

Alcotest-RI[®]

Alcohol Measurement Systems

**DISTILLERIES
WINERIES
BREWERIES**



ALCOHOL LABORATORY SOLUTIONS

Alcohol producers have all the demands of manufacturing a constant product with the added burden of making a product that must comply with government measurement and labeling guidelines. In most countries, the production of alcohol is highly regulated and tax reporting must be accurate. Government prescribed measurement methods can be very slow and require laboratory skills to produce an accurate measurement.

Rudolph addresses the need for alcohol producers to make fast, accurate measurements at various stages during the production process. Rudolph also addresses government requirements by providing certified instruments that will keep your production facility in full compliance.



THE PROBLEM - EFFICIENCY, REGULATION, AND TAXES

Alcohol manufacturers operate in a competitive world. They must keep costs under control and keep production operating efficiently to ensure profitability.

However, manufacturers must report correct % ABV values and must do this to the satisfaction of the local government authority. Many governments require testing methods such as distillation, which are very slow and can significantly disrupt production.

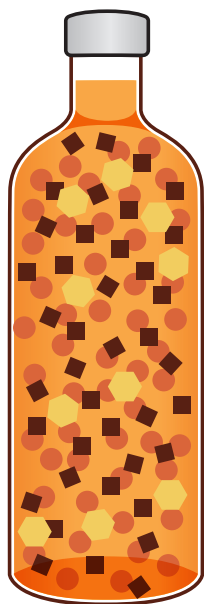
THE SOLUTION

The **Alcotest-RI**[®] offers a certified government compliant method and a rapid non-certified method to read % ABV. Certified results can be used for taxation purposes and will serve as the benchmark method. Using the "Production Method" you can measure alcohol content, without distillation, and also read the sugar content which is the source of most obscuration in flavored alcohol beverages. It just takes a few keystrokes to move between the certified Government Compliant Method and Production Methods.

Principle of Operation

REGULATORY METHOD - VODKA AND SIMILAR PRODUCTS

Vodka is a mixture of alcohol and water. The density of water and alcohol are well known, so the user simply measures a sample in the density meter and the measurement display shows % ABV. Different countries use different scales and even different expressions of the same scale. AOAC ABV is used in the USA, OIML ABV is used in Europe, the UK uses Proof, Canada uses ABV, and the Japan Taxation Department uses AOAC Proof. These are just a few of the many scales that can be used to present % alcohol.



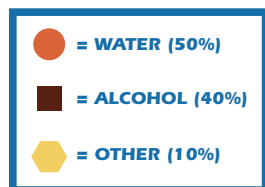
REGULATORY METHOD - OTHER PRODUCTS

The difficulty with many alcohol products today is that other ingredients besides alcohol and water are included in the final product. These other ingredients are important because they add unique tastes and aromas with improved "mouth feel".

The consumer likes these additional ingredients which are generally sugar and flavorings but they obscure the % alcohol and alter the density measurement. The USA TTB solution is for the user to distill the sample before measurement in a density meter. This distillation process is time consuming and can take as long as 2 – 3 hours according to the US TTB. At the end of the process, the user has an alcohol water mixture which they can measure in the density meter in the same way they would measure straight alcohol. Accuracy in regulatory mode is dependent on the model of density meter that the **Alcotest-RI**[®] is built around.

PRODUCTION MODE - OTHER PRODUCTS

In Production Mode, the **Alcotest-RI**[®] also measures the refractive index. Refractive Index (RI) is a proven measurement used to estimate the amount of other ingredients in the sample and correct the density meter measurement for their effect on the % alcohol value. Production Mode allows a user to obtain a result in less than 2 minutes with no sample pretreatment. Accuracy in Production Mode is sample dependent, but is often comparable to the results obtained using a standalone density meter and distillation step.



YOU MUST REPORT AND PAY TAXES ACCURATELY



COMPLIANT

REGULATORY MEASUREMENT MODE
MINIMAL DISTILLATION

YOU MUST KEEP PRODUCTION MOVING AND MAKE A PROFIT



PROFITABLE

PRODUCTION MEASUREMENT MODE
NO DISTILLATION

BALANCE

The **Alcotest-RI**® is designed to help the person in charge of an Alcohol Laboratory balance the need for both compliance and profitability.

Government regulators don't care how long it takes to make measurements, they don't care how many resources are needed in the compliance process, they simply want accurate results done according to the approved method.

