

## OPTECH REFRACTOMETERS

Refractometers are instruments that determine the concentration of an aqueous solution (see BRIX SCALE) by measuring the index of refraction (see REFRACTION PRINCIPLE).

By means of just a few sample drops poured onto the prism, the value of the dissolved solid concentration can be read directly from the refractometer scale.

Thanks to their versatility and small size, refractometers can be used in numerous fields and for a broad range of substances (see table 1).

Major feature of refractometers is the high sensitivity to temperature changes.

This is the reason why the refractometer casing features a rubber grip (see fig. 1)

that protects against the heat of the user's hand,

so as not to affect measurement results

and avoid imprecise readings.

The rubber eyeguards fitted to the eyepiece protect

the instrument from light

penetration through the eyepiece itself

during measuring.

Fig. 1



## BRIX SCALE (%)

The Brix degree measures the concentration percentage of soluble solid content of a sample (aqueous solution), i.e. the sum of all the solids dissolved in the water (sugar, salt, proteins, acids, etc.); the measurement result is their sum in the sample. Basically, the Brix degree is calibrated to the grams of cane sugar contained in 100 g of solution. For this reason, when a sugar-based solution is measured, the Brix degree precisely calculates real concentration. In the event of the substance to be examined also containing other components different from sugar, a referment should be a conversion table, so as to correct the obtained values and make sure the result represents the exact sample concentration.

## REFRACTION PRINCIPLE

A practical example of how the refraction index changes from one substance to another can be obtained by dipping a pen in two containers holding different solutions.

When a pen is dipped in a container filled with water, the tip appears inclined (fig. 2).

By dipping the same pen in a container of water and dissolved sugar, the tip of the pen will appear even more inclined.

This is the light refraction phenomenon.

Refractometers are measuring instruments in which this physical law is put into practice.

They are in fact based on the principle according to which increasing the density of a substance (for instance, when sugar is dissolved in water) corresponds a proportionate increase in the refraction index of that substance. The light refraction is then projected, thanks to a sophisticated system of lenses, onto the refractometer reading scale, where the measurement result can be directly read.

Therefore in the case of a low-concentration solution, the difference between the refraction index

of the substance and the prism's one is considerable and consequently the angle of refraction will be wide

("A" fig. 3). On the other hand,

in the case of a denser, highly-concentrated solution

the difference between the two indices is lower

and the angle is smaller ("B" fig. 3).

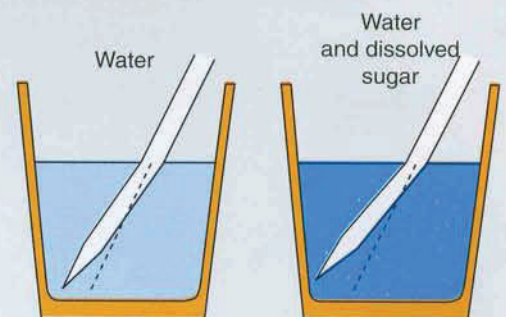


Fig. 2

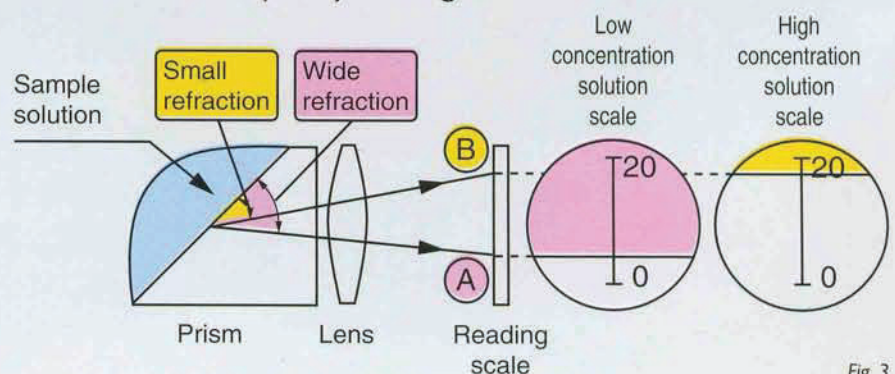


Fig. 3