Abbe Refractometers

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Sucrose Solution (for Brix confirmation)

Sucrose solutions for Brix confirmation are NOW available by ATAGO. Please choose for your use.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Brix Concentration</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE-110010</td>
<td>10% Sucrose</td>
<td>10.00 ±0.03%</td>
<td></td>
</tr>
<tr>
<td>RE-110020</td>
<td>20% Sucrose</td>
<td>20.00 ±0.03%</td>
<td></td>
</tr>
<tr>
<td>RE-110030</td>
<td>30% Sucrose</td>
<td>30.00 ±0.03%</td>
<td></td>
</tr>
<tr>
<td>RE-110040</td>
<td>40% Sucrose</td>
<td>40.00 ±0.04%</td>
<td></td>
</tr>
<tr>
<td>RE-110050</td>
<td>50% Sucrose</td>
<td>50.00 ±0.05%</td>
<td></td>
</tr>
<tr>
<td>RE-110060</td>
<td>60% Sucrose</td>
<td>60.00 ±0.05%</td>
<td>Approx. 5mg</td>
</tr>
</tbody>
</table>

* Shelf life for these solutions is 6 weeks.

EXPLANATION OF ICONS

Icons for functions, specifications and scales have been added to catalog.

- Can be connected to a printer
- Can be connected to a PC
- Calibration with water
- High temperature samples
- Calibration 1 point for water distillate
- Calibration with água
- Calibration avec eau distilled
- Calibration mit Wasser
- Scale with refractive index scale
- Indice de refracción
- Escala de índice de refracción
- Refraktionsgradskala
- Scale with refractive index scale
- Indice di refrattivita
- Scala di indice di refrattivita
- Scale with refractive index scale
- Scale with refractive index scale

**ATAGO products conform to ASTM Standards.**

※ Please contact ATAGO for further details.
By simply setting the boundary line of refraction at the cross hairs, this refractometer directly indicates a measurement value (in refractive index or Brix (%), selective) together with the temperature on a digital display. This refractometer enables anyone to easily carry out measurements without reading analog graduation.

*Dispersion value cannot be measured with the DR-A1.

### Specifications

- **Measurement range**
  - Refractive Index (nD) 1.3000 to 1.7100
  - Brix 0.0 to 95.0% (Automatic Temperature Compensation is executed from 5 to 50°C)
- **Minimum scale**
  - Refractive Index (nD) 0.0001, Brix 0.1%
- **Measurement accuracy**
  - Refractive Index (nD) ±0.0002, Brix ±0.1%
- **Measurement temperature**
  - 5 to 50°C
- **Ambient temperature**
  - 5 to 40°C
- **Light source**
  - LED Lamp (Approximating to wavelength of D-line)
- **Power supply**
  - AC adapter (100 to 240V (50/60Hz) AC input)
- **Power consumption**
  - 16VA
- **Dimensions and weight**
  - Refractometer 13×29×31cm, 6.0kg (main unit only)
  - AC adapter 10.5×17.5×4cm, 0.7kg

### Accessories

- **Test piece**
  - Contact liquid [monobromonaphthalene] (4mL) 1pc
- **Allen wrench for detaching/attaching prism**
  - 1pc
- **Lighting adapter for solid sample**
  - 1pc
- **Tube band**
  - 10pcs
- **AC adapter (AD-13)**
  - 1pc
- **AC cable**
  - 1pc
- **Instruction manual**
  - 1pc

### Circulating Constant Temperature Bath

**60-C4**

Cat.No.1922

A circulating water bath for precise temperature control of refractometers without Peltier.

