SHERWOOD SCIENTIFIC
FLAME PHOTOMETER RANGE

FOR THE ANALYSIS OF SODIUM, POTASSIUM, LITHIUM, CALCIUM, BARIUM, CESIUM, RUBIDIUM AND STRONTIUM

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FLAME PHOTOMETERS

Sherwood Scientific entered the Flame Photometer market with the model 410, having acquired the manufacturing rights to the design from Corning. We made some significant updates to the Corning M410, now over 30 years old, but retained all of the key features which give the model 410 it's respected place in industry. It has long been the best performing, low temperature, single channel Flame Photometer available. The dual channel model 420, developed at Sherwood, has many of the 410's attributes (ease of use, maintenance and stable flame design) enhanced with auto-flame optimisation, internal standard referencing and on-board firmware, to improve sample throughput and precision. The model 425 has an additional detector and filter for Calcium determination. The model 360 offers a combination of Sherwood's experience of manufacturing the 410, 420 and 425, with changes in marketplace demands and we intrduced teh M420Cs for those needing Cesium internal reference.

SINGLE CHANNEL FLAME PHOTOMETERS

MODEL 360

The model 360 retains the mixing chamber and burner design which give the model 410 its renowned stability; a solid foundation to which we have added the model 420's auto flame optimisation technology. Ease of maintenance is also retained as a key feature and five filters for Sodium, Potassium, Lithium, Calcium and Barium are supplied as standard. This is a single channel unit providing analysis of one element at a time in a competitively priced build design. The model 360 is available in three formats; 360 Nat Gas for use with low pressure Natural Gas supplies 360I for use with Propane/Butane/LPG and 360C with linearised Sodium response, for use with Propane/Butane/LPG.

MODEL 410

The model 410, with its robust design, outstanding performance and reliability, has a range that includes the 410 Classic, 410 Industrial and 410 Scientific; the latter two have a digital interface fitted as standard. We have filters for Na, K, Li, Ca, Ba, Rb, Sr and Cs for use with the model 410.

MODEL 410 CLASSIC AND INDUSTRIAL

Flame Photometry is the technique of choice for the measurement of Na, K and Ca in all sample types in: Mineral Extraction, Oil and Paper Industries, Pharmaceuticals, Soil analysis, Utilities, Food & Beverage, Chemical Manufacture and Fertilisers. Both 410 Classic and 410 Industrial have Na, K and Ca filters fitted and are delivered with (6 x 100 ml) 1000 ppm standards for each analyte. The Industrial has a digital interface for printer or PC connection and the option to linearise Sodium response (to 50 ppm) and facilitate use of a single point calibration.

MODEL 410 SCIENTIFIC

For biochemistry samples, flame photometry is the most sensitive and robust method for the determination of Na, K and Li. The model 410 Scientific is delivered with Na, K and Li filters and an appropriate multi-element calibrator in mmol/l. (1 x 100ml). The 410 Scientific is also fitted with a Lineariser, allowing direct, straight line, calibration of clinically significant concentrations of Sodium, as well as Potassium and Lithium, following suitable dilution. The model 806 Dilutor gives nominal sample dilution ratios of 1:200 and 1:50. It has been designed to give consistent dilution of calibrator and samples to the Flame Photometer. The 410 Industrial and 410 Scientific can be further enhanced by the use of 410 BlueNotes™ software and model 865 Autosampler. Fully integrated and automated systems are possible via our Update and Automate modules and packages which may also be applied to the 410 Classic.

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DUAL CHANNEL
FLAME PHOTOMETERS

MODEL 420, 420Cs & 425

Developed from the single channel model 410 with the objective of improving productivity and analytical performance of the laboratory when measuring Sodium and Potassium. The biggest improvement is dual channel operation, allowing both Sodium and Potassium to be calibrated, measured and displayed simultaneously. The model 420 retains many of the model 410's attributes: ease of use, ease of maintenance and stable flame design but is enhanced with auto flame optimisation, internal standard referencing and on-board firmware to achieve significant improvement in sample throughput and precision. The time taken to set up and calibrate the instrument is much reduced; achieved by automatic ignition and optimisation of the flame conditions. The analytical performance is improved by the use of a Lithium Internal Standard signal which corrects for fluctuation in flame conditions and dilution errors. The internal standard feature (Reference Mode) can be turned off if required. Readings on both channels are linear over the working range of the model 420. There are several monitoring and control functions included in the firmware driving the model 420 thus measurements can only be made after blanking and calibration. The model 420 can operate in Continuous or Peak mode. In Continuous mode, the instrument displays the current value on each channel and through the analogue ports; an instantaneous reading can be printed at any time. In Peak mode, the 420 automatically detects a stable reading for transfer to a printer or computer and the display is frozen until the next sample is introduced. The model 425 expands upon capability of the model 420 with addition of an extra detector and filter for Calcium determination. It also offers a "301 mode" feature which allows connection to a number of the more popular continuous flow systems. Both the 420 and 425 have RS232 output for printer or computer connection and are compatible with our model 865 Autosampler for unattended sample analysis. Both models may be used with the 806 continuous flow Diluter, inconjunction with or without the 865 Autosampler. Dual Channel flames are supplied with standard 420 BlueNotes software. For optimum performance, these units are designed for use only with Propane, Butane or LPG. The model 420 is available in two formats: the 420 Industrial and the 420C whilst the 425 is only supplied in Industrial format. The M420Cs offers use of Cesium as an internal reference.

