RUDOLPH RESEARCH ANALYTICAL

TECHNICAL BULLETIN 940



Laboratory Flexibility with Industrial Strength and Simplicity

The J157 PLUS Series of Automatic Refractometers



RUDOLPH LIFETIME CELL WARRANTY · 20 YEAR Service Guarantee · 8 YEAR Software Update Pledge · 3 YEAR WARRANTY · ISO 17034 · ISO 17025 · ISO 9001

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.

The Rudolph Advantage

The New J157 PLUS Series of Automatic Refractometers from Rudolph Research Analytical bring together exclusive features that provide unmatched performance to improve your process.

Sample Quality

The J157 PLUS with **Smart Measure™** checks the quality of the measurement and can provide feedback on correct sample loading and cleaning.

TempTrol™

Exclusive Dual Temperature Control System with cooling and heating above and below the sample allows the J157 PLUS -CC models unparalleled temperature stability and range: ±0.01°C from 10°C- 90°C.

Flat Easy To Clean Prism

The flat easy to clean prism is a Rudolph trademark. Sticky, difficult to clean or acidic samples are no problem with Rudolph's optional Hastelloy sample dish.

Improve your Process with Trend Analysis™

Trend Analysis™ allows you to save a measurement into a method history to track long term stability of your unique methods.

Calibration Reference Materials

CRM is available at various Refractive Indexes and temperatures. Contact a customer service representative for assistance in choosing a calibration standard that is right for your application. We can also include a range of 5 NIST tracable CRMs at time of purchase.

Insulating Ring

When Rudolph's Exclusive TempTrol™ cover with insulated ring is closed, it creates a protected micro environment with temperature control from below and above the sample.



Choose 5 Decimal Place Accuracy with the J157HA PLUS or choose an expanded RI Range with the J157WR PLUS:

The J157HA PLUS offers ±0.00002 RI Accuracy over the food and beverage RI Range of 1.32-1.53/ 0-95 BRIX while the J157WR PLUS offers ±0.0001 accuracy over the chemical Range of 1.3-1.7.

Embedded Windows™ Operating System for Complete Communication Flexibility

Direct connection to LIMS or Server; save data in PDF or Excel. No PC needed. No other brand offers the flexibility of an Embedded Windows Operating System.

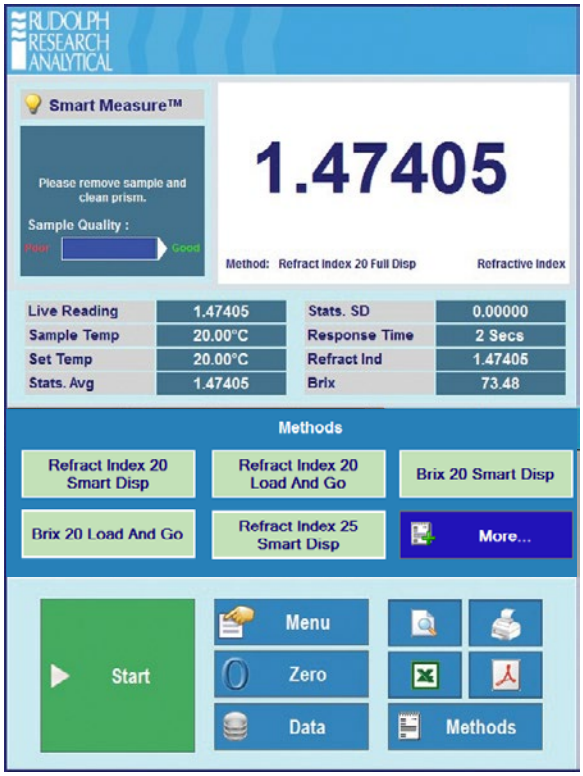
Rudolph Research Analytical 55 Newburgh Road, Hackettstown, NJ 07840 USA • Phone: 973-584-1558 • Fax: 973-584-5440 • E-mail: info@rudolphresearch.com • Internet: www.rudolphresearch.com

