For The Most Demanding Applications

The J457 Series of Automatic Refractometers



RUDOLPH RESEARCH ANALYTICAL

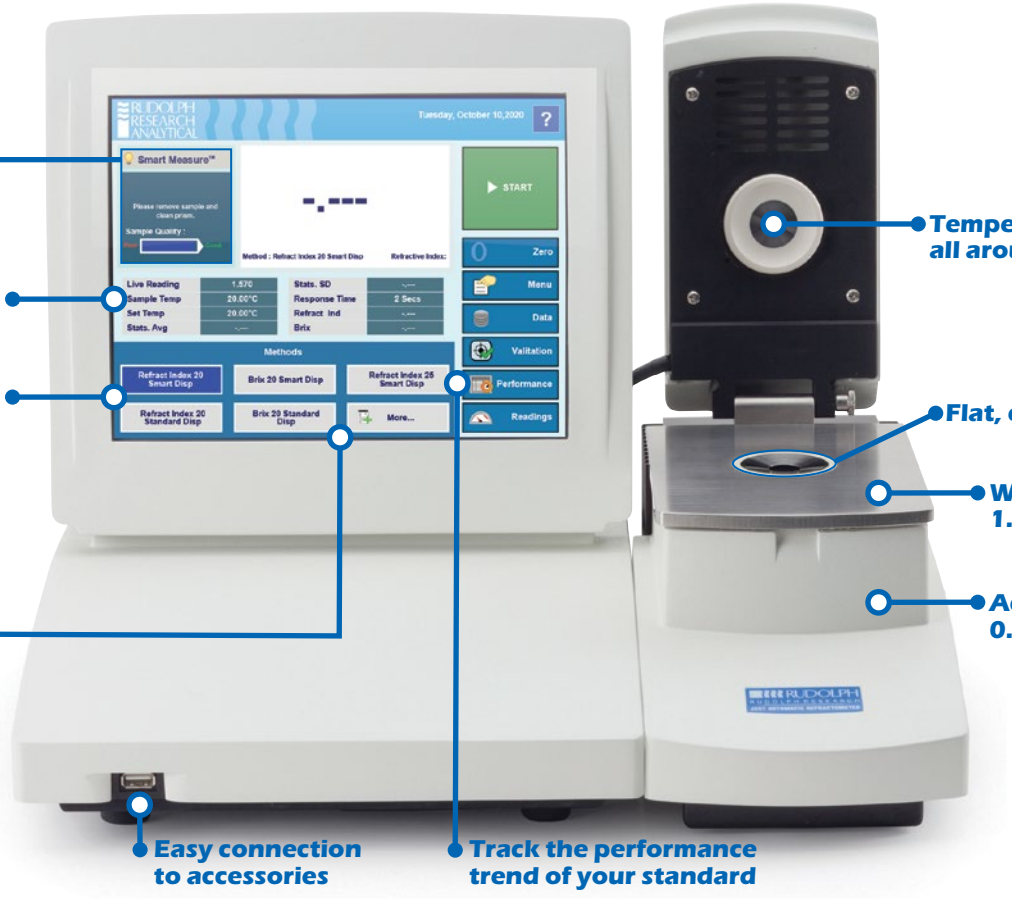
TECHNICAL BULLETIN 930 -R4

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.

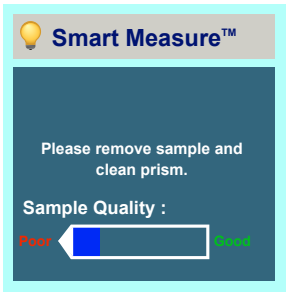
The Rudolph J457 Features at a Glance

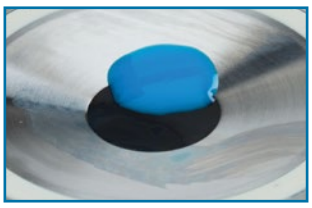


Exclusive SmartMeasure™

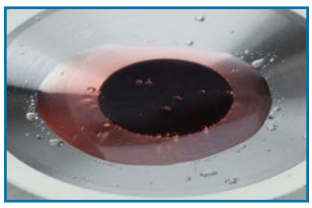
The SmartMeasure™ system helps guide the user through the measurement process.

