



## REFRACTOMETERS

Sper Scientific portable refractometers work in ambient light with no battery or other power source necessary. They can be used in labs, on production lines, in the field, or anywhere. Simply place a drop or two of sample on the prism and read the results immediately. With reasonable care their reliability, precision, and optical performance will last forever. All Sper Scientific refractometers come complete with:

- Rubber coated hand grip and construction which insulates the test solution from inaccuracies caused by the body heat of the user.
- Covered eye piece and bright clearly defined scale for easy to read measurements.
- All the accessories necessary for immediate use, including calibration tools and solutions, full instructions, transfer pipettes, protective cases, and a reference block for model 300004.



#### **SUGAR/BRIX REFRACTOMETER 0-32% 300001**

The most popular refractometer range due to its usefulness in a wide variety of quality control applications for the sugar content of fruit, fruit juices, wine, milk, soft drinks and yeast cultures solutions. Also used for industrial cutting, lubricating, soluble tempering oils, and emulsification solutions.

Dim: 6 3/4" x 1 1/2"

Weight: 6 oz

Range: 0-32% brix

Resolution: 0.2%

Accuracy:  $\pm 0.2\%$



With certificate of calibration: 300001C

#### **SUGAR/BRIX REFRACTOMETER w/ATC 0-32% 300010**

Same as the above, but this refractometer comes with Automatic Temperature Compensation (ATC), which makes manual temperature corrections unnecessary.

Dim: 6 3/4" x 1 1/2"

Weight: 7.7 oz



With certificate of calibration: 300010C

#### **SUGAR REFRACTOMETER 28-62% 300002**

Use to test solutions with a higher sugar content, such as fruit juice concentrates, canned fruits containing added sugar, or ketchup as well as for egg yolk.

Dim: 6 1/4" x 1 1/2"

Weight: 6.5 oz

Range: 28-62% brix

Resolution: 0.2%

Accuracy:  $\pm 0.2\%$



With certificate of calibration: 300002C

#### **SUGAR REFRACTOMETER 0-80% 300003**

Covers all of the above mentioned substances as well as very high sugar content products such as jam, marmalade, and syrup. Its wide range also makes this refractometer a good choice for the testing of any solution with an unknown sugar content.

Dim: 7" x 1 1/2"

Weight: 19 oz

Range: 0-80% brix

Resolution: 1%

Accuracy:  $\pm 1\%$



With certificate of calibration: 300003C

#### **HONEY REFRACTOMETER 300004**

This unique model not only tests the sugar content of honey but also determines its water content and baume specific gravity at the same time, tests that normally require 3 separate refractometers.

Dim: 6 1/2" x 1 1/2"

Weight: 7 oz

	RANGE	RESOLUTION	ACCURACY
% Sugar	58-90%	1%	$\pm 1\%$
Specific Gravity Baume	38-43	0.5	$\pm 1$
Water Content	17-27%	1%	$\pm 1\%$



#### CLINICAL REFRACTOMETER 300005

Measures protein concentration, urine specific gravity, or gives the refractive index in seconds using only a few drops of blood serum, plasma, urine or albumen.

Dim: 6<sup>3</sup>/<sub>4</sub>" x 1<sup>1</sup>/<sub>2</sub>"

Weight: 6.6 oz

	RANGE	RESOLUTION	ACCURACY
Serum Albumen	1 to 12 g/dL	0.2 g/dL	± 0.2 g/dL
Urine Specific Gravity	1.000 to 1.040	0.005	± 0.005
Refractive Index (nD)	1.3330 to 1.3600	0.0005	± 0.0005



With certificate of calibration: 300005C

#### SALT REFRACTOMETER 300006

Measures salt content in sea water, aquariums, breeding ponds, or pickling-brines. While the scale is calibrated for sodium chloride, it can also be used for calcium chloride, barium cobalt, magnesium, cesium, potassium, sodium chloride, cupric sulfate, potassium iodide, citric acid, and acetic acid (vinegar), when tested against a known standard.

Dim: 6<sup>3</sup>/<sub>4</sub>" x 1<sup>1</sup>/<sub>2</sub>"

Weight: 6.5 oz

Range: 0-28% Sodium Chloride

Resolution: 0.2%

Accuracy: ± 0.2%



With certificate of calibration: 300006C

#### SALT REFRACTOMETER w/ATC 300011

This refractometer comes with Automatic Temperature Compensation (ATC), which makes manual temperature corrections unnecessary. Double scale in parts per thousand and specific gravity.

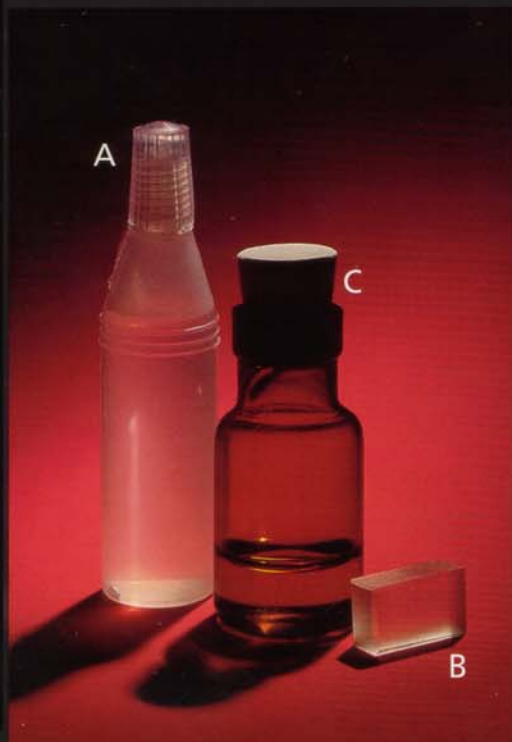
Dim: 7<sup>3</sup>/<sub>4</sub>" x 1<sup>1</sup>/<sub>2</sub>"

Weight: 8.5 oz

	RANGE	RESOLUTION	ACCURACY
Parts Per Thousand	0 to 100	1	± 1
Specific Gravity	1.000 to 1.070	.001	± .001



With certificate of calibration: 300011C



#### A. 28% BRIX CALIBRATION SOLUTION 300007

Individual bottles for on sight recalibrations of Refractometer 300002. Box of 10.

#### B. REFERENCE BLOCK 300008

For on sight recalibration of Refractometer 300004. Packed individually.

#### C. DIOPTRIC OIL 300009

Individual bottles for use with reference block 300008 and Refractometer 300004. Box of 10.



## PRINCIPLES OF REFRACTOMETRY

Refractometers are instruments used to measure substances dissolved in water and certain oils. The refractometer works using the principle of light refraction through liquids. As light passes from air into a liquid it slows down. This phenomenon is what gives a "bent" look to objects that are partially submerged in water. To put it simply, the more dissolved solids water contains, the slower light travels through it, and the more pronounced the "bending" effect on light. Refractometers use this principle to determine the amount of dissolved solids in liquids by passing light through a sample and showing the refracted angle on a scale. The scale most commonly used is referred to as the Brix scale. The Brix scale is defined as: the number of grams of pure cane sugar dissolved in 100 grams of pure water (grams sugar/100 grams  $H_2O$ ). Other scales have been developed to measure salt, serum proteins (albumen) and urine specific gravity.