

Frequently Asked Questions

What is a refractometer?

A refractometer is a handheld optical device that measures the concentration of solids in a liquid. Light passes through a drop of the sample liquid, which is spread onto the prism. The refracted light illuminates the scale inside the instrument. The scale, when viewed through the eyepiece, gives a reading at the division of the blue and white refracted light. Common sample liquids are fruit juice, sugar concentrations, salt water, urine, and antifreeze.

Which refractometer is right for me?

We stock brix, salinity, clinical, and automotive refractometers, as described below. For many of our models, you can choose the ATC (Automatic Temperature Compensation) option.

Brix refractometers are used for beverages, sugars, and cutting fluids. Fruit growers, fruit packagers, and the wine industry use the brix scale. Because it covers largest refractive index range, brix is also useful for general purposes.

Salinity refractometers are used for aquaculture, hobbyist marine aquariums, and food processing (to control brine).

Clinical refractometers are used for urinalysis (urine specific gravity), blood analysis (i.e., total serum protein), refractive index (basic scale shows refractivity), or dilutions.

Automotive refractometers are used for antifreeze/coolant (Propylene Glycol and Ethylene glycol) and battery recharge level.

What is ATC?

ATC is an abbreviation for **automatic temperature compensation**. ATC allows the user to take accurate scale readings at varying ambient room temperatures.

Benefits of ATC: Without ATC, if the temperature of the room changes by a degree or two, the refractive index shifts. The scale is only accurate for the temperature at which calibration was done. ATC allows the refractometer to maintain accuracy at a wider range of ambient temperature shifts (between 20-50

degrees Celsius). So ATC refractometers require calibration much less often than models without automatic temperature compensation.

Temperature of the sample: The sample MUST be the same temperature as the prism for an accurate reading. ATC compensates for shifts in ambient temperature, not for the difference between sample and prism temperature. If you are working with samples at a temperature different than the ambient room temperature, leave the sample on the prism for 30 seconds before taking the reading. This allows the sample to acclimate to the temperature of the prism

Ambient air temperature: ATC models are best suited for settings where the room's air temperature may vary more than one degree. Even as much as a single degree of temperature variation can affect the reading of a refractometer without ATC.

How do I calibrate my refractometer?

Calibration for non-ATC refractometers is only accurate for the temperature at which calibration was done. If the temperature of the room shifts 5 degrees, you must recalibrate. Even 1 degree affects the scale, so if the measurement is critical, you should recalibrate. Even with ATC, it is good to recalibrate periodically.

Refer to your refractometer operation manual for your model's specific calibration instructions. If you do not have the manual, here are basic calibration instructions. (Note that while distilled water works for most models, a few models require calibration fluid. The procedure is the same whether you use distilled water or calibration fluid.)

1. Open the daylight plate and place 2-3 drops of distilled water on the main prism. Close the daylight plate so the water spreads across the entire surface of the prism without air bubbles or dry spots. Allow the sample to rest on the prism for approximately 30 seconds before going to step #2. (This allows the sample to adjust to the temperature of the refractometer.)
2. Hold the daylight plate in the direction of a light source and look into the eyepiece. You will see a circular field with graduations down the center (you may have to focus the eyepiece to see the graduations clearly). The upper portion of the field should be blue, while the lower portion should be white.
3. While looking into the eyepiece, turn the Calibration Screw (on the top of the refractometer) until the boundary between the upper blue field and the lower white field meet exactly on the 0.0° line.

After this calibration procedure, your instrument is calibrated for the current ambient room temperature. When the working temperature of the room or

environment (not the sample) changes by more than 5°F, we recommend recalibrating to maintain accuracy and reproducibility.

How do I get replacement parts?

If you need a replacement part, you can call Great Lakes Oil toll free at 1.800.352.9050.

To avoid having to replace broken daylight plates frequently, choose our Industrial or Lighted series models. These have drop-tested daylight plates, so they may be the most economical option if your refractometer is at high risk of being dropped.

Glossary

Baumé: A scale used to measure the density of liquids. The Baumé scale is used in winemaking, brewing, and food processing. Our RHB-90 model includes a Baumé scale and a brix scale.

Brix: The percentage of sugar in a sample is expressed in degrees Brix (°Bx). A sample measured at 15 °Bx is 15% sugar.

Critical angle: Light at the critical angle reflects off the surface of the sample instead of refracting through it. If you do not get a good reading, adjust the angle of the refractometer so the light can pass through the sample.

Refraction: The change in the speed and angle of light moving through different materials. When light comes into the refractometer prism and moves through materials of different densities, it bends toward the denser material.

Refractive index: The difference between the optical density of the glass (known) and the density of the sample (measured) is the refractive index (shown on the scale). This difference in density causes different angles of refraction, which appear on the refractometer's scale as blue and white light. The line between the blue and white light on the scale is the refractive index of the sample. When the sample is a known value, such as distilled water, it is possible to calibrate the refractometer.

Salinity: The concentration of salt in a liquid.