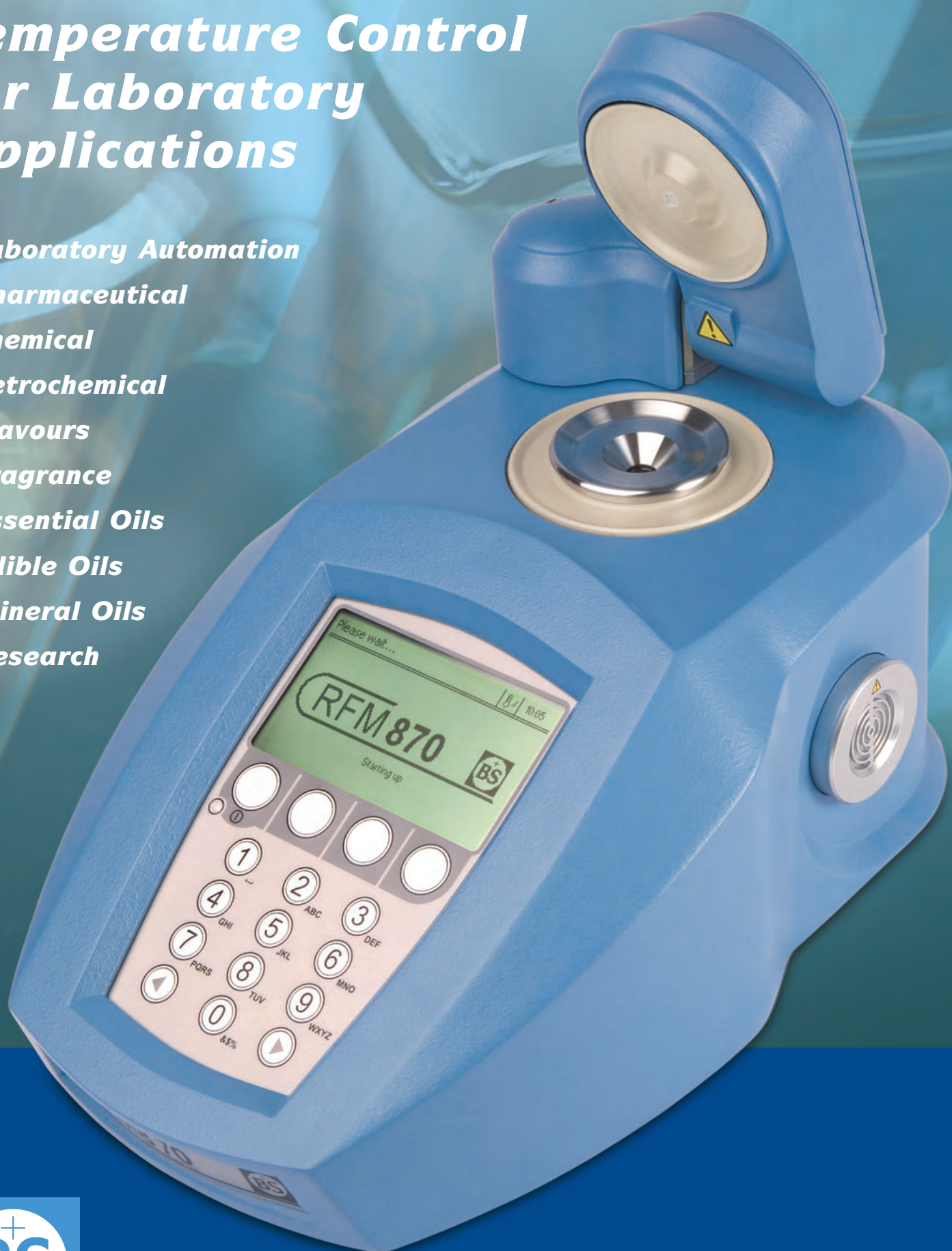


Refractometers with Peltier Temperature Control for Laboratory Applications

- **Laboratory Automation**
- **Pharmaceutical**
- **Chemical**
- **Petrochemical**
- **Flavours**
- **Fragrance**
- **Essential Oils**
- **Edible Oils**
- **Mineral Oils**
- **Research**



Bellingham + Stanley Ltd.
Quality Scientific Instruments

RFM800

Automatic Digital Refractometers for the 21st Century

For over 90-years Bellingham + Stanley has been at the forefront of refractometer design and the RFM trademark has become synonymous for setting the standards in precision, quality and reliability. Whilst these standards are now taken for granted, the RFM800 series represents a major advance in measurement technology allowing digital refractometers to be placed in principal laboratories the world over.

