

Refractometry solutions from Avantor

01. REFRACTOMETERS

02. REFRACTIVE INDEX STANDARDS



VWR® refractometry

Refractive index is widely used in the food and beverage industry, as well as in the chemical and pharma industry for direct measurement of sucrose content or to measure or compare other substances.

Avantor offers a range of instruments and standards to support these measurements. Choose between a range of basic analogue refractometers or the more advanced digital units or high precision bench refractometers with Peltier temperature control systems and wide beam optics, and select the standards suitable for your application.

The Brix value (degree Brix, Bx) indicates the sucrose content of an aqueous solution. Because dissolution of sugars changes the optical properties of a solution. Brix value can be determined by measuring the refractive index relative to a standard sucrose solution of known concentration.

Standards can be used to calibrate a refractometer so that it reads directly in degree Brix. Therefore, accuracy and reliability of the Brix calibration standards used are of utmost importance.

You will also find a selection of useful accessories to make your work as easy as possible.



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VWR® Bench top refractometers

The VWR® PL1 and VWR® PL2 Refractometers have been designed by experts with the world's food, beverage, chemical, pharmaceutical and industrial industries in mind.

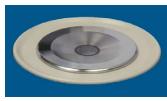
Each digital refractometer is fitted with a Peltier temperature control system and wide beam optics. At the heart of the PL refractometer is a precision engineered flat prism surface for fast, accurate readings and easy-cleaning, as well as a state-of-the-art 7 inch capacitive touchscreen which is bright and clear, durable, and simple to use (even whilst wearing PPE gloves).

Choose between the VWR®PL-1 for three decimal place Brix precision, or the VWR® PL-2 for six decimal place Refractive Index precision below.





Digital refractometer





BENCH TOP REFRACTOMETERS WITH PELTIER TEMPERATURE CONTROL. PLR1/PLR2. VWR®

Simple to use, precise bench top refractometers for use in laboratory or production environments.

- Wide measuring range
- Brix, RI, user scales
- Peltier temperature control
- 7» touch screen
- Multilingual display
- Intuitive menu structure
- Store up to 4000 readings

Two distinct high precision bench top refractometers that offer users a choice based on measurement range and application type. Both models feature refractive index (nD) and sugar (Brix) scales and it is possible to load up to 25 commonly used scales from the instrument's library.

The PLR1 is ideally suited for use with more difficult samples encountered in the food, beverage and industrial markets. Specially designed optics, including a sapphire prism, facilitate measurement of non homogenous samples such as thick sugar syrups, opaque samples and those that may contain fibrous matter such as fruit pulp or suspended solids in emulsions like minute solids experienced when processing coffee. Scales include Brix and refractive index as standard with others including HFCS (40/55/90), % water in honey, grape must are available.

The PLR2 is especially suited for use within research and production of chemicals, petrochemicals, pharmaceuticals, flavours, fragrance and aromas due to its wide refractive index and the robust gasket materials that are fitted to the measurement area.

Both instruments are packed with features that meet the needs of a modern day laboratory. From intelligent on-board Peltier control, measurements via a simple methods system that tracks sample performance against pre-set limits, to the secure handling of data storage, exchange and sign-off. Everyday operation such as taking a reading and performing calibration is a simple function using the instrument's touch screen. Sample cleaning is easy thanks to the shallow prism shape which ensures that sample-to-sample cross-contamination is negated.

Precision: ±0,00001 nD; ±0,01 °Bx Interface: 3× USB (A), 1× Ethernet

US/EP/BP/JP compliant. Supports FDA regulation 21 CFR Part 11.

A selection of accessories and spare parts are available to enhance the instrument and to keep it performing perfectly, day after day. Can be fitted with optional extras. Validation documentation IQ/OQ/PQ available on request.

Supplied with power cables (UK, EU and DK), and multi-language user manual.