Interface Flexibility

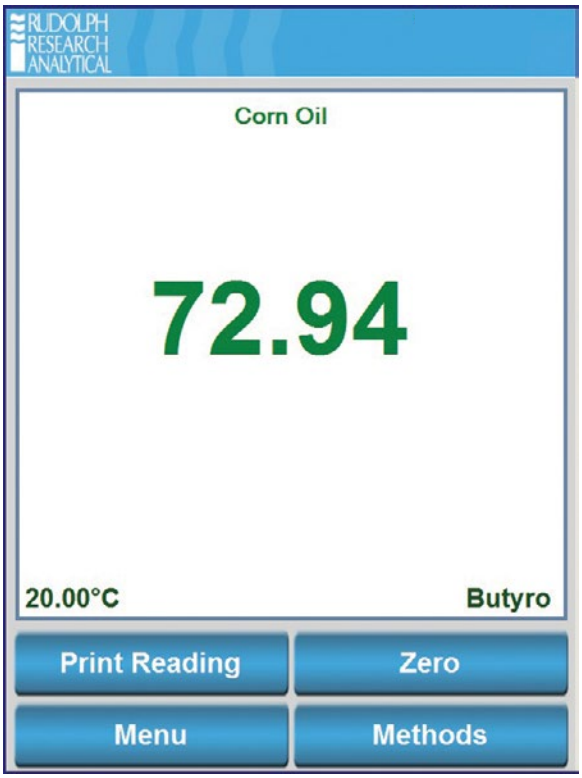
Three Displays Allow For Three Interface Solutions

Rudolph allows the Lab Manager to select from different display options because we understand laboratories and manufacturing floors have different needs when it comes to the information required for monitoring a process. Your instrument's interface can be customized to meet the information your application and environment demand whether you choose our full featured interface or our Load-and-Go™ display interface. The J157 PLUS Series offer laboratory flexibility with industrial strength and simplicity making this model series at home on the laboratory bench or on the factory floor.

