Calculating Fuel Density

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Density can be calculated using the following formula:

Density (g/ml) = weight (g) (NOTE: units ml are the same units as cc)
volume (ml)

1. Weigh the empty graduated cylinder on the scale, and write down the weight.
2. Pour between 10 and 15 ml of gasoline or ethanol into the graduated cylinder. Read the exact volume of the liquid using the cylinder scale, referencing the lowest portion of the meniscus of the liquid.
3. Weigh the cylinder with the gasoline.
4. Subtract the weight of the empty cylinder from the weight of the cylinder with gasoline to calculate the liquid weight. (For example, if your cylinder weighed 166.2 g with gasoline and 156 g empty, you would have poured 10.2 g of gasoline into the cylinder (166.2 - 156 = 10.2).
5. Divide the gasoline weight by its volume from Step 2 to calculate the gasoline density. If you poured 13.5 ml of gasoline weighing 10.2 g, as calculated in Step 4, that gasoline had a density of 0.756 g/ml (10.2 g / 13.5 ml = 0.756 g/ml).

Specific gravity.

The specific gravity of a material is its density compared to the maximum density of water. Water achieves its maximum density of 1 gram per millilitre (g/ml) at about 4 degrees Celsius. This means that the specific gravity of a material is equal to its density value when the density is measured in units of g/ml.

Fuel Density vs Temperature

Of course the density also changes with temperature. In most cases, the density of a substance decreases with increased temperature, because the volume usually becomes greater. To determine the density at temperatures other than room temperature (25^{o}C) is easy for gases , you can use the ideal gas law. For Liquids like gasoline or Ethanol , it's more difficult. There is no real equation to define this so the ECUs uses a parametric equation which fits the empirical data collected during development.