	·				
Model	PLR1	PLR2			
Range	1,32 - 1,58 nD (0 - 100 °Bx)	1,30 - 1,70 nD (0 - 100 °Bx)			
Accuracy	±0,00002 nD; ±0,01 °Bx (0 - 30 °Bx) ±0,00004 nD; ±0,03 °Bx (30 - 100 °Bx)	±0,00002 nD; ±0,02 °Bx			
Reading time	5 s	8			
Temperature sensor	±0,03 °C				
Temperature control	Peltier				
Temperature stability	±0,05 °C				
Temperature measurement	0 or 10 °C below ambient wh	nichever is greater to 60 °C			
Memory	4000 readings (+100	00 configurations)			
Light source	LED (589 nm)	(100,000+ h)			
Prism	Sapphire/silicone	Kalrez® (USP Class VI)			
Electrical	Instrument: 24 V	DC, ±5%, <2 A			
Electrical	External: 100 - 240 V, 50 - 60 Hz (supplied)				
Display	7,4" touch	screen			

Digital refractometer, PLR1 (1,33-1,58 RI) VWR PLR	1,32 - 1,58 nD (0 - 100 °Bx)	0,00001 nD; 0,01 °Bx	1	635-0844
Digital refractometer, PLR2 (1,30-1,70 RI) VWR PLR	2 1,30 - 1,70 nD (0 - 100 °Bx)	0,00001 nD; 0,01 °Bx	1	635-0845
Description			Pk	Cat. No.
Accessories for VWR® bench top refractometers wi	h Peltier temperature control, PLR1/PLR2			
Contact presser			1	635-0846
Impact 230 printer			1	635-0847
Paper for printer			1	635-0849

Cat. No.

VWR® digital handheld refractometers

Dual-scale handheld refractometers providing Brix (sugar concentration) and refractive index measurements with automatic temperature compensation; ideal for taking 'on the spot' readings in the field, factory or the laboratory.



Designed with robustness in mind, these instruments are manufactured using the latest technology materials including a seam welded ABS case, optical glass prism with stainless steel dish for rapid temperature stabilisation and a rubberised keypad for durability; all packed into one of the smallest instruments of its type.

Calibration is as simple as taking a reading. Simply apply distilled water and press the zero key for 3 seconds.

The instrument can also be verified using a non toxic, long life, water soluble AG40 Calibration Fluid making use of the unique 'AG Test Mode.' The AG Test Mode automatically switches the temperature compensation from sugar based (ICUMSA) to one specific for the AG Fluid, providing a precise means of verification that is traceable to NIST.

READ ZERO

VWR

Additionally, the instrument provides a warning for common reading errors, including 'HAL' (High Ambient Light), sample out of range (high/low) and battery strength.

VWR® refractometers are precise, easy to use and versatile in their use.

- Optical glass prism and stainless steel dish to stabilise sample temperature
- Choice of half or full range
- Dual scale Brix and Refractive Index
- Temperature display
- Automatic Temperature Compensation to correct readings of water and sucrose solutions to 20 °C
- Simple zero function
- IP 65 water resistant
- Ergonomic design that truly fits in your pocket

	Half range	Full range	
Cat. No.	635-0723	635-0722	
Measurement range (Brix/RI)	0 - 50 / 1,333 - 1.42 nD	0 - 95 / 1.33 - 1.53 nD	
Measurement time	2 seconds		
Resolution (Brix/RI)	0,1 °Bx / 0.0001 nD		
Accuracy (Brix/RI)	0,2 °Bx / 0,0003 nD		
Automatic temperature compensation	ICUMSA (Brix) / AG Test M	ode	
Ambient temperature range	5 - 40 °C		
Sample temperature range	5 - 95 °C		
Case material	ABS with rubberised keypad		
Ingress protection	IP 65		
Relative humidity	<95% (non condensing)		
Light source	LED – yellow (lifetime gua	rantee)	
Weight	85 g		
Battery/battery life	2x AAA/LR03 (10000 readi	ngs)	
WxDxH (instrument)	55x120x35 mm		
Country of origin	United Kingdom (Europe)		
Compliance	CE, RoSH		
Warranty	24 months		
Ordering information	Supplied in a textile/foam batteries and multilingual	the state of the s	

Description	Range	Refractive index (nD)	Pk	Cat. No.
Digital handheld refractometer	0 – 54 °Bx	1,33 – 1,42	1	635-0722
Digital handheld refractometer	0 – 95 °Bx	1,33 – 1,54	1	635-0723

VWR® Analog handheld refractometers

Handheld refractometers use high precision clear scale, and simple zero adjustment with lock.

