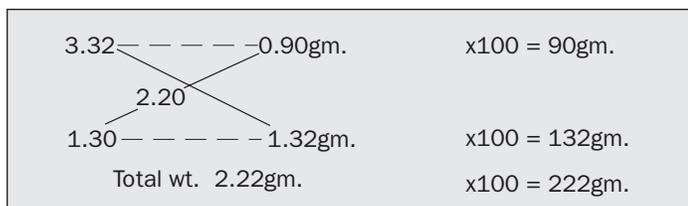


# Method for Custom Formulating of Density Liquids Using the Rectangle

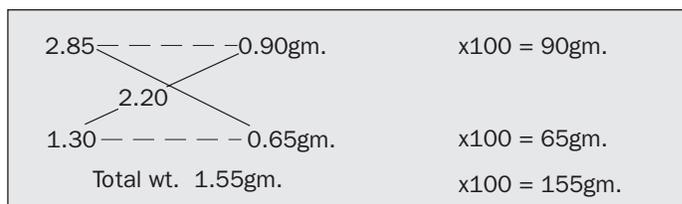
Calculations for custom preparation of intermediate density liquids from two liquids of known density is made simple using the rectangle method. It converts the calculations to simple subtraction across the diagonals, as illustrated in the following examples. In each case, we obtain a liquid of density 2.20 from each of three common high density liquids diluted with BENZYL BENZOATE of density 1.120.

## MI-GEE™ Methylene Iodide diluted to density 2:20 with Benzyl Benzoate.



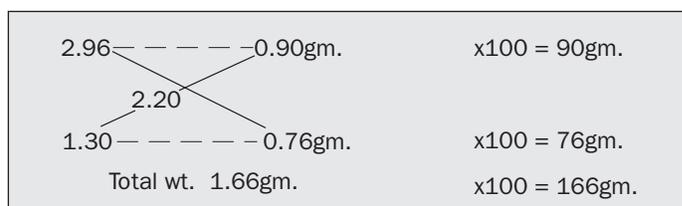
Use the above rectangle and write the high density liquid in the upper left hand corner and the low density liquid in the lower left hand corner. Insert the desired new density in the center of the rectangle. Subtract the numbers across the diagonals of the rectangle and insert the differences at the right side of the diagonal. The upper right hand corner of the diagonal gives the weight in grams of the heavy liquid required and the lower right hand number gives the weight in grams of the liquid required. Adding the two right side numbers gives the resulting weight in grams obtained. Dividing by the desired density of the resulting liquid gives the volume in ml. obtained assuming minimal change in volume with dilution. The case shown above requires 0.90 grams of MI-GEE™ and 1.32 grams of BENZYL BENZOATE to give 2.22 grams of liquid of density 2.20. Dividing 2.22 by 2.20 gives a volume of 1.009 ml. Or multiplying by 100 in order to deal with larger quantities, one gets 90 grams plus 132 grams to get 222 grams of liquid density 2.20. Then one obtains 100.9 ml of the desired liquid.

## Bromoform diluted to density 2.20 with Benzyl Benzoate.



In a manner similar to the above calculations, Insert the known liquids on the left side of the rectangle and the desired density in the center. Subtract across the diagonals to obtain the quantities of known liquids to the unknown liquid. The figures on the right side of the rectangle give the grams of known density liquids required to get the unknown liquid. Thus one uses 0.90 grams of Bromoform and 0.65 grams of BENZYL BENZOATE to get 1.55 grams of liquid of density 2.20. Multiplying by 100 one obtains 155 grams of density 2.20 liquid. Dividing the weight by the density, one gets 70.45 ml. in this case.

## Acetylene Tetrabromide diluted to density 2.20 with Benzyl Benzoate.



Construct a similar rectangle for these two liquids as shown below.

Similarly, subtracting diagonals, 0.90 grams of AcTBr diluted with 0.76 grams of BENZYL BENZOATE gives 1.66 grams of 2.20 density liquid or 0.75 ml. Multiplying by 100 gives 166 grams or 75.6 ml respectively.

### Density Determination of Unknown Liquid.

Use a 10 ml. graduate cylinder and weigh it empty. A trip scale or balance is satisfactory. Fill it to the 10 ml mark with the unknown liquid. Weigh the cylinder again with the liquid in it. Subtract the weight of the empty cylinder from the filled weight. This will give the weight in grams of 10 ml. Divide this number by 10. This will be the weight of 1 ml. or the density of the unknown. It is quite accurate and rapid. If temperature is important, a thermometer may be put into the graduate after the second weighing.



**GEOLIQUIDS, INC.**

4 East Piper Lane, Suite F  
Prospect Heights, IL 60070  
www.geoliquids.com  
mail@geoliquids.com

p 847.215.0938  
p 800.827.2411  
f 847.215.9821