The RFM800 series comprises four standard models that allow the user to select the instrument that best suits the particular application and regulatory requirements. Whilst all instruments incorporate common manufacturing components and software design, models vary according to measuring range, resolution and accuracy.

Measurement Features:

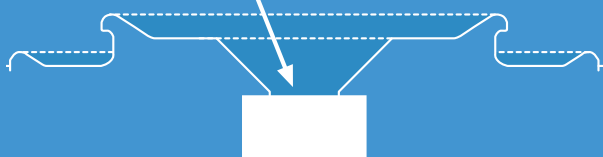
RFM800 series refractometers offer one of the highest measurement specifications available. Results may be displayed in refractive index or Brix, or alternatively, over 15 industry standard scales may be loaded from the instrument library without the need for expensive 'plug-in cards'. Customer defined scales may also be created by using software available free of charge from the Internet.

Sample containment is vital in providing a rapid temperature response. A carefully shaped prism dish ensures only the right amount of sample is applied to the sapphire prism and close-contact temperature sensors ensure rapid response from Peltier devices to quickly control the sample temperature. Readings are monitored by software and when in 'SMART temperature stability mode', the result is displayed only when both reading and temperature has stabilised. ICUMSA temperature compensation is also provided with the option to load User Temperature Compensation.

A carefully shaped prism dish controls precious sample volume and gives rapid temperature stability when samples are applied with a differing temperature to that of the instrument. Cleaning requires less solvent with less interruption to temperature regulation.



Prism



Software Features:

A powerful microprocessor lies behind a simple control panel providing standard measurement or industry specific methods. Navigation is by cursor or numeric index and access is protected to three levels depending on the security of measurement required. The reading display can be configured to show one or a number of different measurement parameters along with instrument configuration, batch code and operator identifiers in accordance with GLP and the technical requirements of FDA regulation CFR21 Part 11. A 'Methods system' provides instant selection of measurement configuration (Scale/TC/temperature etc.) and offers a check against predetermined reading limits. Readings may be output to a printer and/or sent to LIMS in CSV format.

Automation:

RFM800 series refractometers provide both mechanical and electrical connection to other instruments and automated systems. Beer analysis in accordance with International Standards is made easy by connecting a compatible density meter, with alcohol & gravity results being calculated and output in the normal way. A micro flowcell provides the connection for pumped sample from an autosampler in beer and fragrance & flavours systems, whilst funnel flowcells give rapid readings in busy sugar laboratories. Full details of automated systems are available on request.

One, Two and Multipoint Calibration:

Two-point calibration in any selected scale allows accurate control of measurement. Typically 'zero calibration' is made with air and water but for narrow range or high temperature measurement, other samples such as oils may be used. Span calibration facilitates control at the upper end of the scale, whilst multipoint calibration is available to customers wishing to make minor adjustments at more than one point.

Uniquely, a wide selection of calibration materials traceable to International Standards* is available from Bellingham + Stanley Ltd.

Robust Manufacture:

Construction materials have been carefully selected to withstand common samples and solvents. The chemical resistant Polyurethane Foam case offers a seal against moisture and corrosion, whilst materials in contact with the prism are of the highest specification including Kalrez® gaskets and PEEK spill barriers as standard. Optional 'splash covers' are also available. The temperature control system comprises internal Peltier elements and heatsinks using a system of controlled airflow through filtered ducting to ensure there is no contamination to the optics, electronics or heatsinks; ensuring performance year after year.