They have an ergonomic design with anti-roll support, comfortable eyepiece with smooth adjustment, easy to clean prism and push-on flap protection.

For better distinction they show a shaded field of view.





ATC HANDHELD REFRACTOMETERS

Handheld refractometers with automatic temperature compensation (ATC) for consistent results.

- ATC at 20 °C between 10 and 30 °C
- Scales are easy to read and deliver exact results
- Easy to use and clean

Description	Range	Resolution	Pk	Cat. No.
Refractometer for sugar	0 – 10 °Bx	0,1 °Bx	1	635-0629
Refractometer for sugar	0 – 18 °Bx	0,1 °Bx	1	635-0630
Refractometer for sugar	0 – 32 °Bx	0,2 °Bx	1	635-0631
Refractometer for sugar	0 – 55 °Bx	1°Bx	1	635-0634
Refractometer for sugar	28 – 62 °Bx	0,2 °Bx	1	635-0632
Refractometer for sugar	45 – 82 °Bx	0,2 °Bx	1	635-0633
Refractometer for sugar	58 – 92 °Bx	0,5 °Bx	1	635-0635
Refractometer for salinity	0 – 10 % NaCl	0,1 % NaCl	1	635-0636
Refractometer for salinity	0 – 28 % NaCl	0,2 % NaCl	1	635-0637
Refractometer for ethylene glycol F.pt.(°C)	−500 °C	5 °C	1	635-0638
Refractometer for wine	0 – 140 °Oe	1°Oe / 0,2 KMW Babo	1	635-0639

VWR® Refractive index Standards



REFRACTIVE INDEX STANDARDS

Refractive index of each standard is verified using a calibrated and temperature-controlled refractometer.

- Standards are prepared gravimetrically on weight/weight basis
- Solute (sucrose) and solvent (water) are weighed on a calibrated balance using OIML traceable weights

Certificate of calibration is issued in accordance with the requirements of ISO/IEC 17025.

Description	Refractive index (nD)	Pk	Cat. No.
Refractive index standard at 20 °C, solvent based	1.38779	15 ml	85114.015
Refractive index standard at 20 °C, solvent based	1,40485	15 ml	85115.015
Refractive index standard at 20 °C, solvent based	1,42345	15 ml	85116.015
Refractive index standard at 20 °C, solvent based	1,44468	15 ml	85117.015
Refractive index standard at 20 °C, solvent based	1,46768	15 ml	85118.015
Refractive index standard at 20 °C, solvent based	1,49672	15 ml	85119.015
Refractive index standard at 20 °C, solvent based	1,50044	15 ml	85120.015
Refractive index standard at 20 °C, solvent based	1.51726	15 ml	85121.015
Refractive index standard at 20 °C, solvent based	1,53660	15 ml	85122.015
Refractive index standard at 20 °C, solvent based	1.65808	15 ml	85123.015
Refractive index standard at 20 °C, stabilised sucrose	1,34325	15 ml	85124.015
Refractive index standard at 20 °C, stabilised sucrose	1,34782	15 ml	85125.015
Refractive index standard at 20 °C, stabilised sucrose	1,34968	15 ml	85126.015
Refractive index standard at 20 °C, stabilised sucrose	1.35015	15 ml	85127.015
Refractive index standard at 20 °C, stabilised sucrose	1,35093	15 ml	85129.015
Refractive index standard at 20 °C, stabilised sucrose	1,35171	15 ml	85129.015
Refractive index standard at 20 °C, stabilised sucrose	1,35568	15 ml	85130.015
Refractive index standard at 20 °C, stabilised sucrose	1,37233	15 ml	85131.015
	1,38115	15 ml	85132.015
Refractive index standard at 20 °C, stabilised sucrose			
Refractive index standard at 20 °C, stabilised sucrose	1,39032	15 ml	85133.015
Refractive index standard at 20 °C, stabilised sucrose	1,39986	15 ml	85134.015
Refractive index standard at 20 °C, stabilised sucrose	1,40978	15 ml	85135.015
Refractive index standard at 20 °C, stabilised sucrose	1,42009	15 ml	85136.015
Refractive index standard at 20 °C, stabilised sucrose	1,43080	15 ml	85137.015
Refractive index standard at 20 °C, stabilised sucrose	1,44193	15 ml	85138.015



