# Refracto – reliable refractive index wherever you need it

The Refracto ML1701 & ML1702 are compact, easy-to-use refractometers for measurements in laboratory and production environments. Depending on the application, these instruments can be used in two ways: Either put it on a flat surface and place a drop of sample onto the measurement cell, or immerse the sensor directly into the fluid. As soon as you press the measurement key, the result is displayed in the desired units on the backlit LC-Display.

You no longer need to rely on error-prone readings of dark/bright transitions as with optical instruments. Refracto even measures dark samples correctly. Because the refractive index is temperature dependent, Refracto also automatically compensates the result.

Refracto ML1701 has a measuring cell made of optical glass, whereas Refracto ML1702 has a measuring cell made of sapphire. Sapphire has a higher refractive index and a better thermal conductivity than glass. For this reason Refracto ML1702 has an extended measuring range and registers the sample temperature more quickly.

PortableLab™ – Lab power in your hands! Refracto is delivered in a special case which contains everything you need for successful measurements: Pipettes for sample handling, cleaning towels, flasks for samples and cleaning solutions, operating instructions and a CD-ROM with data transmission software, a tutorial to get started and more.

## PortableLab™

**Good-bye Abbé:** Easy-to-perform refractive index measurements

A refractive index determination is the simplest way to quickly determine the quality of a substance. Using Refracto, the determination is faster and less prone to errors than traditional methods (e.g. Abbé-refractometer). Refracto can also store, print and transfer results to a PC.

**Food:**
Reliable quality control

Wherever syrup concentrates, saline solutions or vinegar are produced: Refractometers are essential tools for quality control. The refractive index helps you make sure everything has gone right in the production process. With Refracto, you can perform your quality checks directly in the production facility.

**Grapes and fruit:**
Direct display

With Refracto, you can not only display sugar content in Brix%, but also choose direct conversion into °Oechsle, T.A. 1990, °KMW, °Baume, HFCS42 and HFCS55, which are shown directly after the measurement.

**Antifreeze:**
Quick concentration determination

The measurement of the refractive index is the quickest and easiest method to check antifreeze concentration. Refracto will tell you within seconds whether the antifreeze contains the right amount of ethylene glycol, propylene glycol, ethanol or sodium chloride. It even allows you to directly read the freezing point of these fluids in °C or °F.

**Soft drinks:**
Simple sugar content determination

The precise measurement of the temperature during measurement and the automatic temperature compensation using built-in ICUMSA tables ensure highly reliable Brix% results.

**Customized applications:**
Your own calculations

With Refracto, any concentration measurement can be performed without manual calculation. Just define the corresponding formula and the instrument gives you the final result.

# Refracto: Desktop features in a handheld instrument

**Ease-of-use**

The clearly labelled keyboard makes operation easy and efficient.

**Plain language interface**

The backlit LC-Display of Refracto shows your results and settings in plain language. The simple and intuitive menu structure allows you to change the settings within seconds. You hardly need an instruction manual.

**Temperature compensation**

The refractive index of a sample depends on temperature. During measurement, Refracto determines the temperature and then corrects the refractive index to a standard temperature of 20 °C or any other temperature the user defines. To make quick measurements of different types of samples, you can easily switch between up to 10 user defined correction coefficients.

**Measurement cell with temperature sensor**

Refracto determines refractive index using the total reflection method. The glass prism of the measurement cell of the ML1701 (right) is held by a stainless steel ring, whereas the prism of the ML1702 (left) is made of sapphire, the ring of hard gold plated brass. Sapphire has a higher refractive index and a better thermal conductivity than glass. For this reason the ML1702 has an extended measuring range and registers the sample temperature more quickly.

**It is your choice: hand-held or bench-top**

Refracto is a hand-held and a bench-top refractometer in one. You either place the instrument on a flat surface and add a drop of sample onto the measurement cell or immerse the cell directly into the sample.