### Specifications

- **Tank capacity**
  - 0.5 ℓ
- **Temperature setting range**
  - 10 to 60°C (water)
- **Temperature control**
  - PID control method using a thermo-module
- **Constant-Temperature Accuracy**
  - ±0.2°C
- **Flow Rate**
  - 4 ℓ / min
- **Power Supply**
  - AC100 to 240V, 50/60Hz
- **Power Consumption**
  - 430VA
- **Dimensions & Weight**
  - 38 × 24 × 27cm, 11.0kg (main unit only)
The NAR-1T LIQUID is for liquid sample measurement only. This model has the Refractive Index scale and Brix scale, and operates with D line (589nm) light source. Calibration is performed using distilled water.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Measurement range</th>
<th>Refractive Index (nD) 1.3000 to 1.7000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum scale</td>
<td>Refractive Index (nD) 0.001, Brix 0.5%</td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>Refractive Index (nD) ±0.0002, Brix ±0.1%</td>
</tr>
<tr>
<td>Measurement temperature</td>
<td>5 to 50°C</td>
</tr>
<tr>
<td>Light source</td>
<td>LED Lamp (Approximating to wavelength of D-line)</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC100V to 240V , 50/60Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>5VA</td>
</tr>
<tr>
<td>Dimensions and weight</td>
<td>Refractometer 13×18×23cm, 2.5kg (main unit only)</td>
</tr>
<tr>
<td></td>
<td>Thermometer 10×11×7cm, 0.5kg</td>
</tr>
</tbody>
</table>

**ACCESSORIES**

- Digital thermometer: 1pc
- AC power cable: 1pc
- Lamp cable: 1pc
- LED lamp: 3pcs
- Special screwdriver for calibration: 1pc
- Tube band: 10pcs
- Instruction manual: 1pc

The NEW NAR-1T SOLID Abbe Refractometer was designed for solid sample measurement (this model can also measure liquid samples). This model has the Refractive Index scale and Brix scale, and operates with D line (589nm) light source.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Measurement range</th>
<th>Refractive Index (nD) 1.3000 to 1.7000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum scale</td>
<td>Refractive Index (nD) 0.001, Brix 0.5%</td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>Refractive Index (nD) ±0.0002, Brix ±0.1%</td>
</tr>
<tr>
<td>Average dispersion value</td>
<td>nF-nC (to be calculated according to conversion table)</td>
</tr>
<tr>
<td>Measurement temperature</td>
<td>5 to 50°C</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>5 to 40°C</td>
</tr>
<tr>
<td>Light source</td>
<td>LED Lamp (Approximating to wavelength of D-line)</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC100V to 240V , 50/60Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>5VA</td>
</tr>
<tr>
<td>Dimensions and weight</td>
<td>Refractometer 13×18×23cm, 2.5kg (main unit only)</td>
</tr>
<tr>
<td></td>
<td>Thermometer 10×11×7cm, 0.5kg</td>
</tr>
</tbody>
</table>

**ACCESSORIES**

- Digital thermometer: 1pc
- AC power cable: 1pc
- Lamp cable: 1pc
- LED lamp: 3pcs
- Test piece: 1pc
- Contact liquid [monobromonaphthalene] (4m2): 1pc
- Special screwdriver calibration: 1pc
- Milky white reflector: 1pc
- Tube band: 10pcs
- Instruction manual: 1pc

Abbe Refractometer for low refractive index measurement

In addition to our standard Abbe Refractometer NAR-1T SOLID, we can supply the following Abbe model.

**Abbe Refractometer NAR-1T • LO Cat.No.1217** (for low refractive index measurement)

- Measurement range: Refractive Index (nD) 1.1500 to 1.4800
- Measurement temperature: 5 to 50°C

Note: The refractometers listed above have the same scale as the NAR-1T SOLID.

To obtain the true refractive index value, simply refer to the conversion table that is provided with each unit.

*Dispersion values cannot be measured by the Abbe refractometers listed above. For further details, please inquire to the Overseas Department at ATAGO.
ABBE REFRACTOMETER
Cat.No.1220
NAR-2T
HIGH TEMPERATURE MODEL
Designed for use with compounds that require measurement at high temperatures (up to 120°C).

