Hand-held Refractometers

MASTER of REFRACTOMETRY

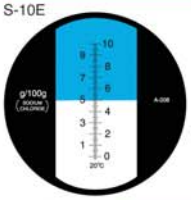
ATAGO®

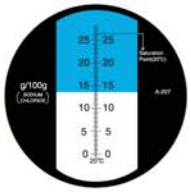
SALINITY REFRACTOMETERS
S-10E *Cat.No. 2412,* S-28E *Cat.No. 2422*

The S-10E and the S-28E are salt concentration refractometers with special scales. The units can be used for controlling the concentration of saltwater used in rinsing seafood or salinity in cooking.

Scale range	: 0.0 to 10.0% sodium chloride
Minimum scale	: 0.1%
Size and weight	: 4×4×20cm, 200g

S-10E





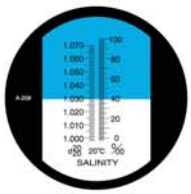
Scale range	: 0.0 to 28.0% sodium chloride
Minimum scale	: 0.2%
Size and weight	: 4×4×18cm, 170g

S-28E

SALINITY REFRACTOMETERS (sea water) / ATC TYPE SALINITY REFRACTOMETERS (sea water)
S/Mill-E *Cat.No. 2442,* ATC-S/Mill-E *Cat.No. 2444*

The S/Mill-E density meter measures the salinity and the specific gravity of sea water. The salinity of sea water is displayed in parts per mille (‰) unit. The ATC-S/Mill-E model is designed with the Automatic Temperature Compensation feature which automatically provides the measurement values at the compensated temperature of 20℃ (compensation range 10 to 30℃).

Scale range	: Salinity 0.0 to 100.0‰ : Specific gravity 1.000 to 1.070
Minimum scale	: Salinity 1‰ : Specific gravity 0.001
Accuracy	: (ATC-S/Mill-E) Salinity±1‰ : Specific gravity ±0.001 (10 to 30℃)
Size and weight	: 4×4×20cm, 200g



S/Mill-E

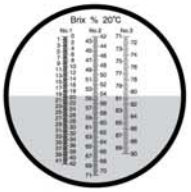
ATC-S/Mill-E

HAND-HELD REFRACTOMETERS (full range)
HSR-500 *Cat.No. 2340,* R-5000 *Cat.No. 2350*

The refractive index of a sugar solution is in proportion to sugar concentration. The model HSR-500 uses this principle, where a transmitting system is applied, to measure within a full range of Brix (0.0-90.0%). The R-5000 can be used for simple, quick and easy measurements of refractive index.

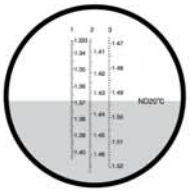
HSR-500

Scale range	: Brix 0.0 to 90% (3-stage switching)
Minimum scale	: 0.2%
Size and weight	: 4×4×20cm, 600g



R-5000

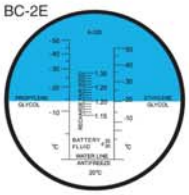
Scale range	: nD 1.333 to 1.520 (3-stage switching)
Minimum scale	: 0.001
Size and weight	: 4×4×20cm, 600g



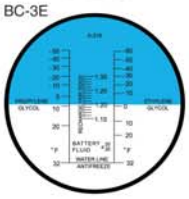
BATTERY COOLANT CHECKERS
BC-2E *Cat.No. 2832,* BC-3E *Cat.No. 2842*

This refractometer has an exclusive scale for measuring specific gravity of battery fluid and for checking the freezing temperature of ethylene glycol and propylene glycol which are used as antifreeze mixture in automobiles, thermal catalyst for solar power systems and other industrial applications. The scale of the model BC-2E is graduated in ℃ while that of the BC-3E is in℉.

BC-2E



BC-3E

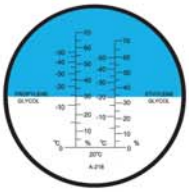


		BC-2E	BC-3E
Scale range	: Ethylene glycol	0 to –50℃	32 to –60℉
	Propylene glycol	0 to –50℃	32 to –50℉
	Battery fluid d_{20}^{20}	1.150 to 1.300	
Size and weight	: 4×4×14cm, 140g		

COOLANT REFRACTOMETER
BR-1E *Cat.No. 2821*

This refractometer can be used for measuring the concentration and freezing temperature of ethylene glycol and propylene glycol which are used as antifreeze mixture for automobiles, thermal catalyst for solar power systems, and other industrial applications. Designed with a dual scale, the BR-1E is ideal for field measurement.

