RUDOLPH RESEARCH ANALYTICAL

TECHNICAL BULLETIN 941



Laboratory Flexibility with Industrial Strength and Simplicity

The J47 and J57-VT Series of Automatic Refractometers



Rudolph Research Analytical serving its customers with Integrity, Quality, and Innovation for over 50 years.

Rudolph subjects itself to a variety of industry accreditations and outside examination. Visit our website to learn how these apply to your purchase.

Sugar Milling, Refining, Processing Applications

"Just wanted to let you know how pleased our company is with the J57HA Automatic Refractometers. We currently have two of the instruments in service in our sugar testing laboratories and are in the process of ordering three additional refractometers.

Before the decision was made to switch our laboratories to the J57HA Refractometers, rigorous testing was done on the instrument over the past year in our Quality and Research Laboratory.

It has been our policy when doing research type work, using our old refractometers, that we place a sample on the prism, set a timer for two minutes, then press the "Read" button until we get three readings in a row that are identical (this could take up to 12 readings).

With the J57HA instrument, we place the sample on the prism, press the "Measure" button and in about 15 seconds we have a stable number. The instrument is so stable in fact, that I can honestly say after using the instrument for over a year, we have never had a different reading from the original measurement, no matter how many times we repeatedly press the "Measure" button."

– R.R., Senior Process Chemist, Western Sugar Cooperative

- Cane sugar milling and refining
- Beet sugar milling and refining
- Invert sugar
- Liquid sugar
- Confectionery sugar
- Molasses
- Brown sugar



Food and Beverage Applications

- Seed oils
- Dairy products
- Edible oils
- HFCS
- Candy
- Sodas
- Sauces
- Soups
- Confections
- Jams
- Milk
- Juice concentrates
- Vegetable products
- Juices
- Soy bean oils
- Soft drinks
- Syrups
- Coffee extracts
- Fruit products
- Starch
- Teas
- Jellies



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Laboratory Quality Refractometer

Superior Performance over ABBE Refractometers



Traditionally the food industry has used an ABBE refractometer either with or without a water bath. Over their comparable useful lives, the cost of replacing the water bath and the ABBE's dual glass prisms compared with the cost of owning a Rudolph Research J57-VT, with its single sapphire prism and electronic temperature control, make the Rudolph actually less expensive to own than the cost of using an ABBE.

ABBE refractometers require the user to make a reading by eye and may result in errors due to shadow-line interpretations. One person says the material is on specification, one person says it's not. In addition, scratches on the glass prisms of an ABBE make visual interpretation even more difficult. The measurement speed and accuracy of the J47 and J57-VT increases productivity and reduces mistakes caused by inaccurate readings.

Choose the Accuracy, Temperature correction, or temperature control needed for your application

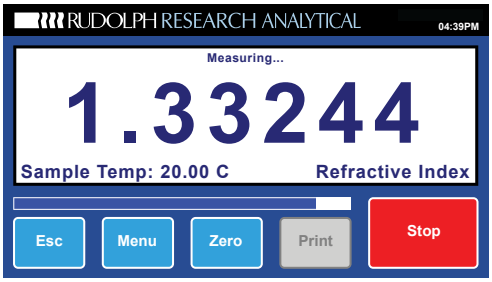
The J47HA, J47WR, J57HA-VT, and J57WR-VT offer a level of accuracy, measurement range, and temperature correction or control needed by the food and beverage industry. The instruments are perfectly designed for harsh, demanding applications and carry a 2 year domestic warranty with a 20 year service guarantee.

Choose the J47 series with temperature correction for samples that are primarily sugar and water. The ICUMSA sucrose temperature correction tables allow highly accurate measurements when working with sugar based products, close to ambient temperature.

Select the J57-VT series with temperature control for precise measurements when working with samples that are very hot, very cold or are not Sucrose, Glucose or sugar based. For example, a glycol sample must be measured with precise temperature control for an accurate measurement – temperature correction for sugar cannot be applied to non-sucrose based samples. A sample coming from a hot kettle on a production line must also be temperature controlled as temperature correction will not be accurate for a sample far from room temperature.

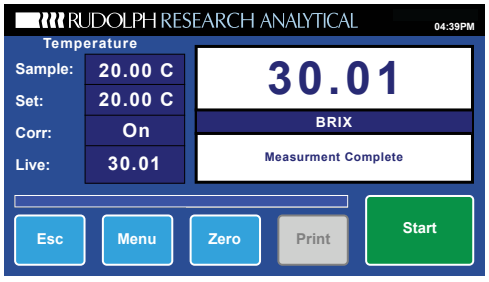
The J57HA-VT (High Accuracy) offers ±0.01 BRIX and ±0.00002 Refractive Index (RI) accuracy, which matches the accuracy of Rudolph's more expensive refractometers. For samples requiring a wide RI range, choose the J57WR-VT(Wide Range) with a 1.3-1.7 measurement range.