MEASURING CALCIUM

The model 425 has the additional channel for Calcium, which has been requested by many customers. It should be noted the Propane /Air flame is not hot enough to break the Calcium Phosphate bond which may occur within, particularly, clinical samples. In these samples a pre-treatment protocol must be used. Sherwood has a method, see: www.sherwood-scientific.com/apps/f003m.html. With other Calcium samples, chelation with EDTA or extraction with Mehling's 3 solution may be indicated. Another application which can be problematical is infusion fluids with low Calcium and high Sodium concentrations: again sample pre-treatment is required to reduce Sodium interference— please ask for further information.

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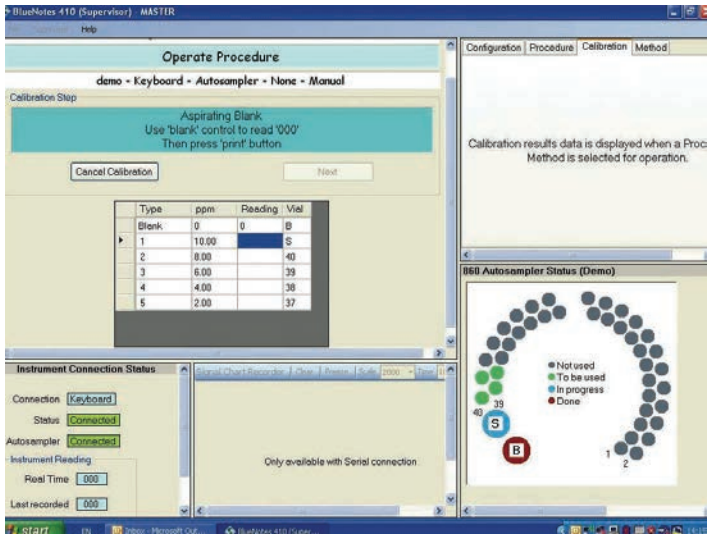
FLAME PHOTOMETERS

ACCESSORIES

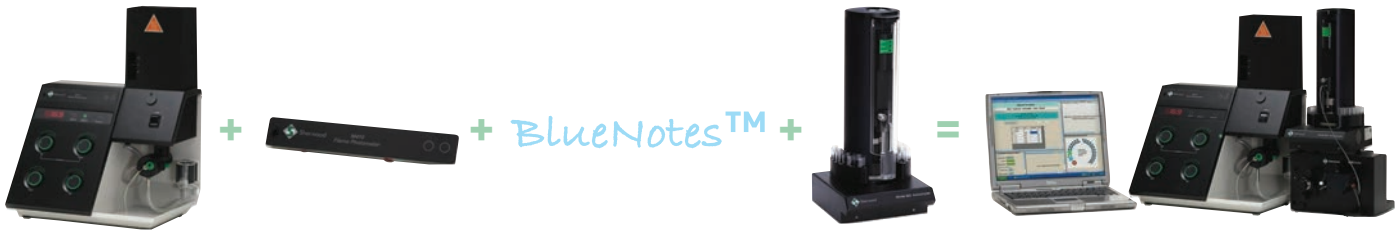
410 BLUENOTES SOFTWARE
EVERYTHING VISIBLE ON ONE OPERATIONAL PAGE

With the 410 BlueNotes™ software package you can:

- Use real names and sample numbers in your reports
- Perform Multipoint calibrations with curve fit
- Automatically correct for instrument drift
- Save methods
- Save calibration curves and archive results
- Prepare and print professional reports
- Use Automatic Peak Selection facility to assess stability of readings
- Automate analyses with addition of the 860 Autosampler