Scale range	: Ethylene glycol 0 to 70%, 0 to –50℃ Propylene glycol 0 to 70%, 0 to –50℃
Minimum scale	: 5%, 5℃
Size and weight	: 4×4×14cm, 140g



HAND-HELD ALCOHOL REFRACTOMETER
AL-21α *Cat.No. 2361*

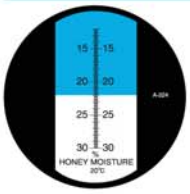
Designed ideally to measure pure alcohol and alcohol after distillation.

Scale range	: Ethyl Alcohol Consentration 0.0 to 21.0% (ml/100ml)
Minimum scale	: 0.2% (Resolution 0.1%)
Size and weight	: 4×4×21cm, 260g

HAND-HELD HONEY REFRACTOMETER
HHR-2N *Cat.No. 2522*

The honey refractometer is specially designed to determine the percentage of water contained in honey.

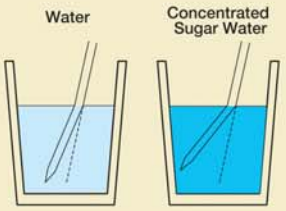
Scale range	: 12.0 to 30.0% (water content in honey)
Minimum scale	: 0.1%
Size and weight	: 4×4×17cm, 260g



Technical Information

Light Refraction

When a straw is placed into a glass of water, the straw appears bent. Now if a straw is placed in a glass with water containing dissolved sugar, the straw should appear even more bent (see illustrations). This phenomenon is known as the principle of light refraction. Refractometers are measuring instruments which put this phenomenon of light refraction to practical use. They are based on the principle that as the density of a substance increases (e.g. when sugar is dissolved in water), its refractive index (how much the straw appears bent) rises proportionately. Refractometers were devised by Dr. Ernst Abbe, a German/Austrian scientist in the early 20th century.



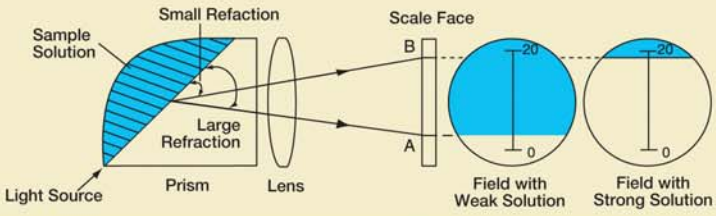
Principles of Refractometers

The detection system for hand-held refractometers (transparent system) is summarized below.

(1) In the figure below the detection is done by utilizing the refractive phenomenon produced on the boundary of the prism and sample. The refractive index of the prism is much larger than that of the sample.

(2) If the sample is thin, the angle of refraction is large (see line "A") because of the large difference in refractive index between the prism and the sample.