SPECIFICATIONS
Measurement range: Refractive Index (nD) 1.3000 to 1.7000
Brix 0.0 to 95.0%
Minimum scale: Refractive Index (nD) 0.001, Brix 0.5%
Measurement accuracy: Refractive Index (nD) ±0.0002, Brix ±0.1%
Average dispersion value: nF-nC (to be calculated according to conversion table)
Measurement temperature: 5 to 120°C
Ambient temperature: 5 to 40°C
Light source: LED Lamp (Approximating to wavelength of D-line)
Power supply: AC100V to 240V, 50/60 Hz
Power consumption: 5VA
Dimensions and weight:
Refractometer: 12 x 20 x 25cm, 5.8kg (main unit only)
Thermometer: 10 x 11 x 7cm, 0.5kg

ACCESSORIES
Digital thermometer.............................................................................1pc
AC power cable .................................................................................1pc
Lamp cable .........................................................................................1pc
LED lamp ............................................................................................3pcs
Test piece ............................................................................................1pc
Contact liquid [monobromonaphthalene](4mL) ....................................1pc
Special screwdriver for calibration....................................................1pc
Tube band .........................................................................................10pcs
Instruction manual ...........................................................................1pc

Another option
*ATAGO can supply Abbe refractometer with measurement range of "nD1.7000 to 2.0800" and with measurement temperature range of "5 to 50°C" or "5 to 120°C".
Note: The refractometers listed above have the same scale as the NAR-2T. To obtain the true refractive index value, simply refer to the conversion table that is provided with each unit.
*Dispersion values cannot be measured by the Abbe refractometers listed above. For further details, please inquire to the Overseas Department at ATAGO.

ABBE REFRACTOMETER
Cat.No.1240
NAR-4T
HIGH REFRACTIVE INDEX MODEL
Research and Development on new materials for modern technologies is being actively conducted in every industry. Many of these materials (especially polymer film and related materials) are of high refractive index—often too high for the existing Abbe refractometers. These can now be measured with the nD 1.4700 to 1.8700 range of the NAR-4T.

SPECIFICATIONS
Measurement range: Refractive Index (nD) 1.4700 to 1.8700
Minimum scale: Refractive Index (nD) 0.001
Measurement accuracy: Refractive Index (nD) ±0.0002
Measurement temperature: 5 to 50°C
Ambient temperature: 5 to 40°C
Light source: LED Lamp (Approximating to wavelength of D-line)
Power supply: AC100V to 240V, 50/60Hz
Power consumption: 5VA
Dimensions and weight:
Refractometer: 13 x 18 x 23cm, 2.5kg (main unit only)
Thermometer: 10 x 11 x 7cm, 0.5kg

ACCESSORIES
Digital thermometer.............................................................................1pc
AC power cable .................................................................................1pc
Lamp cable .........................................................................................1pc
LED lamp ............................................................................................3pcs
Test piece ............................................................................................1pc
Contact liquid [monobromonaphthalene](4mL) ....................................1pc
Contact liquid [methylene iodidecontaining sulfur solution](4mL) ........1pc
Special screwdriver for calibration....................................................1pc
Milky white reflector ........................................................................1pc
Tube band .........................................................................................10pcs
Instruction manual ...........................................................................1pc
PRECISION MODEL

The NAR-3T was developed to give improved measurement accuracy and ease of use. This was achieved by making fundamental improvements to the optical system, utilizing a larger scale, incorporating a high intensity lamp and using a double control knob to give quick and more accurate control.

FEATURES

1. High accuracy obtained using a large scale.
   (a) The scale is four times larger than those used in conventional refractometers.
   (b) The minimum scale division of 0.0002 enables measurements of refractive index of 0.0001 to be made.

2. Double control knob for easier operation.
   (a) Fine control knob for fine adjustment gives greater accuracy and enables the operator to bring the boundary line into the center cross more quickly.
   (b) This facility gives quicker operation and better reproducibility of measurements.

3. Able to measure solid and liquid samples.
   (a) The high intensity lighting is suitable for the measurement of both solid and liquid samples.

4. Safe electrical system.
   (a) The high intensity lighting is suitable for the measurement of both solid and liquid samples.
   (b) The power supply cable is fixed to the main body of the instrument.