- For less experienced users the SmartMeasure™ system can provide guidance on sample placement and also cleaning between samples
- For highly regulated users the sample quality number on the print out can give proof that the sample was measured properly
- For extremely difficult samples the SmartMeasure™ system gives information about how well the instrument is really measuring and can help with method development





Poor Quality Sample Load



Bubbles in Sample

Rudolph Research Analytical

Measurement Date: Tuesday 9/15/2020
This sample was measured on a J457 Refractometer serial number 1648, manufactured by Rudolph Research Analytical, Hackettstown, NJ
Method : Refract Index 20 Smart Disp
Lot ID : water
Temperature Correction : OFF

Count	Average	Std Dev	% RSD	Maximum	Minimum
5	1.33299	0.00000	0.00	1.33299	1.33299

S. No	Time	Result	Scale	Temp	Sample Qaulity
1	3:54:03 PM	1.33299	RI	20.00°C	100%
2	3:54:08 PM	1.33299	RI	20.00°C	100%
3	3:54:13 PM	1.33299	RI	20.00°C	100%
4	3:54:18 PM	1.33299	RI	20.00°C	100%
5	3:54:23 PM	1.33299	RI	20.00°C	100%

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The J457 With User Selected Display



CompUbility
USER SELECTED COMPUTER

The CB can be added to all OM versions of the J457; this includes the EP (pictured above), DP, CP, and CC.

There are two versions of the below Computer Bridge. CB allows the optics of the J series refractometer to be operated from an external PC using Windows 10 or later. CBS provides the same function, and includes a Microsoft Surface.



PC Display

Many users are happy to use their own computer to control laboratory equipment. It does not suit all applications, but it does offer some advantages:

- A PC that is made by millions to a commercial standard is always going to be much cheaper than a controller made by hundreds to an industrial standard
- It allows the user's IT department greater control over updates, exporting and backups.



Tablet display

Using a tablet can be a great choice in certain situations:

- A tablet can be more robust than a PC and easier to locate out of a wet area in an industrial environment
- A tablet is easier to move when the refractometer is being used in multiple locations such as being wheeled around a building on a cart.

J457 Standard Display Configuration Options

All models have Rudolph's exclusive Dual Temperature Control System with Mini Sample Environment



J457 - SC - Standard Configuration

- Completely integrated single unit design
- Tiltable Display



J457 - FC - Factory Configuration

- Splash proof measurement unit
- Display unit with independent bench top option
- Distance measurement unit can be from display unit: 3 ft. or 6 ft.



J457 - WC - Wall Mount Configuration

- Splash proof measurement unit
- Display unit with wall mount option
- Distance measurement unit can be from display unit: 3 ft. or 6 ft.

All displays are available with the Rudolph 21 CFR 11 solution. This is common to our polarimeters and density meters as well as the refractometer. This solution has been tested and accepted by all of the world's top 10 pharma companies as well as hundreds of smaller manufacturers. For more details on this solution please see separate details that are included with the polarimeter technical bulletin.

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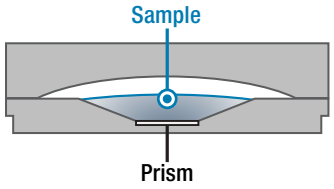
Exclusive TempTrol™
Dual Temperature Control System

The J457 has the widest temperature range

The J457optics with the remote display has the best air circulation of any model in the Rudolph range allowing the widest temperature setting and the fastest stabilization times.

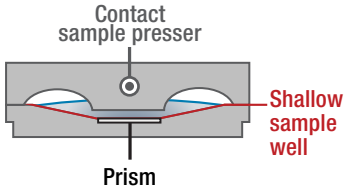
Great for applications where the measurement temperature is near ambient. Temperature control is provided only from below the sample.

ENVIRONMENTAL PROTECTION OPTION (EP)



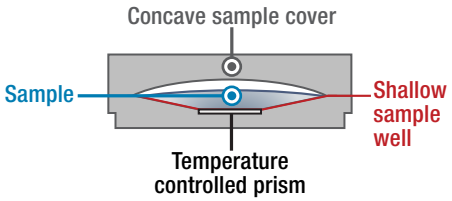
For semi-solid and highly evaporative samples more than 10° from ambient select a model with a contact presser (CP option)

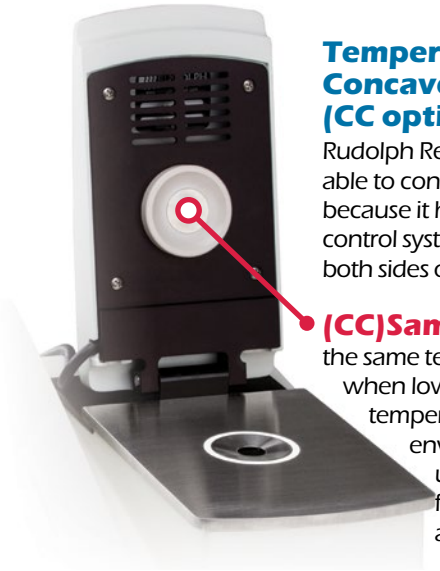
CONTACT PRESSER OPTION (CP)



For most samples 10° from ambient select J Series standard temperature controlled sample cover (CC option)

TEMPERATURE CONTROLLED SAMPLE COVER (CC)





Temperature Controlled Concave Sample Cover (CC option is standard)

Rudolph Research Analytical's J457 is able to control temperature to 100°C because it has a unique dual temperature control system where heat is applied to both sides of the sample.