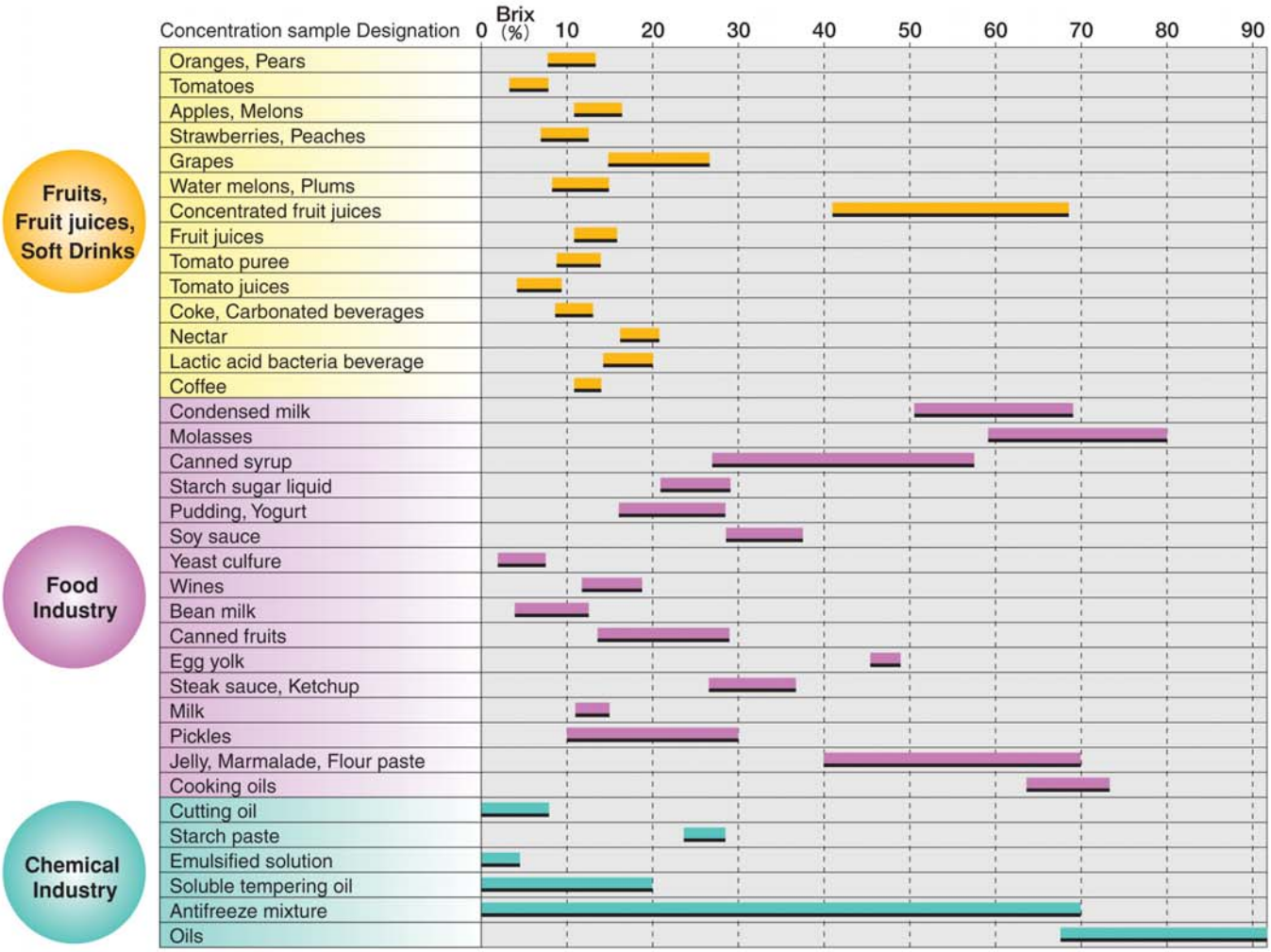
(3) If the sample is thick, the angle of refraction is small (see line "B") because of the small difference in refractive index between the prism and the sample.



Which Refractmeter to choose

Please use as a guide with a chart of back page when you choose the refractometer.