5. Built-in air dryer and moisture removal device.
   (a) A large cartridge drying chamber containing silica gel is incorporated to prevent moisture condensing on the inside of the instrument.
   (b) Means are provided for using compressed air to remove internal moisture droplets.

SPECIFICATIONS

- Measurement range: Refractive Index (nD) 1.30000 to 1.71000, Brix 0.00 to 95.00%
- Minimum scale: Refractive Index (nD) 0.0002, Brix 0.1%
- Measurement accuracy: Refractive Index (nD) ±0.0001, Brix ±0.05%
- Average dispersion value: nF-nC (to be calculated according to conversion table)
- Measurement temperature: 5 to 50°C
- Ambient temperature: 5 to 40°C
- Light source: LED Lamp (Approximating to wavelength of D-line)
- Power supply: AC100V to 240V, 50/60Hz
- Power consumption: 5VA
- Dimensions and weight: Refractometer 12×31×34cm, 9.0kg (main unit only)
  Thermometer 10×11×7cm, 0.5kg

ACCESSORIES

- Digital thermometer ........................................... 1pc
- AC Power cable .................................................. 1pc
- Lamp cable ....................................................... 1pc
- LED Lamp ......................................................... 1pc
- Allen wrench for calibration .................................. 3pcs
- Test piece ......................................................... 1pc
- Contact liquid [monobromonaphthalene](4m2) ............ 1pc
- Air purger for dehumidification ............................. 1pc
- Tube band ......................................................... 10pcs
- Instruction manual ............................................. 1pc

Measurement of double refraction samples

Note: Measurement of double refraction samples requires the use of a “Polarizing eyepiece” that is supplied optionally. Polymer film and other compounds of this sort have different refractive indices depending on the orientation of the film (X-Y-Z axis). MULTI-WAVE-LENGTH ABBE REFRACTOMETERS are best suited for measuring film orientation, etc. Please ask if you need more information for measurement of double refraction samples.
**MULTI-WAVELENGTH ABBE REFRACTOMETERS**

*Abe number can be measured simply!*

**Cat.No.1410**

**DR-M2**

Refractive Index or Abbe number ($v_d$ or $v_e$) can be measured at different wavelengths ranging from 450 to 1,100nm. For measurement at wavelengths ranging from 681 to 1,100nm, the optional near infrared ray viewer (Part No.RE-9119) is required. The DR-M2/DR-M4 digitally displays the measurement results of refractive index or Abbe number on the LCD. Measurement can be achieved by matching the boundary line at the intersection point of the cross hairs. These refractometers can be connected to the digital printer.

### SPECIFICATIONS

- **Measurement range:**
  - DR-M2
    - Wavelength 450nm: Refractive Index 1.3278 to 1.7379
    - Wavelength 589nm: Refractive Index 1.3000 to 1.7100
    - Wavelength 680nm: Refractive Index 1.2912 to 1.7011
    - Wavelength 1,100nm: Refractive Index 1.2743 to 1.6840
  - DR-M4
    - Wavelength 450nm: Refractive Index 1.5219 to 1.9220
    - Wavelength 589nm: Refractive Index 1.4700 to 1.8700
    - Wavelength 680nm: Refractive Index 1.4654 to 1.8544
    - Wavelength 1,100nm: Refractive Index 1.4260 to 1.8259

- **Minimum indication:** Refractive Index ($n_D$) 0.0001, Abbe number 0.1
- **Measurement accuracy:** Refractive Index ($n_D$) ±0.0002 (with the attached test piece at 589nm)
- **Wavelength range:** From 450 to 1,100nm (with interference filters) (For measurement at wavelengths ranging from 681 to 1,100nm, the near infrared ray viewer (optional) is required.)
- **Measurement temperature range:** 5 to 500°C
- **Output terminal:** For digital printer, DP-22(B)(optional), Conforming to Centronics standard
- **Power supply:** AC100V to 240V, 50/60Hz
- **Power consumption:** 160VA
- **Dimensions and weight:** Refractometer 13×29×31cm, 6.0kg Light source unit 15×33×11cm, 3.0kg

