

PYCNOMETER FOR THE DETERMINATION OF THE SPECIFIC GRAVITY OF ALCOHOLIC DISTILLATES.

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For several years we have been using with much satisfaction Reischauer's form of Specific Gravity bottle. This consists essentially of a narrow-necked graduated flask used in volumetric work. Those, which we first used, were made for us on our own specifications by a commercial glassblower, but were not graduated by him. We specified that the necks of the flasks should not be over 6 mm. in diameter inside, that the flask be as light as possible without sacrificing strength, and that the

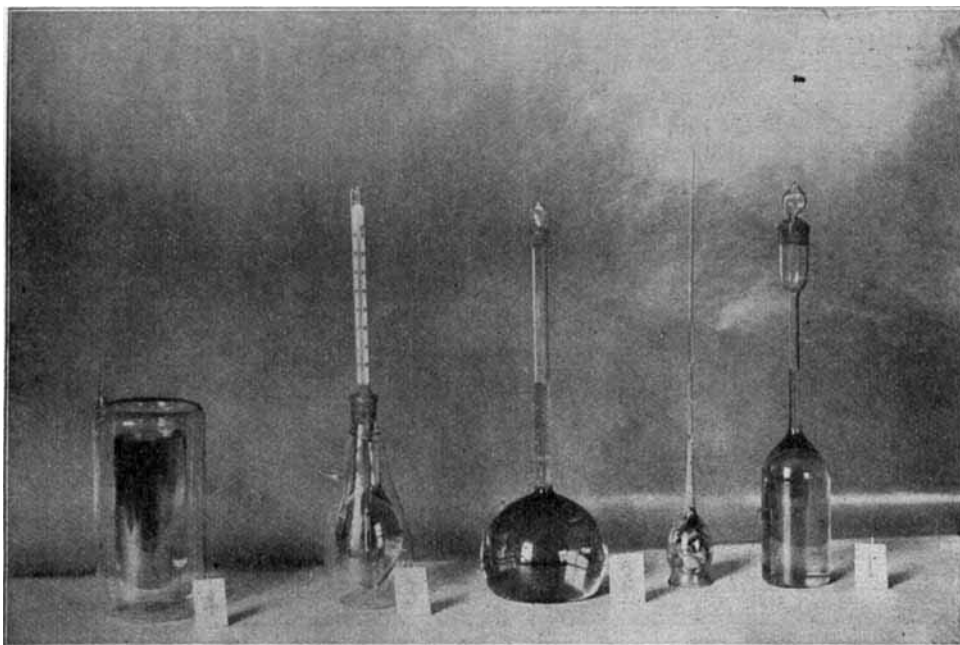


FIG. 3.

mark on the neck should be as low as possible. The empty (100 cc.) flasks, with stoppers, weighed 18 to 20 grams. The tare was obtained, then exactly 100 grams of water weighed into them at room temperature, the flask and water put into a constant temperature at 15.6° C., and allowed to remain there until constant temperature is attained (about 30 minutes is ample time), the position of meniscus is then carefully noted and etched around neck. The tare is then again obtained on the clean dry flask and it is ready for use.

To obtain the specific gravity of any solution, the flask is filled above the mark—care being taken to get rid of air bubbles—and brought to constant temperature at 15.6°, the excess of solution above mark removed by a capillary pipette, neck dried by a strip of filter paper, bottle stoppered, wiped dry and allowed to

warm to room temperature, and weighed. With the 100 gram size it is not necessary to weigh closer than 1 milligram. Subtract the tare, and the specific gravity is obtained at once to five figures without calculation. When only small quantities are available, these flasks can be obtained to hold only 25 or 50 grams, but the necks are smaller and more care is required in filling. For complete directions on the use of this form of pycnometer see "Der Wein und seine Chemie," by Paul Arauner, p. 25-31.

In determining alcohol in any product, a wine for example, the specific gravity bottle is filled as above indicated, then contents transferred to an appropriate distilling flask, the specific gravity bottle rinsed out, and the rinsings added to the main portion. A small quantity of calcium carbonate is added to neutralize any acidity, a piece of porcelain (broken crucible cover) to prevent bumping, and water added to make a total volume about 50 per cent. greater than sample taken, and the liquid is then distilled, catching the distillate in the specific gravity bottle. Distillation is continued until the liquid is almost up to mark, then bottle and contents put in constant temperature bath at 15.6° as before. After about one-half hour the flask is filled exactly to mark with distilled water at 15.6, neck wiped out, etc., as before, and weighed, and tare being subtracted, gives the specific gravity direct when using 100-gram bottle.

These bottles when stoppered do not change in weight, except on long standing, such as overnight, and by following the method given above very accurate results can be obtained. The weights of contents on 100 gram bottles can be checked easily by different operators to less than 5 milligrams, which means a variation of only about 0.05 alcohol at the most, and the agreement is often closer than this amount. Agreement as close as this is not obtainable by the use of ordinary forms of apparatus. Flasks No. 1 and No. 2 in the attached photograph show two forms of this apparatus, form No. 2 being most satisfactory, if mark is low on neck in order to allow for expansion, as it is more stable than form No. 1. The long slender funnel tube is used to fill both forms of bottles.

Reischauer's bottles as shown in photograph form No. 1 in 25, 50 and 100-grams capacity, are listed and kept in stock by Eimer & Amend, New York City.

DEWAR VESSELS AS APPLIED TO THE DETERMINATION OF SPECIFIC GRAVITY OF LIQUIDS.

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The now familiar principle of the Dewar flask, originally designed by Professor Dewar for the heat insulation of liquid air, and at present so extensively used for maintaining liquids at constant temperature, is most advantageously employed in maintaining liquids at constant temperature during specific gravity determinations. Two types of such apparatus are here described: one type to be employed by the method of the hydrostatic balance, and the other as a pycnometer.

Hydrostatic Balance Type of Dewar Vessels This type is shown in the accompanying etching as No. 4. It consists of a double walled glass cylinder having a