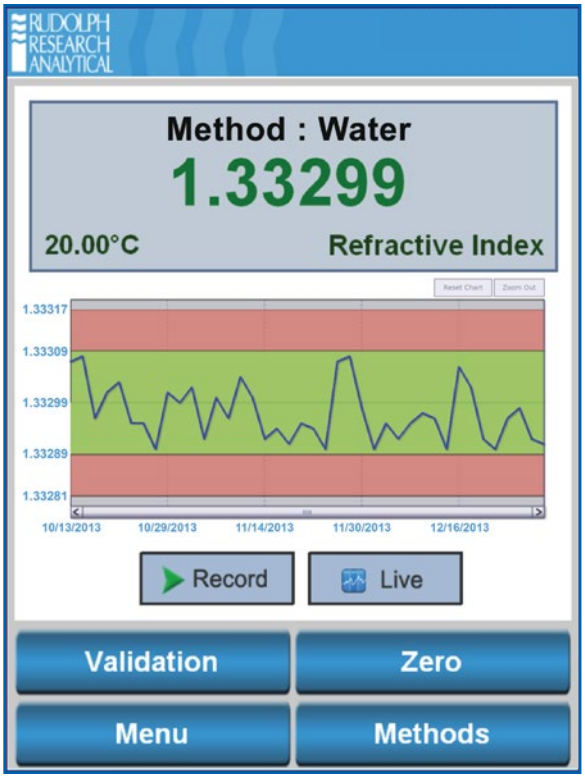
Full Display with Smart Measure™



Load - and - Go™ Display



Trend Analysis™ Display



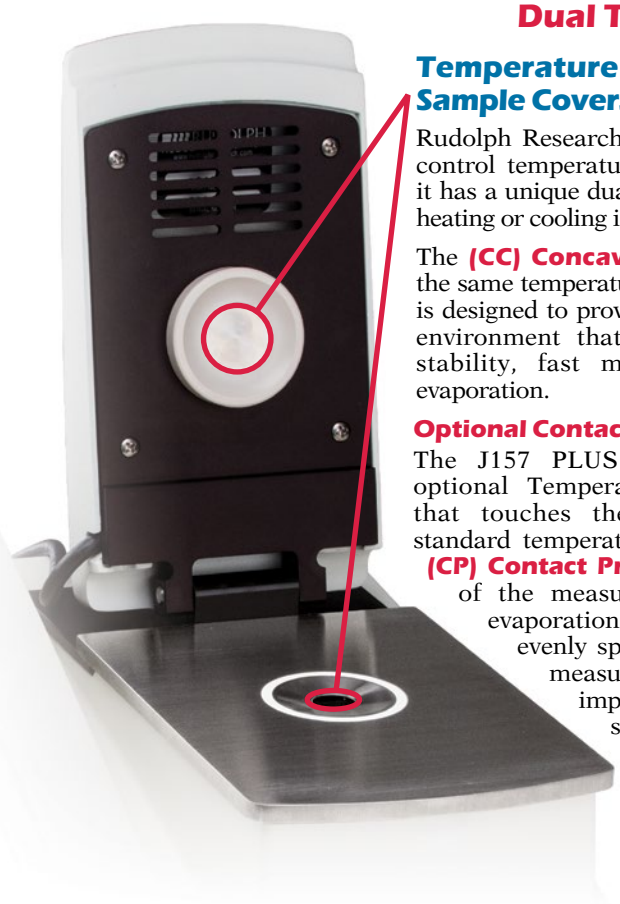
In a modern factory, the most precious commodity is time. When a process starts to move outside its limits people want to know FAST. They want to correct the problem, preferably while it's still small and before a product goes out of specification.

The Rudolph live reading and **Trend Analysis™** feature allows users to easily and quickly see how a process is going and catch minor deviations before they become major ones.

Even in the most tightly controlled manufacturing environments, things do occasionally go out of specification. When an out of specification condition happens, material has to be quickly identified and decisions made as to what to do with the product. Long term data collection is a part of any good process. Knowing when and where the out of specification condition happened is equally as important. Rudolph Trend Analysis™ software quickly shows a supervisor the process history and where the problem occurred.

Exclusive TempTrol™

Dual Temperature Control System



Temperature Controlled Concave (CC) Sample Covers and Pressers

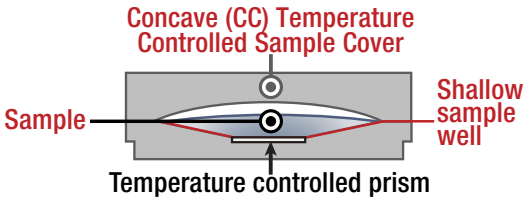
Rudolph Research Analytical's J157 PLUS is able to control temperature quickly and accurately because it has a unique dual temperature control system where heating or cooling is applied to both sides of the sample.

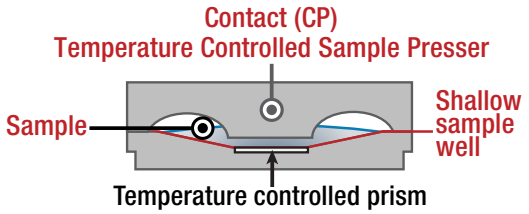
The **(CC) Concave Sample Cover** is controlled to the same temperature as the prism and, when lowered, is designed to provide a temperature controlled micro environment that provides unrivaled temperature stability, fast measurement time and minimal evaporation.

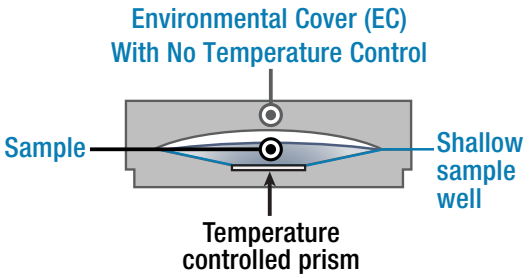
Optional Contact Presser (CP Presser)

The J157 PLUS Series are available with an optional Temperature Controlled Sample Presser that touches the sample. Compared with the standard temperature controlled cover, the optional **(CP) Contact Presser** reduces the empty volume of the measurement area thereby decreasing evaporation and at the same time helping to evenly spread semi solid materials over the measurement prism. This feature offers improved performance on many samples such as PET and Glycerine.