**ACCESSORIES**

- Test piece: 1pc
- Allen wrench: 1pc
- Contact liquid [monobromonaphthalene](4mL): 1pc
- Contact liquid [methylene iodidecontaining sulfur solution](4mL)(for DR-M4 only): 1pc
- Interference filter, 589nm: 1each
- Lighting glass for film measurement: 1pc
- Spare bulb: 1pc
- Tube band: 10pcs
- Instruction manual: 1pc

**Abbe number can be measured simply!**

(In the case of measurement of Abbe number "$v_d$")

1. Set the sample on the prism surface.
2. Insert the 589nm interference filter (attached to the DR-M2 as a standard accessory). While looking through the eyepiece, match the boundary line with the intersection point of the cross hairs. Then, press the SET key.
3. Replace the interference filter with the 486nm interference filter (of an optional part). While looking through the eyepiece, match the boundary line with the intersection point of the cross hairs. Then, press the SET key.
4. Replace the interference filter with the 656nm interference filter (of an optional part). While looking through the eyepiece, match the boundary line with the intersection point of the cross hairs.
5. Press the SET key. The indication on the display at that time represents the Abbe number "$v_d$". *It is very convenient if you use an optional digital printer, because refractive index at each wavelength and Abbe number are printed.*
Refractive Index or Abbe number (νd or νe) can be measured at different wavelengths ranging from 450 to 1,550nm. These refractometers digitally display the measurement result on the LCD. Measurement can be achieved by matching the boundary line at the intersection point of the cross hairs. These units can be connected to the digital printer.

**SPECIFICATIONS**

- **Measurement range:**
  - DR-M2/1550(A) • DR-M2/1550(B)
  - Wavelength: 450nm: Refractive Index 1.3278 to 1.7379
  - Wavelength: 589nm: Refractive Index 1.3000 to 1.7100
  - Wavelength: 680nm: Refractive Index 1.2912 to 1.7011
  - Wavelength: 1,100nm: Refractive Index 1.2743 to 1.6840
  - Wavelength: 1,550nm: Refractive Index 1.2662 to 1.6759

- **Minimum indication:** Refractive Index (nD) 0.0001, Abbe number 0.1

- **Measurement accuracy:** Refractive Index (nD) ±0.0002 (with the attached test piece at 589nm)

- **Wavelength range:** From 450 to 1,550nm (with interference filters)

- **Measurement temperature range:** 5 to 50°C

- **Output terminal:** For digital printer, DP-22(B) (optional), Conforming to Centronics standard

- **Light source:** Monochromatic light source device
  - Dimensions, Weight and Power supply
    - (Cat.No.1412, 1415)
    - 23×35×21 to 31cm, 5.9kg,
    - AC200 to 240V, 50/60Hz, 285VA

    - (Cat.No.1413, 1416)
    - 23×32×21 to 31cm, 5.0kg,
    - AC100 to 110V, 50/60Hz, 225VA

- **Power supply:** AC100V to 240V, 50/60Hz

- **Dimensions and weight:** Refractometer 13×29×31cm, 6.0kg
  - Power supply unit 15×33×11cm, 3.2kg

**ACCESSORIES**

- Near infrared ray viewer
- Mounting adapter
- Monochromatic light source device
- Test piece
- Allen wrench
- Contact liquid [monobromonaphthalene][4mg]
- Contact liquid [methylene iodidecontaining sulfur solution][4mg](for DR-M4/1550 only)
- Interference filter, 589nm
- Interference filter frame for 589nm
- Interference filter frame for registration
- Tube band
- Lighting glass for film measurement

**DIGITAL PRINTER -optional-**

**DP-63(B)**

Cat.No.3135

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All ATAGO refractometers are designed and manufactured in Japan.

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*Specifications and appearance are subject to change without notice.*