The owner of the factory is interested in accurate measurements as well, but they see the laboratory as a cost center needed for compliance and meeting government regulations should be done with as few resources as possible.

The **Alcotest-RI**® responds to the need for fast results and the need for high accuracy government compliant measurements.

 = WATER

 = ALCOHOL

 = OTHER

DIGITAL DENSITY METER (DDM)

The Digital Density Meter (DDM) measures Density of the entire solution but cannot solve for % ABV if anything other than alcohol and water is present.



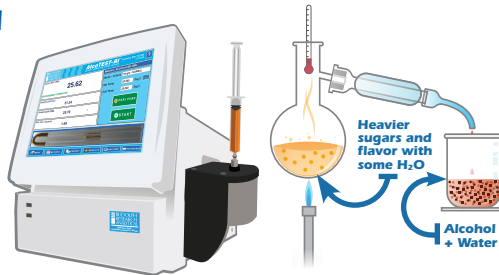
If your sample contains only water and alcohol, the DDM can accurately measure %ABV.



If your sample contains anything other than alcohol and water a stand alone density meter will not be able to measure for %ABV accurately.

DDM WITH DISTILLATION

Using distillation you can distill the alcohol and water from the other ingredients obscuring the sample. This allows you to solve for %ABV, but the distillation process is very time consuming.



After distillation, the water and alcohol are separated from the sugars and flavors. Once this process is finished the separated alcohol and water can be measured in a stand alone density meter.



ALCOTEST-RI®

Using the DDM and a J457OM-DP with custom software allows you to measure %ABV, even with the presence of other ingredients, in less than 3 minutes.



Alcotest-RI® eliminates most of the distillations you are now performing.



SPIRITS



Manufacturers of spirits are generally subject to the highest tax rates and benefit the most from the use of the **Alcotest-RI**[®]. With the recent explosion in the growth of flavored or obscured spirits, the ability to make specialized methods for each product will mean that the number of distillations a lab needs to do can be dramatically reduced. The **Alcotest-RI**[®] is the perfect solution to help with this. Instead of making 2, 3 or even 4 distillations on a batch of flavored product, the **Alcotest-RI**[®] can reduce that number to one.

Alco|calc[®]
DISTILLERY SOFTWARE

The **AlcoCalc**[®] option allows the **Alcotest-RI**[®] to be used for calculating dilutions of alcohol and water solutions. The **AlcoCalc**[®] feature will automatically calculate for you the amount of water to dilute a high % ABV solution to a desired % ABV based on known tables, or how much alcohol to add in order to recreate the %ABV.

WINE



There are many, non approved, quick methods for wine analysis. While wine alcohol content is often not as critical as it is for spirits there are still regulatory requirements. Depending on the country there may be a point above a certain alcohol level that the tax rate changes (16.0 % ABV in the USA). It is critical for a winery to use an approved method when they are producing product near that point. Some of the non approved methods are geared more toward measuring other components in wine and may provide % ABV but not with the accuracy available with the **Alcotest-RI**[®].

BEER



The last decade has seen a large expansion of different types of beer being brought to market. Being able to accurately control the brewing process is the key to moving from hobbyist to a profitable brewer.

The Alcotest-RI[®] Determines:

- Original Extract
- Apparent Extract
- Real/True Extract
- Alcohol by volume
- Alcohol by weight
- Real Degree of Fermentation
- Real Attenuation
- Apparent Degree of Fermentation / Apparent Attenuation

LOW ALCOHOL READY TO DRINK



In many countries this is now the fastest growing alcohol category. It includes things like hard seltzer, wine coolers and alcopops. The manufacturing process can either be by diluting higher ABV products or fermentation. The Alcotest is able to quickly measure alcohol content even in products with high sugar and high flavor levels. The Alcotest is also able to provide at least two other key pieces of information:

- Calorie content for label values, information that is extremely important to many consumers in this area.
- Brix values corrected for the effect of the Alcohol allowing better formulation control.

FLAVORS

The growth of flavored alcohols is an opportunity for flavor manufacturers. The relatively short production runs and high cost of these new alcoholic beverages means that supplying flavors to this area can be very profitable. Making test beverages can be more complicated than with non-alcoholic beverages. The **Alcotest-RI**[®] eliminates this complexity making alcohol drinks as simple to measure as soft drinks. Best of all, the **Alcotest-RI**[®] is built on top of an instrument that is already used by flavor companies for measurement of Specific Gravity and Refractive Index of flavors. The methods for doing these tests are included in the standard **Alcotest-RI**[®].