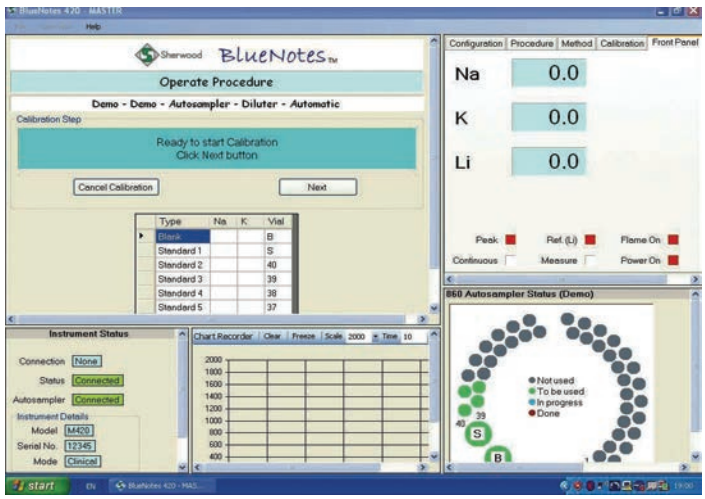
410 BlueNotes is a package designed not just for data collection, storage, manipulation and report generation; it can also improve throughput, enhance precision and extend the utility of the model 410.



410 Classic | Digital Interface | Software | 865 | Fully automated 410 system (shown with 806 Dilutor)

MULTI CHANNEL
BLUENOTES SOFTWARE

This package allows collection and viewing of signals from all four (M425 & M420Cs) or all three (420) detectors simultaneously. Selection of Lithium/Cesium or Potassium as an internal reference is possible. In addition to the instrument's single point calibration, operation with 420 BlueNotes offers multi-point calibrations, allowing operation beyond the linear response range of the instrument. Automatic report generation is standard (PC and printer not supplied).



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THE MODEL 806 CONTINUOUS FLOW DILUTOR

· Dual Rotor for reproducible ratios

· Positive Pumping for accurate measurements

· Uptake from original sample vessel

· Fibrin clot remover

· Excellent overall system performance

The model 806 Dilutor can work with all Sherwood Flame Photometers. It features two pump mechanisms, one for sample and one for diluent, which are permanently linked to ensure reproducible dilution ratios. Designed for the 200:1 dilution ratio used for Na and K solutions in clinical samples, it also allows a 50:1 ratio for clinical Lithium. When used with model 420 or 425 Flame Photometers, the Dilutor automatically adds Lithium (Cesium for M420Cs) at the optimal concentration to act as an internal reference for improved precision of results.

THE MODEL 865 AUTOSAMPLER

· 40 sample capacity

· Separate positions for Blank and Calibrant

· Designed for use with 420, 420Cs and 425 Flame Photometers

· Works with or without Sherwood Model 806 Diluter

· Works with 410 but only with 410 BlueNotes™ Software.

The models 420, 420Cs and 425 Flame Photometers were designed to interface bidirectionally with the model 865; control sits in the Flame Photometer. The model 410 with Digital Interface, requires 410 BlueNotes™ software to run the M865 Autosampler

MODEL 851 AND 855 COMPRESSORS

A critical component for good operation. We have two Air Compressors available for use with Sherwood Flame Photometers; the model 851 and model 855 (shown). The 855 has a water-cooled trap for operation in humid atmospheres. Both provide a dedicated, clean, dry air supply which is vital to achieving stable flame conditions and constant sample delivery.

FUEL GAS REGULATORS

We can supply fuel gas regulators to fit gas cylinders. The Dual channel Flame Photometers require a supply greater than one bar of pressure and are only for use with Propane, Butane or LPG. The M410's can be used with Natural Gas but only if the Natural Gas Regulator Kit is purchased and fitted. The M360 Nat Gas model will work as supplied with Natural Gas.

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FLAME PHOTOMETERS

ORDERING INFORMATION
PART NUMBERS

INSTRUMENTS

STOCK CODE	DESCRIPTION	MODEL
36000009	M360 5-ELEMENT FLAME PHOTOMETER - Propane/Butane M360 5-	M360
36000109	ELEMENT FLAME PHOTOMETER - Natural Gas M360 C FLAME	M360
36000209	PHOTOMETER - Propane/Butane	M360
41000009	M410 CLASSIC	M410
41000209	M410 INDUSTRIAL	M410
41000309	M410 SCIENTIFIC	M410
47542000	M420C 2-CHANNEL FLAME PHOTOMETER	M420
47542100	M420 2-CHANNEL INDUSTRIAL FLAME PHOTOMETER	M420
47542500	M425 FOUR-ELEMENT FLAME PHOTOMETER	M425
47542300	M420Cs CESIUM INTERNAL REFERENCE FLAME PHOTOMETER	M420Cs

410 INSTRUMENT UPGRADE/AUTOMATION

NOTE: When ordering these products you must state the Serial Number of the flame photometer to which they will be fitted.