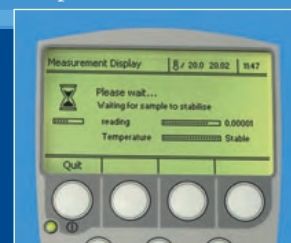
* For details contact B+S Ltd or recognised distributor

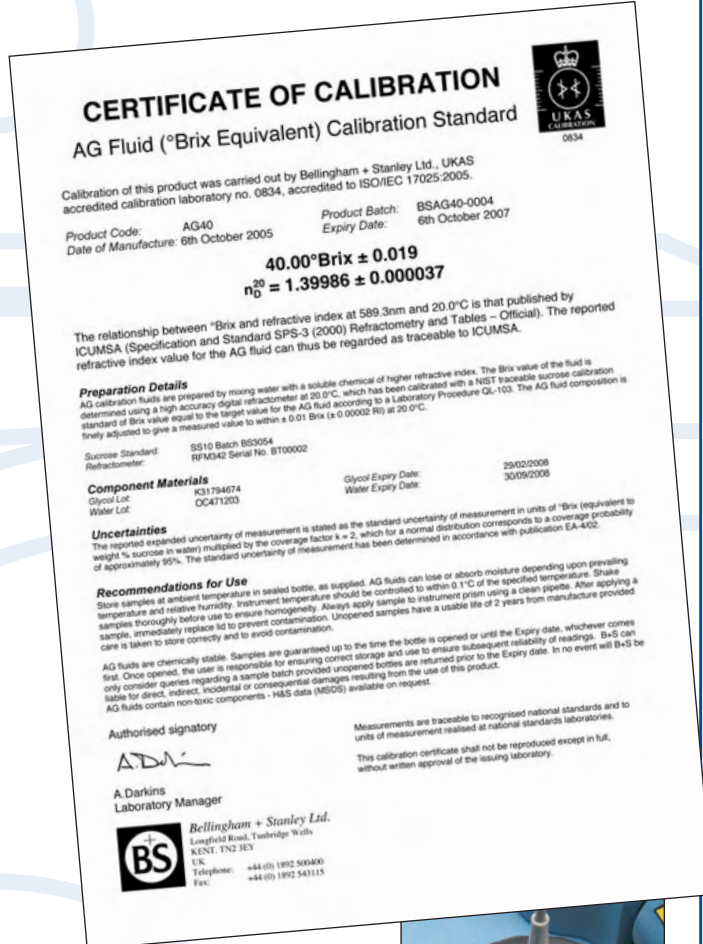
Measurement display showing detailed reading



Computer simulated images

SMART stability check temperature screen





Measurement Features:

- Wide Range – 1.30 to 1.70 RI
- Standard Brix range
- User Scale Library
- 5-decimal place RI
- 2-decimal place Brix
- Peltier Temperature Control
- Wide Temperature Range

Software Features:

- Temperature Stability Checks
- Measurement Methods
- Reading Limits Check
- Calibration Log/Report
- PIN Protection
- GLP Printout
- CFR21 Part 11

Methods:

- Coffee
- BeerSmart %ABV
- Daily Offsets
- Edible Oils
- Automation

Options:

- Funnel Flowcell
- Micro Flowcell
- Barcode Reader
- Autosampler
- IP66 Power Supply
- Calibration Materials
- Splash Covers

Compliance:

- GLP
- OIML
- USP/EP/BP
- ASTM D 1218-02
- ASTM D 5006

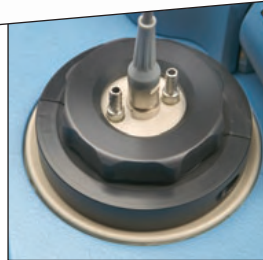
Security Features:

FDA Regulation CFR21 Part 11

Strict controls within the pharmaceutical industry dictate the need for high levels of security in terms of sample analysis and data control. Instrument software facilitates the level of security: low, medium and high. The lowest level requires a 3-digit PIN to access determinable parts of the instrument menu, whilst 'medium' requires an 8-digit PIN. In either of these modes, setting the supervisor PIN to zero allows free access to all users.