(EP) Environmental Cover is great for applications where a micro environment is needed but samples are measured near room temperature where heating and cooling from above the sample may not be needed.







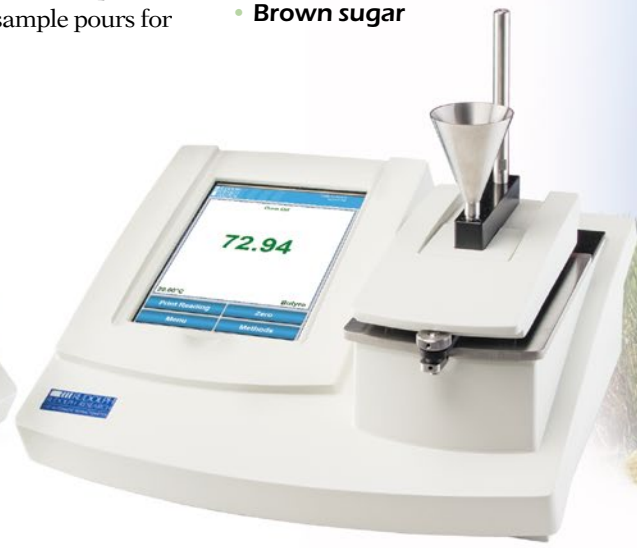
Sugar Milling, Refining, Processing

Pour Through Solutions

Pour Through refractometers are designed for measuring cane or beet juice in a sugar mill. This design has two important benefits: cleaning becomes part of the sample loading process and measurement time is reduced because one sample is poured in after another, making the design attractive for seasonal operators. The small funnel design forces improved sample flushing by increasing the number of sample pours for the same amount of sample.

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







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Measurement Surface

Ultra Hard Sapphire Prism



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

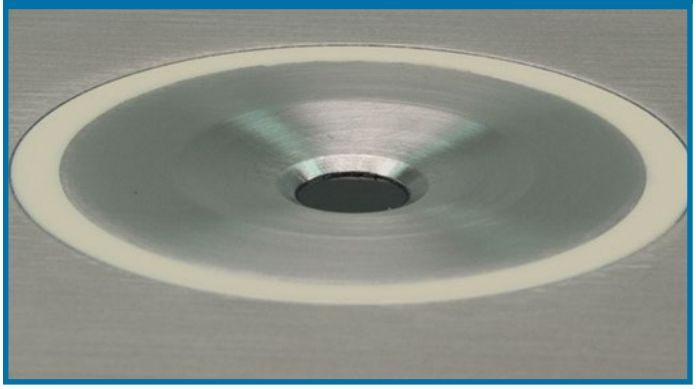
Don't worry, you can clean the Rudolph prism with regular paper towels, no special cleaning paper is required.

Ultra Flat Prism



Easy to clean prism – No matter how good the refractometer is, the results will only be right if the prism is clean. **Rudolph's flat prism sample well interface 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 a **scratch-proof synthetic sapphire prism** makes the J157 a popular choice for high throughput laboratories.

