Rancho Cucamonga, CA 91730, (714)987-0550.