(CC)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 Option)

The J457 is available with an optional Temperature Controlled Sample Presser (CP option) 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.

The J457 has Rudolph's widest range and most accurate optical system.

Wide range from 1.26 to 1.72

- Extreme low range makes the instrument able to measure fluorocarbons like sevoflurane (1.27RI)
- Extreme high range makes the instrument able to measure aromatic flavor materials like cinnamaldehyde (1.619 RI) and chemicals like methylene iodide (1.718 RI).

High accuracy 0.00002

The J457 has accuracy equal to the short range food refractometers making it able to be used for high accuracy Brix measurement.

Easy clean prism

The J457 has the flat, easy clean prism as standard. It's possible to find other models in Rudolph's range that do 1 or 2 of the things the J457 does, but the J457 rolls ALL the specifications into one package.

Ultra Hard Sapphire Prism



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.

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Sample Handling Options

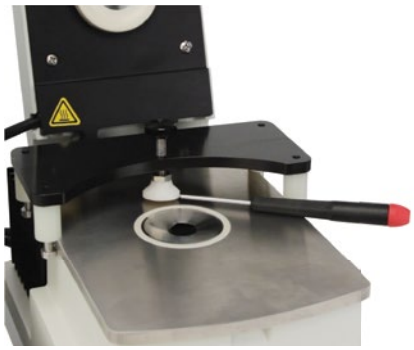
Flexable Sample Handling Options for Your Application

Rudolph Research offers many options to deliver samples to the J457 including, AutoFlex™ R837 Auto Sampler, Peristaltic Pump, Vertical KVP for samples with suspended solids, and the DP Cover. These options offer the ability to use the refractometer horizontally or vertically, with samples introduced manually, with a syringe, or pumped for higher throughput labs.

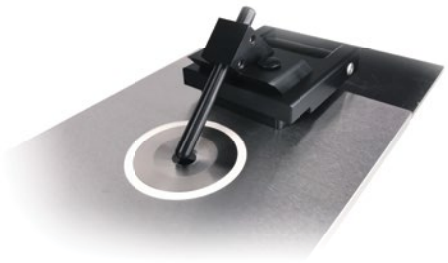
For most liquids and semi solids the drop sample prism is the easiest. Drop it on and wipe it off. Some users may prefer to push the sample through either because it's extremely evaporative and needs to be kept in a closed system or, more commonly because the refractometer is attached to a sample handling system such as the Rudolph R837. Also available is a solids measuring attachment for plastics.



Vertical Loading Position



Solid and Thin Film Measuring

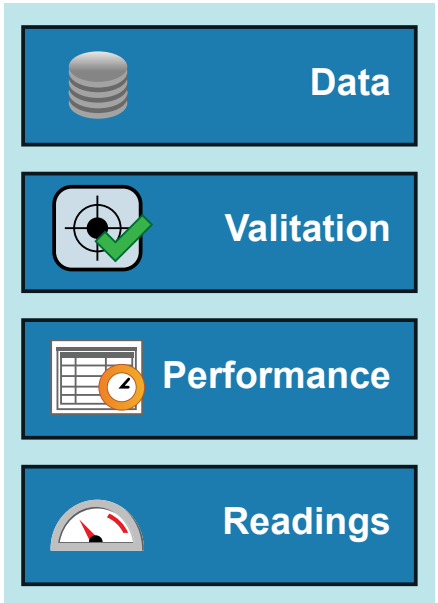


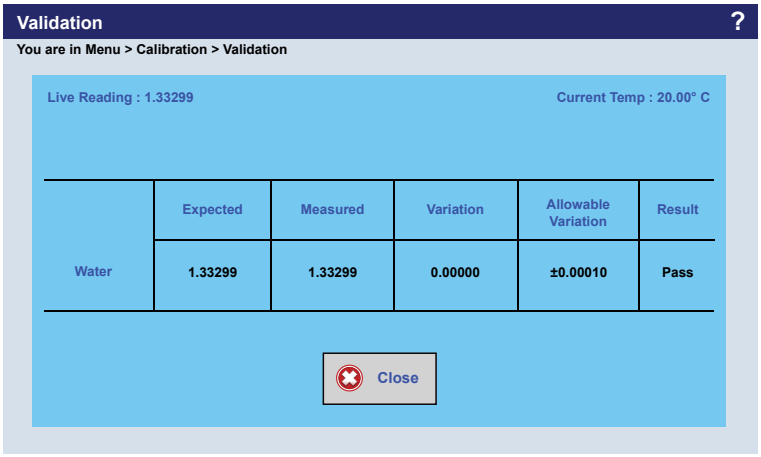
ULV (Ultra Low Volume)