One Instrument Two Display Choices



Continuous Measurement Mode

Touch nothing as the display updates continuously.



Standard Display

Offers a time delay after start and temperature stabilization feature so you get 1 reading when your measurement criteria is met.



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The Rudolph Advantage

The Rudolph J47 and J57-VT Automatic Refractometers from Rudolph Research Analytical bring together exclusive features that provide unmatched performance to improve your process.

The J47 and J57-VT series of refractometers are specifically designed for food and beverage industry production and quality control and are perfect for 24/7 food industry applications where fast, automatic, and accurate Brix readings are required. The J47/J57-VT refractometers are easy to operate, produce easy to read digital measurements, clean-up easily, and eliminate errors created by ABBE style refractometers where user errors can occur frequently. The J47/J57-VT refractometers offer temperature correction using the latest ICUMSA tables. To measure very hot production samples coming from the kettle, select the J57-VT with temperature control.

Ultra Flat, Ultra Hard and High Durability Industrial Sapphire Prism

Synthetic sapphire prisms have similar hardness to diamond and can be cleaned with a paper towel.

The Standard and Ultra-Flat Sample Dishes are Easy to Clean

Regardless of an instrument's specified accuracy, a refractometer's real world performance depends on how well the instrument is cleaned between samples. The J47 and J57-VT address this issue by providing a very flat easy to clean measurement surface with no corners or crevices that tend to trap samples causing contamination.

J57-VT Series Has Variable Temperature Control

Peltier Temperature Control at the prism surface allows for improved accuracy and greater stability. The J57-VT with variable temperature control allows sample cooling and heating at any temperature between 10°C and 65°C.

Underside Cooling Fan

The J57-VT allows operation in high ambient temperature environments.



Simple To Operate User Friendly Display With Full Digital Read-Out

Touch screen flexibility with key lock-out simplicity.

Rugged Construction With Small Footprint

L: 12 inches W: 6 inches
H: 5 inches Wt: 8.8 lbs.

Refractometer shown above without Standard EP Cover for purposes of illustration, and below with Standard EP Cover



J47 Provides Instant Results with Temperature

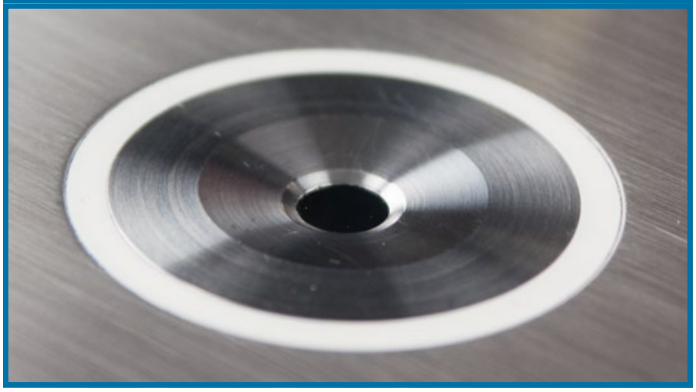
The Rudolph J47 refractometer corrects for errors caused by sample temperature variation using the latest ICUMSA temperature correction tables. Temperature correction is a very fast mathematical solution to obtaining measurement results without a temperature control system or a water bath. These measurement results are the most accurate when samples are comprised of predominantly sugar and water and measured near room temperature.

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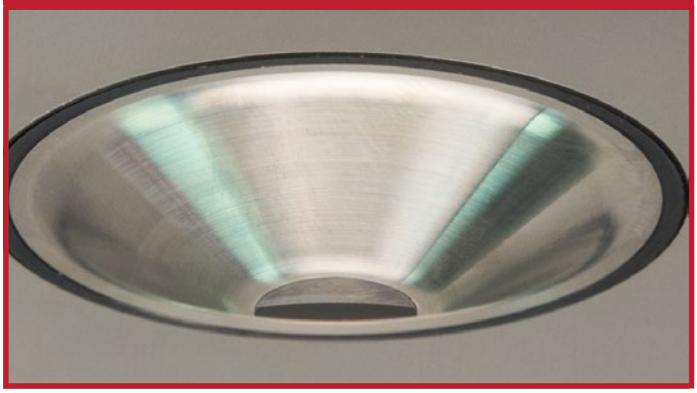
Easy To Clean Measurement Surface

No matter how good a refractometer is, the results will only be right if the prism is clean. **Rudolph's flat prism design makes cleaning easy,** even with sticky syrups. The flat low profile sample well with a sample volume of less than 1ml is easily cleaned by wiping with a common paper towel. A single cleaning surface with **scratch-proof sapphire prism** makes the J Series popular for high throughput laboratories.

