



## How Does the TechWizard™ Calculate Density?

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There are two main methods used by the TechWizard™ to calculate density. The first is referred to as the USDA Density Calculation for Milk.

**The USDA Density Calculation for Milk uses the following equation:**

**Density(kg/L at 40 °F) =** $100/[100 + (\%BF \times 0.03928) - (\%SNF \times 0.39221)]$  **Density (lb/gal) = 8.3364 x kg/L**  
BF = butterfat, SNF = milk solids not fat

**The second method is referred to as the Mix Density Equation.**

The Mix Density Equation is useful for calculating the density of completely dispersed, water containing liquids only:

**Density (kg/L at 60 °F) =** $100/[(\%fat/0.9) + (\%SNF/1.58) + (100 - TS)]$  **Density (lb/gal) = 8.3364 x kg/L**  
SNF = solids not fat, TS = total solids

The user can also enter a density directly or enter a density value for an ingredient using the Density Editor.

### ***How Does the TechWizard Know Which Density Calculation to Use?***

Once the user has decided on a method of calculating density or entering values, how does the TechWizard know how to handle density data for a particular ingredient? The TechWizard uses a variable, referred to as Volume Choice, which is set by the user to determine how density values are obtained. The Volume Choice can be set to 0, 1, 2, or 3 which corresponds to:

- 0** - no volume for the ingredient is calculated regardless of whether or not density values are provided.
- 1** - volume calculated using USDA Density Calculation for Milk.
- 2** - volume calculated using density values provided for the ingredient.
- 3** - volume calculated using the Mix Density Equation.

An ingredient can also be designated as bulky. This means the ingredient will not be adequately dispersed when added to the other ingredients so that the techniques just described to calculate density could not be used. Furthermore, the density equations described above do not apply to dry ingredients.