REFRACTIVE INDEX CERTIFIED REFERENCE MATERIAL AT 20, 25 AND 30 °C

Refractive Index Certified Reference Materials (CRMs) are ideal for verification and calibration of temperature controlled refractometers, with each CRM providing certified values for refractive index measurements at 20, 25 and 30 °C.

- Certified in strict accordance to ISO 17025 and ISO 17034 under UKAS accreditation
- Highest level of accreditation guaranteed, providing the most credible certified data available worldwide
- All measurements are fully traceable to NIST and international protocols
- Low levels of uncertainty, ensuring maximum data accuracy at hand and dependable results
- Available in single 10 ml volume tamper-evident glass bottles, or as a multi-pack of five per material (includes set of disposable pipettes)
- 12 month shelf life
- Manufactured in the United Kingdom

Refractive Index is measured for many reasons and is useful for multiple applications. It is a parameter that provides valuable information into determining the concentration of liquid mixtures (i.e. any dissolved mixtures), as well as providing information as to a sample's purity and clarity. This is useful for identification and quality control purposes.

Many industries will use refractometers for quality control purposes, particularly within food and beverage industries, from portable handheld machines to bench top-based refractometers such as Abbe or automatic digital refractometers. Temperature controlled refractometers are ideal for high precision refractive index measurements. These are ideal for food, beverage, pharmaceutical, medical and petrochemical industries and applications.

UKAS ISO 17025 and ISO 17034.

Description	Nominal refractive index at 25 °C	Packed	Pk Info	Cat. No.
Refractive index certified reference material	1,3325	Glass bottle	1×10 ml	99177.100
Refractive index certified reference material	1,3325	Glass bottles	5×10 ml	99177.001
Refractive index certified reference material	1,3891	Glass bottle	1×10 ml	99178.100
Refractive index certified reference material	1,3891	Glass bottles	5×10 ml	99178.001
Refractive index certified reference material	1,4023	Glass bottle	1×10 ml	99179.100
Refractive index certified reference material	1,4023	Glass bottles	5×10 ml	99179.001
Refractive index certified reference material	1,4196	Glass bottle	1×10 ml	99180.100
Refractive index certified reference material	1,4196	Glass bottles	5×10 ml	99180.001
Refractive index certified reference material	1,4206	Glass bottle	1×10 ml	99181.100
Refractive index certified reference material	1,4206	Glass bottles	5×10 ml	99181.001
Refractive index certified reference material	1,4573	Glass bottle	1×10 ml	99182.100
Refractive index certified reference material	1,4573	Glass bottles	5×10 ml	99182.001
Refractive index certified reference material	1,4941	Glass bottle	1×10 ml	99183.100
Refractive index certified reference material	1,4941	Glass bottles	5×10 ml	99183.001
Refractive index certified reference material	1,5349	Glass bottle	1×10 ml	99184.100
Refractive index certified reference material	1,5349	Glass bottles	5×10 ml	99184.001
Refractive index certified reference material	1,5440	Glass bottle	1×10 ml	99185.100
Refractive index certified reference material	1,5440	Glass bottles	5×10 ml	99185.001
Refractive index certified reference material	1,6556	Glass bottle	1×10 ml	99186.100
Refractive index certified reference material	1,6556	Glass bottles	5×10 ml	99186.001



MULTI-PARAMETER REFRACTIVE INDEX AND DENSITY CERTIFIED REFERENCE MATERIAL AT 15, 20 AND 25 °C

The Refractive Index and Density Certified Reference Materials provide a flexible, cost-effective and efficient solution to any laboratory calibrating and/or verifying refractive index and density measurements – all from a single material.

