RESEARCH
FACT SHEET

Bulletin Number: 611

# Explanation Of Percent Concentration

The percent concentration of a material in solution can be expressed in several ways depending on how the material and solution are measured. This fact sheet briefly describes the difference between three common percent concentration expressions, weight per weight (w/w), weight per volume (w/v) and volume per volume (v/v).

If the percent concentration of a material (solute) in solution is expressed as 'w/w', this is known as the mass percentage of the solute in solution. This expression is commonly used when the solute and solution are measured by weight. For example, if 600 pounds of ethanol (solute) is added to water to produce 900 pounds of a finished solution, the calculated percent concentration of the ethanol in the finished solution would be approximately 67% w/w.

If the percent concentration of a material in solution is expressed as 'w/v', this is known as the mass concentration of the solute in solution. This expression is commonly used when the solute is measured by weight before being added to the solution. To accurately calculate the mass concentration, the density of the finished solution needs to be factored into the calculation. For example, if 600 pounds of ethanol is added to water to produce 900 pounds of a finished solution with a density of 0.96, the calculated percent concentration of the ethanol in the finished solution would be approximately 64% w/v.

If the percent concentration of a material in solution is expressed as 'v/v', this is known as the volume concentration of the solute in solution. This expression is commonly used when the solute is measured by volume before being added to the solution. To accurately calculate the volume concentration, the weight per gallon of the solute and solution needs to be factored into the calculation. For example, if 600 pounds of ethanol has a weight per gallon of 7.0 and is added to water to produce 900 pounds of a finished solution with a with a weight per gallon of 8.0, the calculated percent concentration of the ethanol in the finished solution would be approximately 76% v/v.

Other factors can affect the final calculation, such as other ingredients that may be added to produce the final solution. The weight per gallon of these ingredients can affect the final density and weight per gallon of the finished solution and would need to be taken into account to accurately calculate the final percent concentration.

The percent concentration of ethanol in Symmetry™ Foaming Hand Sanitizer is reported on the label as a mass percentage of approximately 62% w/w. Taking into account the factors discussed above such as the density of the final solution and additional ingredients, the volume concentration of ethanol in Symmetry™ Foaming Hand Sanitizer is calculated as approximately 70% v/v.

Issued: 5/17/11

**Buckeye International, Inc.**
2700 Wagner Place • Maryland Heights • MO 63043 • USA • 314.291.1900
www.buckeyeinternational.com