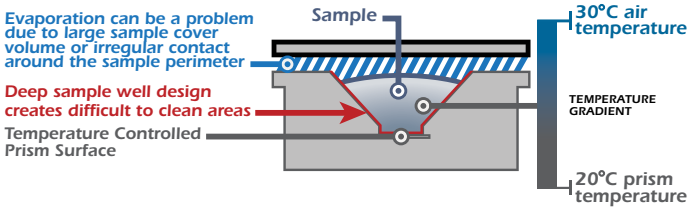
Standard Prism



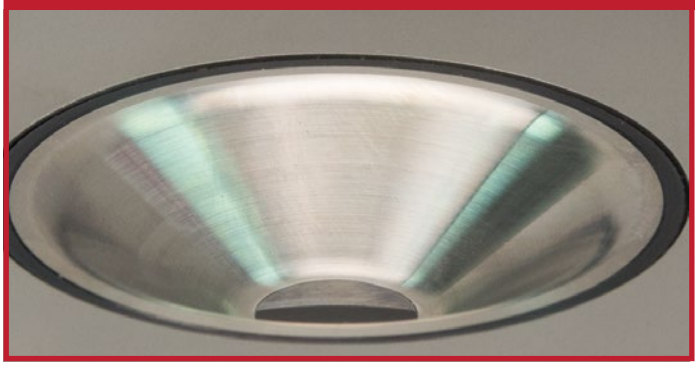
The flat open sample area has no corners to trap even sticky materials and is resistant to almost all solvents including Acetone, Toluene and similar organics. Choose the Hastelloy option for HFl and HCl acids.

Other manufacturers compromise

From the pictures below one can see that **other manufacturers have to make a compromise with the depth and angle of the sample well.** Since these manufacturers use one sample well and cover design for all temperature applications, they end up with a **sample well that is too narrow and deep. The deep sample well makes cleaning needlessly hard** at ambient temperature while failing to provide ideal temperature control when the sample and air temperature are more than 10°C from the desired measurement temperature.



Competitor 1:
Deep Sample well with prism only temperature control



Competitor 2:
Difficult to clean prism sample well interface



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Specifications

Market Focus	Food and Beverage Related Industries	Chemical Related Industries
Instrument Model	**J157HA Plus**	**J157WR Plus**
Measurement Range	RI 1.32-1.53 Brix 0-100 Urine SG 1.000-1.0400	RI 1.3-1.7 Brix 0-100 Urine SG 1.000-1.0400
Accuracy	±0.00002 RI ±0.01 Brix	±0.0001 RI ±0.1 Brix
Reproducibility	±0.00002 RI ±0.01 Brix	±0.0001 RI ±0.1 Brix
Resolution	±0.00001 RI ±0.01 Brix	±0.0001 RI ±0.1 Brix
Sample Dish	Easy Clean Ultra Flat Prism	Standard Sample Dish
Temperature Control Range (°C) (within 10°C of ambient)	10°C to 90°C	10°C to 90°C
CC Cover	Standard	Standard
EP Cover	Optional	Optional
CP Presser	Optional	Optional
PTW Presser	Optional	Optional
Smart Measure™	Standard	Standard
Validation	Standard	Standard
Trend Analysis	Standard	Standard
Measurement Scales	Refractive Index (nD), Brix (% Sucrose), Urine SG and up to 100 custom programmed scales	
User Interface / Display	8" color Touchscreen Display, 800dpi x 600dpi pixel resolution with 400 nits of brightness	
21CFR Part 11	Available in models J257, J357, and J457	
Operating System	Windows Embedded	
Method Creation	Standard	
Temperature Repeatability	±0.002°	
Temperature Resolution	±0.01°	
Ambient Temperature Limit	5°C to 40°C	
Temperature Correction Range	4°C to 95°C (for sucrose solutions)	
Sample Temperature Limit	-20°C to 250°C	
Optical Wavelength	589.3nm (NaD line)	
Measurement Response Time	User configurable, can be less than 3 seconds	
Calibration	Using water or NIST traceable fluids. Factory default calibration can always be reset.	
Prism	Synthetic Sapphire	
Light Source	Light emitting diode (Estimated life 100,000 hours)	
Acid Resistanc	Hastelloy™ measurement surface (optional)	
Data Storage / Internal Memory	32 GB Non-removable Compact Flash	
Communication Interface	3 USB, RS232 and Cat5 Network (Ethernet)	
Operating Dimensions / Weight	L: 17 1/4 inches W: 12 inches H: 13 inches / 23 lbs. L: 43.5 cm W: 30.5 cm H: 33 cm /10.4 kg	
Power Requirements	100 - 240 volts, 50 Hz - 60 Hz	

The J157 Plus small format, impact, strip printer for production applications



Strip Impact Printers have the following advantages:

- Small footprints
- Designed for rough industrial environments
- Do not use thermal paper
- Industrial product with long model life, so that the printer is often available for many years

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