

APPENDIX B

SMALL VOLUME CONVERSION TABLE

These days, the Internet offers you an abundant number of electronic conversion sites that make the following tables redundant and irrelevant. For example, <http://www.unitconversion.org> or <http://www.kylesconverter.com>. Better yet, they will do the math instantly for you. All you have to do is to specify the starting point on the conversion table, e.g. ounces to milliliters, type in the number of ounces, and instantly the equivalent amount in milliliters will appear. There are charts for every conceivable conversion. In the event that you do not have access to the Internet, here are the old school equivalent figures.

DRY MEASURE:

1 pound =	453.6 grams
16 ounces =	453.6 grams
1 pound =	16 ounces
16 ounces =	7000 grains
1 ounce =	28.35 grams
1 ounce =	437.5 grains
1 gram =	0.77 scruple (apothecary)
1 scruple =	1.3 grams
1 gram =	0.03527 ounce
1 gram =	15.43 grains
10 grams =	154 grains
1 grain =	0.0648 grams
10 grains =	.648 grams
7 g sugar =	1 tablespoon
10 grams =	154 grains
10 grains =	.648 grams
100 grains =	6.48 grams

1 gram = weight of 1 ml / 1 cc water

1 nickel = 5 grams

1000 g = 2.2 pounds

- To change ounces to grams: multiply (x) ounces by 28.35
- To change grams to ounces: divide (\div) grams by 28.35
- To change pounds to grams: multiply (x) by 453.6
- To change grains to grams: multiply (x) grains by 0.0648
- To change grams to grains: divide (\div) grams by 0.0648
- To change grams to milligrams: multiply (x) grams by 1000
- To change milligrams to grams: divide (\div) milligrams by 1000

LIQUID MEASURE:

1 gallon = 4 quarts or 128 fluid ounces (fl oz)

1 gallon = 3.785 liters or 3785 milliliters (ml)

1 quart = 32 fl oz

1 quart = 946 ml

1 liter = 1000 ml

1 liter = 33.81 fl. oz.

1 cup = 240 ml

4 cups = 950 ml

1 pint = 16 fl oz

1 pint = 473.12 ml

1 fluid oz. = 29.57 ml (USA)

1 fluid oz. = 28.41 ml (GB)

1 fluid oz. = 8 fluid dram

1 Tbs = 15 ml / 15 cc

3 Tsp = 1 tablespoon (Tbs.)

1 Tsp = 5 ml / 5 cc

1 dram = 3.697 ml

1 ml = 1 cc (*cubic centimeters - c. cm.*)

1 cc = 1 ml

1 ml of water = 1 gram (dry weight)

100 ml = 3.38 fl oz.

20 drops = 1 ml / 1 cc / 20 minims (*use a plastic dropper for consistency*)

1 drop = .067 ml / 1 minim

Ounces & Milliliter Conversions:

* To change ounces to milliliters: multiply (x) ounces by 29.57

* To change milliliters to ounces: divide (÷) milliliters by 29.57

Making a Saturated Solution:

A saturated solution is one where a specific chemical is added to a volume of water until no more of that chemical will dissolve and where sediment remains in the liquid solution. An example of seeking a saturated solution is where you are mixing up potassium, or ammonium, dichromate to use as an ingredient in a gum bichromate sensitizer. Dichromates are used in a saturated solution in gum printing. Ammonium dichromate is *saturated* at around 25% to 30% and potassium dichromate at 10% to 13%. If you had 100 g of potassium dichromate and you stirred that chemical into 1000 ml of water you would begin to see evidence of saturation in that 10% solution.

TEMPERATURE CONVERSIONS:

To convert Fahrenheit (F°) into Centigrade (C°):

1. Subtract (-) 32 from F° temperature
2. Multiply (x) that number by 5
3. Divide (÷) by this number by 9 to get the C° conversion.

Example: 100° F, minus 32 = 68, times 5 = 340, divided by 9 = 38 ° C

Equals: 37.77 ° C

To convert Centigrade into Fahrenheit:

1. Multiply (x) Centigrade temperature by 9
2. Divide (÷) that number by 5
3. Add 32 to that number and get the F° conversion.

Example: 38°C , multiply by $9 = 342$, divide by $5 = 68.4$, add $32 = 100^{\circ}\text{F}$
Equals: 100.4°F

HOW TO FIGURE PERCENTAGES:

For figuring percentages, I now use an iPhone app called Soulver that is so so much better for me than pencil and paper.

<http://www.acqualia.com/soulver/iphone/>

Percentage (%) is a term applied to expressing the concentration of a given solution where a specific chemical weight has been stirred into a specific volume of liquid. It defines the number of parts in a particular compound when added to 100 parts of a solution. In other words, if you needed to make a 10% solution of potassium dichromate you would simply add 10 grams of potassium dichromate to water until you had a total liquid volume of 100 ml. This is called percent weight per volume. (% w / v)

Percentages can be expressed in three different ways:

- % w / v (*percent weight per volume*): This is used when combining a solid with a liquid.
- % v / v (*percent volume per volume*): This is used when combining two liquids together. For instance, a 30 % solution of hydrogen peroxide would comprise 30 ml of hydrogen peroxide in 100 ml of water.
- % w / w (*percent weight per weight*): Seldom used as a measurement, this refers to grams of a given compound per 100 grams of a given solution. *As 1 ml of water has a weight of 1 gram it is not uncommon for grams and ml's to replace one another.*

Figuring a Percentage for a Solution:

Here's a quick elementary reference for you to use if you need to make a liter of 15% solution of sodium thiosulfate. Multiply 1000 by 0.15 and you will get 150. Mix 150 grams of sodium thiosulfate into the liter of water for the solution.

If you need to make a liter of 3% solution of sodium thiosulfate multiply 1000 by 0.03 and you will get 30. Mix 30 grams of sodium thiosulfate into the liter of water for the solution.