**Save and transfer your data whenever you want**

Refracto stores up to 1100 results including sample identification, measurement unit, temperature compensation coefficient, date and time. You are free to transfer the data (together with an instrument identification) to a PC or printer any time using the infrared interface. The PC software to do this comes with Refracto.
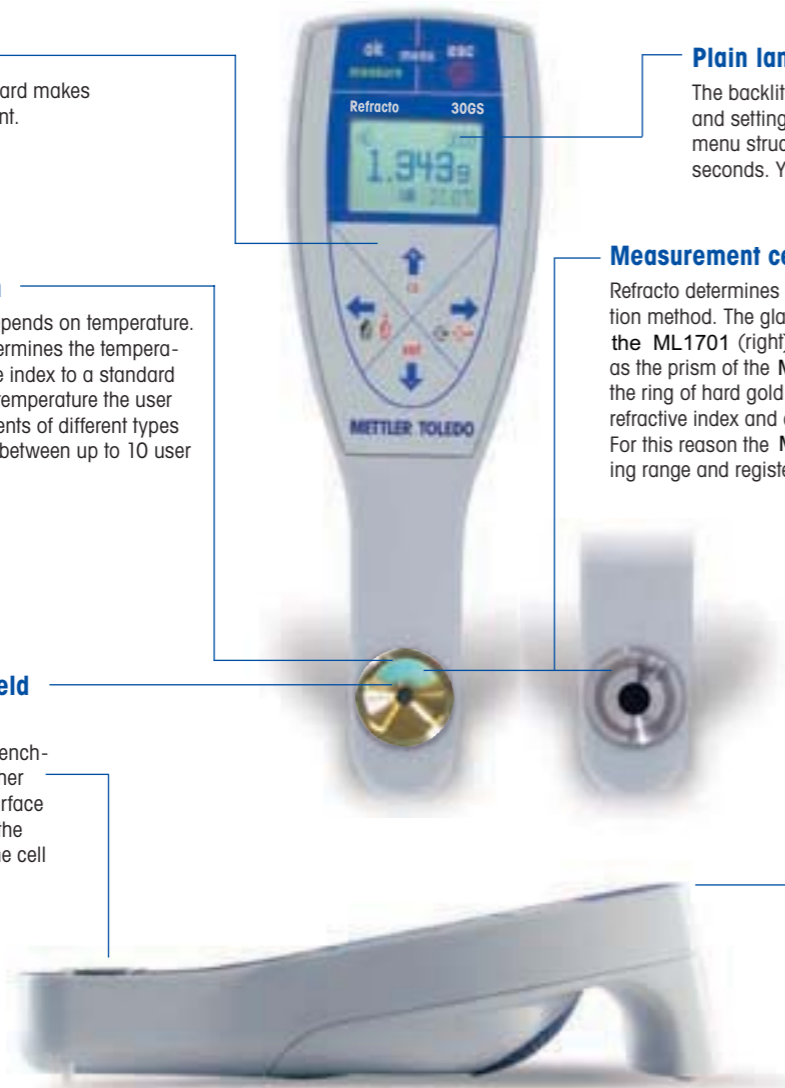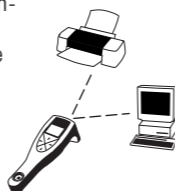
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**Specifications ML1701 / ML1702**

**Measurement method:** Determination of the angle of total reflection of the D-line of sodium (589.3 nm) • **Refractive index:** Measurement range: 1.32 – 1.50 (PX), 1.32 – 1.65 (GS), Resolution: 0.0001, Accuracy: ± 0.0005 • **Brix%:** Measurement range 0 – 85 Brix%, Resolution: 0.1 Brix%, Accuracy ± 0.2 Brix% • **Temperature:** Measurement range: 10 – 40 °C, Resolution: 0.1 °C, Display: °C or °F, Ambient temperature: 5 – 35 °C • **Units of measurement:** nD, nD temperature compensated, Brix%, HFCS42, HFCS55, T.A. 1990, °KMW (Babo), °Baume, °Oechsle (D, CH), w/w%, v/v%, spec. gravity and freezing point (°C or °F) for ethanol and NaCl, w/w%, v/v% and freezing point (°C or °F) for ethylene glycol and propylene glycol, w/w% and v/v% for isopropanol, user defined unit • **Temperature compensation:** With user-defined temperature compensation coefficient (nD temperature compensated, user defined), or automatically (all other units). Up to 10 temperature correction coefficients can be stored in the instrument • **Calibration:** With pure water • **Data memory:** For up to 1100 results (result with unit, sample identification, temperature correction coefficient, date and time) • **Display:** Backlit LC-Display • **Interface:** Infrared for data transfer to PC and printer (IrDA or RS232C) • **Weight:** Approx. 250 g • **Batteries** 2 x LR3, 1.5 V, type AAA approx. 60 hours battery life (one measurement per minute) • **Materials:** Housing: PBT. Measurement cell (PX): Glass, stainless steel. Materials with sample contact (PX): Glass, stainless steel, PBT. Measurement cell (GS): Sapphire, hard gold plated brass. Materials with sample contact (GS): Sapphire, gold, PBT.

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