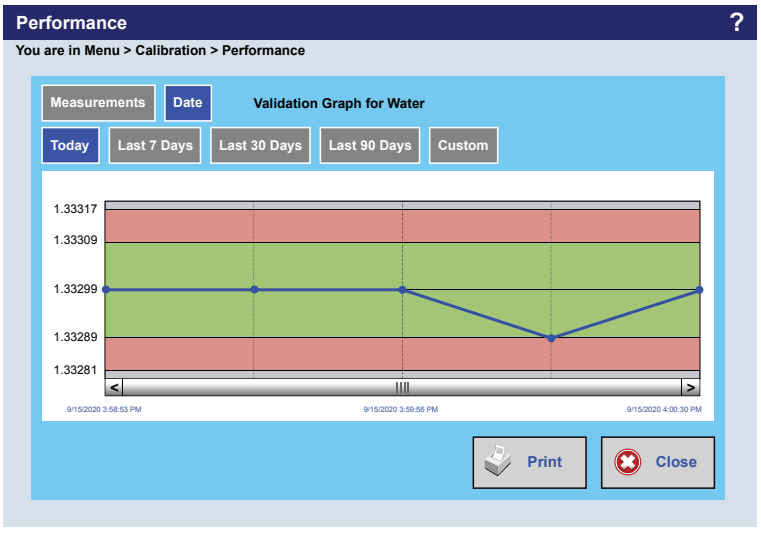
Trend Analysis

Set a standard, measure it over time. The J457 has the ability to set up prompted validations and provide a graph of that validation over time.

The requirements can be programmed by the laboratory allowing a lab to set limits as defined by USP<831> or ISO or any other standard.







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J457 Specifications

Refractometer Specifications J457 (All models)

Measurement scales:	Refractive Index (nD), Brix (% Sucrose), and up to 100 custom programmed scales
Measurement range:	Refractive Index 1.26 – 1.72 Brix 0 – 100
Accuracy:	Refractive Index ±0.00002 Brix 0.015
Reproducibility:	Refractive Index ±0.00002 Brix 0.015
Resolution:	Refractive Index 0.00001, Brix 0.01
Temperature control range:	10°C to 110°C (wider temperature range available dependent on ambient conditions and options) Temperature control by dual Peltier system; boost option to 120°C available
Temperature control reproducibility:	±0.01°C
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)
Light Source:	LED (Estimated life 100,000 hours)
Response time:	User configurable, generally less than 30 seconds
Calibration:	Using water or NIST traceable fluids. Factory default calibration can always be reset.
Prism:	Artificial sapphire
Acid resistance:	Hastelloy™ measurement surface (optional)
Data storage/ internal memory:	32 GB Non-removable Compact Flash
Display:	Adjustable 10.4 inch diagonal, 800-600 pixels, color, Flat Panel Monitor with Resistant Touch Screen Interface, 400 nits brightness, gasketted for spill protection
User interface:	Touchscreen
Communication interface:	3 USB, RS232 and Cat5 Network (Ethernet)
Operating dimensions/weight:	L: 17 1/4" W: 12" H: 13" / 23 lbs. L: 43.5cm W: 30.5cm H: 33cm / 10.4 kg
Power requirements:	100 - 240 volts, 50 Hz - 60 Hz

Applications



Part of Automation

The J457 is key part of the Rudolph multi parameter automation system.

ASTM INTERNATIONAL

Petroleum

The wide temperature range of the J457 enables it to meet not just D1218 but also D1747 and allow it to measure even crude oils with very high cloud points.



Difficult samples

The advanced optics of the J457 enables it to measure difficult samples like heavy corn syrup or resins with binder.



Flavors, Fragrances and Essential Oil

Combined with the DDM density meter the J457 can be used to measure SG and RI, the two staples of flavor / fragrance. The wide range of the instrument means it can measure all essential oils and provide a CofA at the right temperature.



Pharmaceutical Measurement

The J457 is able to measure EVERY material in the USP and EP. It can come with a IQOQPQ that checks both calibration and linearity and can have 21 CFR 11 compliant software.



Chemical Research

Research means going where the data takes you and no one knows where they will end up. If they did it wouldn't be research. The J457 means things don't grind to a halt just because the new material reads "out of range" on a lesser instrument

Other Applications

- Jams
- Jellies
- Urine
- Urea
- Aviation Fuel
- Adblue
- DEF
- Corn Syrup
- Plastics
- Resins
- Alcohol
- Beer
- Wine
- Grape Juice
- Fruit ripening
- Chemicals
- Polymers
- Tires
- Rubber
- Edible oil
- Fertilizer
- Sugar syrups
- Fruit Juice
- Sport

Drinks

- Mixers
- Acids
- Maple syrup
- Solvents
- Monomers

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