Standard Prism and Sample Dish



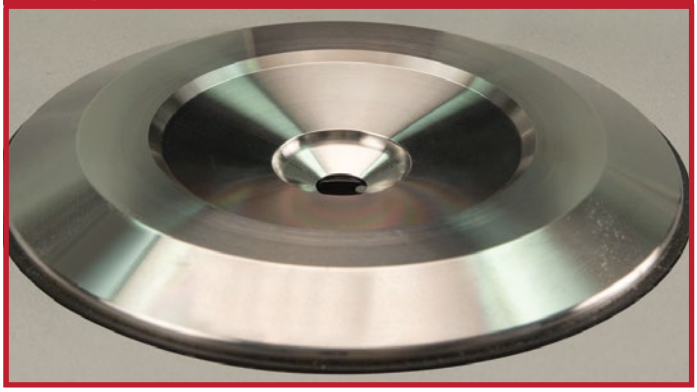
Competitor 1



Ultra-Flat Prism and Sample Dish



Competitor 2



The flat open sample area has no corners to trap even sticky materials and is resistant to almost all solvents including acetone, toluene and similar organics. Choose Hastelloy option for acids like HFl and HCl.

Some manufacturers use glass or YAG (Yttrium-Aluminum-Garnet) prisms. These prisms are softer than sapphire and have slower temperature transfer coefficients.

Don't worry, you can clean the Rudolph prism with regular paper towels; no special cleaning paper is required.

Traceability and

Traceability and Calibration

J47/J57-VT series of refractometers help modern, high volume food or beverage businesses maintain high standards and traceability in their production processes.

Both the J47 and J57-VT series are factory calibrated using NIST traceable fluids. The J47/J57-VT series of automatic refractometers offer 1 or 2 point calibration by the operator to ensure that the instrument is measuring to factory specifications. On the factory floor, the J47 series can be operator calibrated using certified sucrose standards, while the J57-VT series can be operator calibrated using NIST traceable oils to be in compliance with ISO guidelines.

5 Fluid Calibration Kit with NIST Traceable Certificate shown below.



Specifications

Market Focus	Food and Beverage Related Industries			
Instrument Model	**J47HA**	**J47WR**	**J57HA-VT**	**J57WR-VT**
Measurement Range	RI 1.32-1.53 Brix 0-100	RI 1.3-1.7 Brix 0-100	RI 1.32-1.53 Brix 0-100	RI 1.3-1.7 Brix 0-100
Accuracy	RI ±0.00003 Brix ±0.03	RI ±0.0001 Brix ±0.1	RI ±0.00002 Brix ±0.01	RI ±0.0001 Brix ±0.05
Repeatability	RI ±0.00002 Brix ±0.01	RI ±0.0001 Brix ±0.1	RI ±0.00002 Brix ±0.01	RI ±0.0001 Brix ±0.05
Resolution	RI 0.00001 Brix 0.01	RI 0.0001 Brix 0.1	RI 0.00001 Brix 0.01	RI 0.0001 Brix 0.01
Temperature Control	Temperature Correction Only		10°C to 65°C - Cooling fan included for High Ambient Temperature Environments above 40°C	
Temperature correction range	4°C to 95°C (for sucrose solutions)			
Sample Dish	Easy Clean Sample Dish	Standard Sample Dish	Easy Clean Sample Dish	Standard Sample Dish
EP Cover	Standard			
Operating System	Amulet			
Measurement Scales	Refractive Index (nD), Brix (% Sucrose)(% RDS)			
Temperature Repeatability	NA	NA	±0.002°	±0.002°
Temperature Resolution	±0.01°			
Ambient Temperature Limit	5°C to 40°C			
Sample Temperature Limit	-20°C to 250°C			
Optical Wavelength	589.3nm			
Measurement Response Time	User configurable, can be less than 5 seconds			
Calibration	Using water or NIST traceable fluids. Factory default calibration can always be reset.			
Prism	Synthetic Sapphire			
Data Storage / Internal Memory	16GB Flash Chip			
Display	4.3", 480 dpi x 270 dpi color TFT LCD Touch Screen			
User Interface	Touchscreen			
Light Source	Light emitting diode (Estimated life 100,000 hours)			
Communication interface	1 USB, 1RS232			
Operating Dimensions/weight	L: 12 inches L: 31 cm	W: 6 inches W: 15.5 cm	H: 5 inches H: 13 cm	/ 7.8 lbs. gross weight / 3.5kg
Power Requirements	100 - 240 volts, 50 Hz - 60 Hz			

Market Specific Scales Available

- **Urine Specific Gravity**
- **Honey**
- **Fuel System Icing Inhibitor**
- **Ethylene Glycol / Coolant**
- **Alcohol**
- **Butyro**
- **Propanol**
- **Baume**
- **Calcium Chloride**



- **Ethanol**
- **Formaldehyde**
- **Glycerol**
- **Methanol**
- **Potassium Chloride**
- **Urea**
- **H_2O_2**
- **Nitric Acid**
- **Sodium Chloride**

Many other standard and custom scales are available for your application.

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