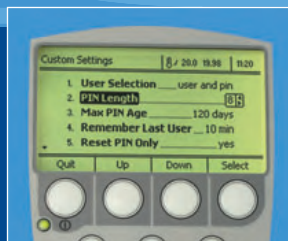
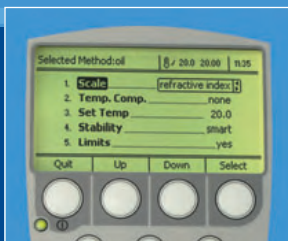
The highest standard of security is compliant with the technical requirements of FDA regulation CFR21 Part 11, where access to measurement and data transfer is strictly controlled, making use of extended passwords and electronic signatures that have a controlled schedule of validity and re-usage. Changes to the instrument configuration are also recorded in the instrument as an 'audit trail' that also records calibration activity, all of which may be extracted using PC software.

Additionally, latest models are fitted with a non-volatile memory that if activated, will record instrument configuration and electronic signatures, so that in the unlikely event of instrument failure, installation of new equipment is made easy and audit trails remain intact.



Method set-up screen

Security setting screen





Measurement Specifications	RFM830	RFM840	RFM860	RFM870
Scales RI Sugar (°Brix) User-defined (100 scales – configurable)	1.32 – 1.58 0-100 YES	1.32 – 1.58 0-100 YES	1.30 – 1.70 0-100 YES	1.30 – 1.70 0-100 YES
Resolution RI Sugar (°Brix)	0.0001 0.1	0.00001 0.01	0.0001 0.1	0.00001 0.01
Accuracy RI Sugar (°Brix)	±0.0001 ±0.1	±0.00002 ±0.02	±0.0001 ±0.1	±0.00002 ±0.02
Presser Type	Polyacetyl	Polyacetyl	PEEK	PEEK
Other Scales	Zeiss, Oechsle (CH) & (D), Babo (KMW), Baumé, Probable Alcohol (A.P), Sodium Chloride (NaCl), HFCS (42, 55 & 90%), Butyro amongst others from instrument library OR custom user scales by push button entry or via PC program			
Reading Time	Minimum 4 seconds			
Ambient Temperature Range	0 – 40 °C			
Measuring Temperature Range Lower limit Upper limit	0 °C or 10 °C below ambient whichever is the greater approximately 100 °C			
Temperature Sensor Accuracy	± 0.03 °C			
Temperature Stability	± 0.05 °C			
Automatic Temperature Compensation Sucrose (°Brix) User-defined	5 – 80 °C Simple coefficient (units/ °C) or polynomial function with offset			
Temperature Stability Checks	None/delay time/repeatability/Smart (independently selectable by method)			
Ambient Humidity Range	< 80% RH			



Physical Specifications

Prism	Artificial Sapphire
Prism Dish	316 Stainless Steel / PEEK
Prism Seal	Kalrez®
Interfaces	1 Parallel (printer), 2 x Serial (RS232)
Sample Illumination	Light Emitting Diode – (life 100,000 hours +)
Temperature Control	Peltier

Order Codes Description

26-30	RFM830 including external power supply (100-240V~, 50-60Hz), spare filters (4 Pack) and instructions
26-40	RFM840 including external power supply (100-240V~, 50-60Hz), spare filters (4 Pack) and instructions
26-60	RFM860 including external power supply (100-240V~, 50-60Hz), spare filters (4 Pack) and instructions
26-70	RFM870 including external power supply (100-240V~, 50-60Hz), spare filters (4 Pack) and instructions
55-80	Barcode Reader (230V~, 50Hz)
55-81	Barcode Reader (110V~, 60Hz)
26-292	Dust Filter (Pack of 20)
26-155	Switch Membrane Anti-splash Cover
55-250	Waterproof Power Supply to IP66 (100-240V~, 50-60Hz)
26-80	Micro Flowcell (vol. 0.6ml)
26-81	Macro Flowcell (vol. 1.2ml)
28-82	Funnel Flowcell (vol. 1.2ml & 30ml flush at 30 °Brix max.)
26-451	Validation Documentation (only)
Warranty	24-months



Bellingham+Stanley Ltd operates a Quality Management System complying with BS EN ISO 9001:2000 (Certificate No. LRQ 0963791).

Bellingham+Stanley Ltd pursues a policy of continuous product development and improvement, and, as such, information given on this Data Sheet may be updated or withdrawn without notice.

CE These products comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC



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