

# HANNA Digital Refractometers

## Introduction

### Refractometry

Refractometry is the method of measuring a substance's refractive index (one of their fundamental physical properties) in order to assess their composition or purity.

The refractive index of a substance is strongly influenced by temperature and the wavelength of light used to measure it, therefore, care must be taken to control or compensate for temperature differences and wavelength. The refractive index measurements are usually reported at a reference temperature of 20 degrees Celsius, which is equal to 68 degrees Fahrenheit, and considered to be room temperature.

A digital refractometer is an instrument used to measure the refractive index and to convert/compensate this information in specific units (depending by model).

### Refractive Index

Determinations are made by measuring the refractive index of a solution. Refractive Index is an optical characteristic of a substance and the number of dissolved particles in it.

Refractive Index is defined as the ratio of the speed of light in empty space to the speed of light in the substance. A result of this property is that light will "bend", or change direction, when it travels through a substance of different refractive index. This is called refraction.

When passing from a material with a higher to lower refractive index, there is a critical angle at which an incoming beam of light can no longer refract, but will instead be reflected off the interface.

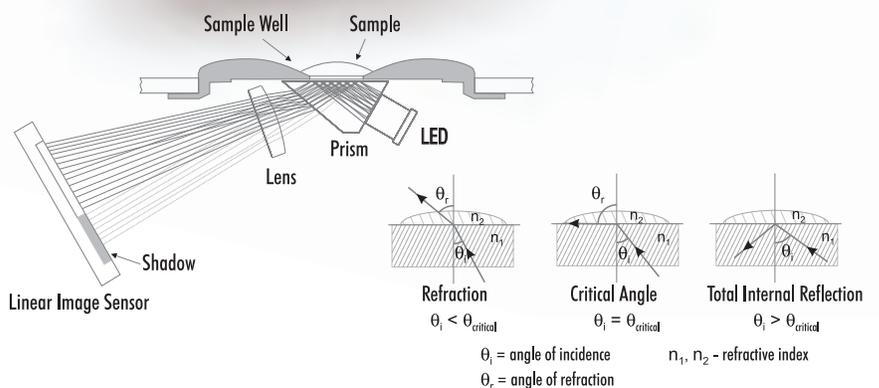
The critical angle can be used to easily calculate the refractive index according to the equation:

$$\sin(\theta_{\text{critical}}) = n_2 / n_1$$

Where  $n_2$  is the refractive index of the lower-density medium;  $n_1$  is the refractive index of the higher-density medium.

Light from an LED passes through a prism in contact with the sample.

An image sensor determines the critical angle at which the light is no longer refracted through the sample. Specialized algorithms then apply temperature compensation to the measurement and convert the refractive index to the specified parameter.



- **Automatic Temperature Compensation**  
For exceptionally accurate measurements
- **Easy measurement**  
Place a few drops of the sample in the well and press the READ key
- **BEPS**  
(Battery Error Prevention System) alerts the user in the event that low battery power could adversely affect readings.
- **IP65 water protection**  
Built to perform under harsh laboratory and field conditions.
- **Single point calibration**  
Calibrate with distilled or deionized water
- **Small sample size**  
Sample size can be as small as 2 metric drops.
- **Stainless steel sample well**  
Easy to clean and corrosion resistant
- **ABS thermoplastic casing**
- **Start-up**  
When powered on the meter displays battery life and the set measurement units.
- **Unit selection**  
Pressing the RANGE key quickly cycles through the units of measurement (if applicable).
- **Calibration**  
Perform a quick and easy calibration after start-up with distilled or deionized water.



Battery life on display



Easy to clean stainless steel sample well



Easy measurement