- Density certified in accordance with primary level ASTM D1480 methodology
- Ensures full compliance to ASTM and IP test method protocols
- All measurements are fully traceable to NIST and international protocols
- Low levels of uncertainty, ensuring maximum accuracy of data and dependable results
- Supplied in 30 ml sealed glass vials for ample measurement readings
- 12 month shelf life

In particular, Refractive Index and Density Certified Reference Materials are of significance to technicians with combined density and refractive index instruments to calibrate/verify their equipment's performance and help laboratory managers meet their quality assurance requirements.

UKAS ISO 17025 & ISO 17034.

Description	Nominal refractive index at 25 °C	Packed	Pk	Cat. No.
Refractive Index & Density Certified Reference Material	1,33249	Glass bottle	30 ml	99173.030
Refractive Index & Density Certified Reference Material	1,41959	Glass bottle	30 ml	99174.030
Refractive Index & Density Certified Reference Material	1,54403	Glass bottle	30 ml	99175.030
Refractive Index & Density Certified Reference Material	1,65555	Glass bottle	30 ml	99176.030



Sucrose (Brix) standard, stabilised

SUCROSE (BRIX) STANDARDS, STABILISED SOLUTIONS FOR REFRACTOMETRY

A range of Brix/refractive index standards for ease of use when calibrating all types of refractometers.

- Manufactured using high purity raw materials
- Contain the same raw materials as the ICUMSA range, but are stabilised to have an extended shelf life of 12 months

These products represent excellent value for users that are not required to follow ICUMSA Guidelines

Note: The brix scale is reported with the degree type symbol (x°) but it equates to the % concentration of the stabilised sucrose solution used.

Therefore $0^{\circ} = 0\%$ concentration

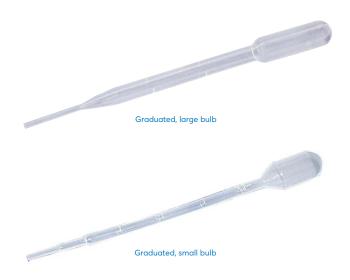
5° = 5% concentration

* The Refractive Index value in the table below refers to the nominal refractive index and is taken from the ICUMSA published tables for all product numbers except 87022.015 (Brix value 67.5°) which is a measured value.

Description	Refractive index	Pk	Cat. No.
Sucrose (Brix) standard, stabilised, 0°	1.332986	15 ml	87000.015
Sucrose (Brix) standard, stabilised, 5°	1.340264	15 ml	87001.015
Sucrose (Brix) standard, stabilised, 7°	1.343253	15 ml	87002.015
Sucrose (Brix) standard, stabilised, 10°	1.347824	15 ml	87003.015
Sucrose (Brix) standard, stabilised, 11.2°	1.349682	15 ml	87004.015
Sucrose (Brix) standard, stabilised, 11.5°	1.350149	15 ml	87005.015
Sucrose (Brix) standard, stabilised, 12°	1.350930	15 ml	87006.015
Sucrose (Brix) standard, stabilised, 12.5°	1.351714	15 ml	87007.015
Sucrose (Brix) standard, stabilised, 14.9°	1.355519	15 ml	87008.015
Sucrose (Brix) standard, stabilised, 15°	1.355679	15 ml	87009.015

Description	Refractive index	Pk	Cat. No.
Sucrose (Brix) standard, stabilised, 20°	1.363842	15 ml	87011.015
Sucrose (Brix) standard, stabilised, 25°	1.372328	15 ml	87012.015
Sucrose (Brix) standard, stabilised, 30°	1.381149	15 ml	87013.015
Sucrose (Brix) standard, stabilised, 35°	1.390322	15 ml	87014.015
Sucrose (Brix) standard, stabilised, 40°	1.399860	15 ml	87015.015
Sucrose (Brix) standard, stabilised, 45°	1.409777	15 ml	87016.015
Sucrose (Brix) standard, stabilised, 50°	1.420087	15 ml	87018.015
Sucrose (Brix) standard, stabilised, 55°	1.430800	15 ml	87019.015
Sucrose (Brix) standard, stabilised, 60°	1.441928	15 ml	87021.015
Sucrose (Brix) standard, stabilised, 67.5°	1.459290	15 ml	87022.015

VWR Collection accessories and tools



TRANSFER PIPETTES, STANDARD LINE

LDPE, disposable. These unbreakable 'all in one' pipettes eliminate the potential hazard of broken glass and exposure to infectious materials.