Sample Handling Options

ALCOTEST-RI® WITH VERTICAL LOAD

The simplest option, the Vertical Load, works by the user sucking the sample into a syringe and injecting it into the fitting on top of the instrument. Building on the well proven horizontal load system the vertical load allows injection with either hand.

The VL uses the least amount of sample of any option and it is also easily adaptable to creams and gels making it a good choice if the Alcotest is going to be used for hand sanitizer.



ALCOTEST-RI® WITH THE MM-PERI PUMP OPTION

The MM-Peri loads directly from the bottle or cup; no syringe is needed. The system displaces the last sample with the new sample directly eliminating the cleaning step and making the instrument much faster and easier to use. The MM-Peri also adds the ability to measure under pressure and thus can measure samples like white wine that will tend to outgas.



ALCOTEST-RI® M68

The simplest multi sample option, the M68 allows a user to load up to 24 samples and leave the instrument to do the rest. Like the MM-Peri the M68 displaces the previous sample with the new sample meaning fast cycle times and no cleaning solvents.



ALCOTEST-RI® WITH R837 AUTOFLEX™

The most versatile option, the R837 uses less sample than the M68. The R837 cleans and dries between samples allowing it to measure when samples are not necessarily miscible such as a flavor company measuring both raw flavor materials and test beverages.



Configure Your System

CHOOSE A DENSITY METER

The density meter is detailed in Technical Bulletin 935. Some key features are:

- Patented VideoView™ system for detecting even the smallest bubbles
- Direct network connection using Windows embedded operating system
- User friendly color touch screen with ergonomic pivot for different operator heights
- Complies with ISO / GMP / GLP

DDM 2910

Accurate to 0.0001 g/ml density
Accurate to 0.1% ABV
Ideal for wineries and breweries

DDM 2911

Accurate to 0.00005 g/ml density
Accurate to 0.05% ABV
Ideal for wineries and breweries
Meets European requirements for spirits

DDM 2911 PLUS

Accurate to 0.00001 g/ml density
Accurate to 0.01% ABV
Ideal for distilleries and multi-product producers
Meets US and European requirements for spirits
Used by the US TTB



CHOOSE A REFRACTOMETER

The refractometer is detailed in Technical Bulletin 930. Some key features are:

- Sample quality system checks that sample is loaded correctly
- Operation from density meter touch screen
- Complies with ISO/GMP/GLP
- Wide range means the instrument can measure materials like cinnamon oil

J157OM-DP (WINE, BEER AND OBSCURED SPIRITS)

Accurate to 0.00002 Refractive Index
Accurate to 0.02 Brix
Range 1.32 – 1.53 Refractive Index
Range 0 – 100 Brix
Ideal instrument for all beverage applications, both alcoholic and non alcoholic

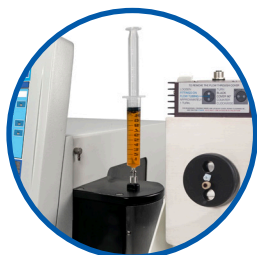
J457OM-DP (WINE, BEER, OBSCURED SPIRITS AND RAW FLAVORS)

Accurate to 0.00002 Refractive Index
Accurate to 0.02 Brix
Range 1.26 – 1.70 Refractive Index
Range 0 – 100 Brix
Identical performance on beverages to the J157 model this refractometer is a good choice for flavor companies wanting to measure raw materials

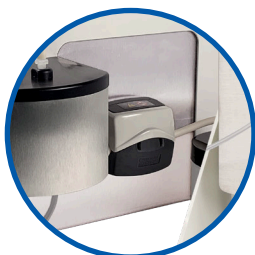


CHOOSE YOUR SAMPLE HANDLING OPTION

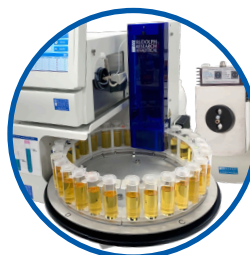
ALCOTEST-RI® WITH VERTICAL SYRINGE FILL



ALCOTEST-RI® WITH MM PERI PUMP OPTION



ALCOTEST-RI® WITH M68 SAMPLE DISPLACEMENT AUTOMATION



ALCOTEST-RI® R837 AUTOMATION SOLUTION THAT CLEANS AND DRIES BETWEEN SAMPLES