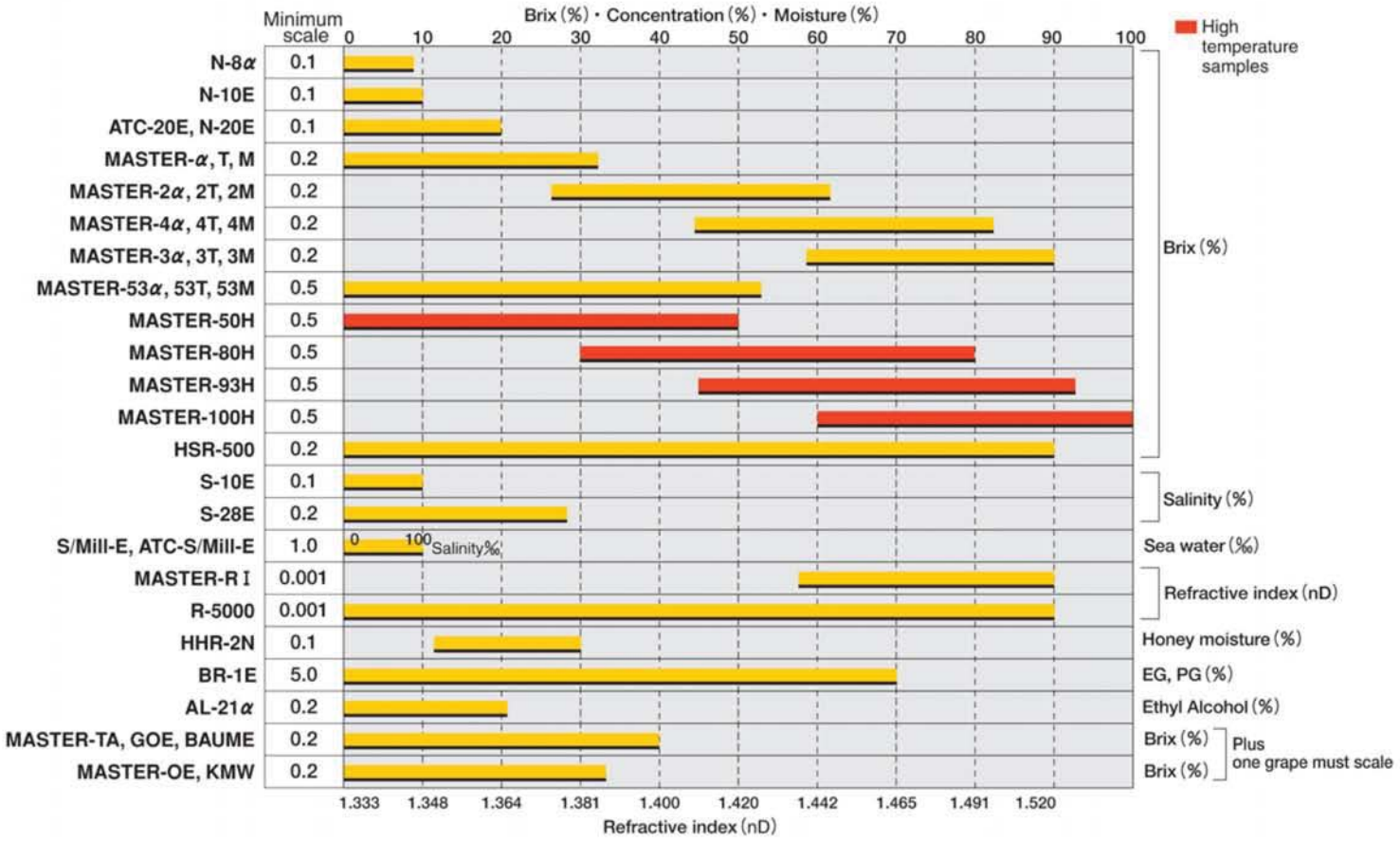
■Known sample's typical concentration



●About the Brix (%) Scale

All Refractometers are designed to measure the refractive index of a solution. The Brix scale is based on a sucrose (sugar) and water solution. However, since most samples contain substances other than sugar - such as salts, minerals and proteins - the Brix percentage represents the total concentration of all soluble solids in the sample. For certain samples, such as cutting oils and other industrial fluids, a conversion chart from the Brix percentage to the sample's total concentration may be necessary.

■Measurement range for each model



■EXPLANATION OF ICONS Icons for functions, specifications and scales have been added to this catalog.

* Automatic Temperature Compensation
* Compensation automatique de température
* Automatische Temperaturkompensation
* Compensazione automatica della temperatura
* Compensación de automática de temperatura
* 自動溫度補償

* External Light Interference
* Interférence de la lumière externe
* Äußere Lichteinflüsse
* Interferenza della luce esterna
* Luz de Interferencia Externa
* 外部光線干涉

* High temperature samples
* Résistant à la chaleur
* Hitzebestaendig
* Resistente al calore
* Muestras De Alta Temperatura
* 高溫樣品用

* Calibration with exclusive standard liquid
* Calibration 1 point sur solution standard
* Kalibrierung mit speziellem Standard
* Calibration 1 point sur solution standard
* Calibración con patrones líquidos especiales
* 使用專屬標準液歸零

* Calibration with water
* Calibration 1 point* sur eau distillée
* Kalibrierung mit Wasser
* Calibrazione con acqua
* Calibración con agua
* 用水歸零

* Compact and easy to carry
* Portable
* Leicht und einfach zu tragen
* Calibrazione con liquidi standard esclusivi
* Compacto y fácil de llevar
* 輕巧易於攜帶

* Digital display
* Affichage numérique
* Digital Anzeige
* Display digitale
* Pantalla digital
* 數字顯示

* Battery operated
* Alimentation par pile
* Batteriebetrieben
* Alimentazione a batteria
* Funcionamiento con batería
* 使用電池操作

* Refractive index scale
* Indice de réfraction
* Skala fuer Refraktive Index
* Indice di rifrazione
* Escala de índice de refracción
* 折射率刻度

* Salt concentration scale
* Teneur en sel
* Skala fuer Salzkonzentration
* Salinità%
* Escala de concentratión salina
* 鹽分濃度刻度

* Seawater scale
* Spécial eau de mer
* Seewasserskala
* Salinità o/oo
* Escala de agua de mar
* 海水刻度

* Wine scale
* Spécial viticulture
* Skala fuer Wein
* Scale Enologia
* Escala de vinos
* 葡萄酒刻度

All ATAGO refractometers are designed and manufactured in Japan.

HACCP GMP GLP ATAGO products comply with HACCP, GMP, and GLP system standards.

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* Specifications and appearance are subject to change without notice.

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