

Alcohol Density – Alcoholic beverage Sample Preparation

Measuring Alcohol Density with a Density Meter requires specific sample preparation Procedures for sample preparation for measuring alcohol density with a Rudolph Research I

Application Report

Alcoholic Beverage Sample preparation:

In general, there are two basic types of alcoholic beverage classifications, each with a different procedure for sample preparation and density measurements.

1) Alcoholic Beverages without Extract

This would include vodka, gin, fruit brandies, and any product produced by distillation and diluted with water or stored in wooden barrels. Traces of small amounts of aromatic compounds, other alcohols and/or other volatiles are present but are considered pure alcohol/water mixtures and may be measured directly by the density meter without any further preparation.

2) Alcoholic Beverages with Extract

In addition to the alcohol/water mixture, these beverages contain various amounts of colors, sugars, flavors, and other solids that affect the density of the liquid and therefore will yield incorrect alcohol results. Therefore, it is necessary to separate the alcohol by distillation. By heating the alcoholic beverage during distillation, the alcohol evaporates which is the volatile fraction. The extract fraction remains behind in the original flask as it is not volatile.

This distillation analysis is a standard laboratory procedure. It requires a precise measurement made on a known volume of sample. After the distillation procedure, pure water is added to the alcohol fraction until it is back to the original volume. This is now the exact same alcohol concentration as the original sample prior to the distillation. This sample may now be measured directly and its concentration determined.

From the extract fraction which remains behind in the original flask, the concentration of extract or “dry matter” can be determined. The original flask is now also filled back to its starting volume or weight. Now this sample may be introduced into the density meter to determine its concentration. Most often, this extract concentration is treated as if it were pure sucrose. Therefore, there is a conversion from the extract’s density to its concentration as % sucrose in solution or as °Brix.

Filling the DDM 2911 Plus Density Meter:

Sample may be injected into the Density Meter manually by the use of a Luer tip syringe. Automation is available with the Rudolph Research Analytical’s Auto-sampler.

Preservation of the Alcohol Sample's Integrity:

Sample containers with alcohol must always be covered tightly. As alcohol is hygroscopic, it has the tendency to absorb moisture from the environment. And as alcohol is also very volatile, it will evaporate into the atmosphere from an open container. Therefore, it is best to fill the container to nearly the very top. The correct procedure is to gently rock the container back and forth (not shaking!) to allow the liquid to re-absorb the moisture. This is important when measuring in the density meter.

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