- Will not shatter or break
- Non toxic and inert to biological fluids and most acids
- Can be sealed, refrigerated and gas sterilised
- No bulb to insert or remove
- Uniform drop size

The low affinity surface reduces the loss of cells and valuable proteins due to binding. They work well whenever there is a need for quick, safe transfer of fluids.

Capacity (ml)	Drops per ml	Bulb draw (ml)	Length (mm)	Graduation (ml)	Sterile	Packed	Pk	Cat. No.
Graduated, large	bulb							
5,8	25	3,4	155	0,25	+	20 per bag	500	612-4491
5,8	25	3,4	155	0,25	-	Bulk	500	612-4494
5,8	25	3,4	155	0,25	+	Individually wrapped	500	612-4497
5,8	25	3,4	155	0,25	+	Peel-off pouch (50×10)	500	612-4523
7,0	20	3,0	153	1,0	-	Bulk	500	612-4472
7,0	20	3,0	153	1,0	+	Individually wrapped	500	612-4473
7,5	20	3,2	155	0,5	+	Peel-off pouch (50×10)	500	612-4538
7,5	20	3,2	155	0,5	+	Individually wrapped	500	612-4543
7,5	20	3,2	155	0,5	-	Bulk	500	612-4545
Graduated, small	bulb							
3,0	25	2,1	140	0,25	-	Bulk	500	612-4520
Graduated, for blo	ood banks							
5	25	1,9	155	0,5	-	Bulk	500	612-5770
Non graduated, st	tandard							
7,5	20	3,2	155	-	-	Bulk	500	612-4504
Non graduated, la	ong							
5,5	25	2,3	230	-	-	Bulk	500	612-3610
Non graduated, e	xtra long							
23,0	20	7,3	300	-	-	Bulk	100	612-3627
Non graduated, fi	ne tip, standard							
5,8	50	3,3	147	-	-	Bulk	500	612-4492
Non graduated, e	xtended fine tip, small b	oulb						
1,5	50	1,0	104	-	_	Bulk	400	612-3619



BOTTLES, NARROW NECK, WITH SCREW CAP

LDPE, translucent. Excellent for sample collection, storage and transporting liquids.

- Leakproof, robust and versatile
- Squeezable, containers can be used as a dropper or wash bottle
- Raised graduations

Capacity (ml)	Thread (mm)	Ø ext. (mm)	Height (mm)	Neck I-Ø (mm)	Pk	Cat. No.
Bottles						
50	18	37	87	11	10	215-5637
100	18	47	105	11	10	215-5638
250	25	63	119	18	10	215-5639
500	25	78	152	18	12	215-5640
1000	28	96	206	20	12	215-5641
2000	28	120	264	20	6	215-5642

For bottles	Thread (mm)	Pk	Cat. No.
Dropper closures for narrow neck bottles			
50/100	18	10	215-2195
250/500	25	10	215-2196
1000/2000	28	10	215-2197
Spray caps for narrow neck bottles			
100	18	1	215-6312
250/500	25	1	215-6313
1000	28	1	215-6314



FACIAL TISSUES

Two ply facial tissues made from 100% cellulose.

Extra soft

Colour: White

L×W (mm)	Packed	Pk	Cat. No.
195×200	150 sheets per box	150	115-0600



LENS CLEANING TISSUES, GRADE 541

Suitable for cleaning various optical lenses such as objectives, binoculars, magnifying glasses, spectacles, as well as optical fibre filaments.

L×W (mm)	Packed	Pk	Cat. No.
80×100	1×500 sheets	500	111-5003
100×150	25×25 sheets	625	111-5004

Setting science in motion to create a better world



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