41086009	DIGITAL INTERFACE/LINEARISER	M410 CLASSIC *see NOTE above*
41086010	BlueNotes UPGRADE for M410 (Digital Interface 41086009 + 410 BlueNotes software 41066000)	
41086011	BlueNotes UPGRADE/AUTOMATION PACKAGE (860 Autosampler 86500009 + BlueNotes Upgrade 41086010)	
41066000	M410 BlueNotes SOFTWARE	M410 INDUSTRIAL + SCIENTIFIC
41086004	BlueNotes AUTOMATION PACKAGE (865 Autosampler 86500009 + 410 BlueNotes software 41066000)	

ACCESSORIES & SOLUTIONS

86500009	M865 AUTOSAMPLER - 40 PLACE	All
80600009	M806 DILUTOR, CONTINUOUS FLOW	All
85101000	AIR COMPRESSOR M851/115V, BOXED FOR SHIPMENT	All
85101001	AIR COMPRESSOR M851/230V, BOXED FOR SHIPMENT	All
00108234	REGULATOR, PROPANE, PRIMARY ASSEMBLY	All
00108439	REGULATOR, BUTANE, PRIMARY ASSEMBLY	All
00108732	REGULATOR, CAMPING GAZ	All
47708400	REGULATOR, FOR DISPOSABLE PROPANE CYLINDERS	All
40020001	RESTRICTOR, BUTANE/PROPANE ASSEMBLY	M410
41019002	REG. KIT, NATURAL GAS INC FILTER	M410
00108233	REGULATOR, PROPANE, FRENCH	All
00156100	SOLUTION, 140Na/5K/1.5Li 1X100ML	M360/410/M420C
00156124	SOL'N 1000PPM BARIUM STD 100ML	M360
00156620	SOL'N 1000PPM SODIUM STD 6X100ML	M360/410/M420
00156621	SOL'N 1000PPM POTASSIUM STD 6X100ML	M360/410/M420
00156622	SOL'N 1000PPM LITHIUM STD 6X100ML	M360/410/M420
00156623	SOL'N 1000PPM CALCIUM STD 6X100ML	M360/410/M425

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FLAME PHOTOMETERS

PERFORMANCE
INSTALLATION

Note: do not install a Flame Photometer beneath overhanging cupboards. There must be at least 1 metre of clear space above the chimney. For optimum performance, installation should be in accordance with the following conditions:

· The environment must be clean and free from dust

· The instrument must be placed on a strong, level worktop, free from vibration. Approximately 500mm x 500mm of bench space is required, which includes an area in front for solutions and clearance at the rear for fuel and air tubing, with clear access to the mains supply switch

· Avoid sites that expose the instrument to direct sunlight or draughts

· To meet the specification the ambient temperature must be within the range +10°C to +35°C and the maximum relative humidity must not be more than 85%, non-condensing

ELECTRICAL SUPPLY

An A.C. supply between 90V and 240V ±10%, at 50Hz or 60Hz, is required.

AIR

All Flame Photometers require a clean (oil free), dry, pulse-free air supply capable of delivering up to 6 litres per minute of air at a minimum of 1 bar or 15 psi pressure. For a Sherwood compressor see the accessories page in this brochure or on our website.

FUEL

All Flame Photometers require a supply of Propane, Butane or Propane/Butane mixture regulated at the cylinder to 2.1kg/cm2 (30psi), flow rate at least 0.4 litres per minute. (NB. Propane gives the best results for Ca). Primary regulators to fit cylinders are available as optional accessories from Sherwood Scientific. If Natural Gas is to be used with the M410, order and fit the Natural Gas Regulator Kit.

WASTE CONTAINER

A sink or waste container, sited to the right of the instrument, will ensure the minimum length of waste tubing. Do not use a waste container with high sides, as this will cause the drain tube to be lifted above the level of the constant head drain and poor drainage has a detrimental affect on performance

PERFORMANCE

Those determining Calcium should be aware there is a significant background interference from Sodium For a full specification sheet for the Model of interest contact: info@sherwood-scientific.com

DESIGN FEATURES:

· Ease of use with large, accessible, "upfront" work area for calibrator and sample presentation

· Gas control/flame optimisation

· Ease of maintenance with "no-tools" approach to removing; mixing chamber, burner stem and burner

· Element filters easily accessible for cleaning and/or replacement

SAFETY FEATURES

Sherwood Scientific Flame Photometers feature as standard:

· Optical "flame-on" and air pressure detectors for instant fail safe flammable gas containment

· "Cool" chimney

· Full CE Compliance

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INTRODUCTION AND HERITAGE

Sherwood Scientific Ltd., develops and manufactures a range of scientific instruments and apparatus with application in many industries, as well as in education and research. Known for high quality and reliability, Sherwood Scientific products are all manufactured at the company's base in Cambridge, UK and sold and supported through an extensive distributor network covering over 80 countries. Fully equipped training and laboratory facilities enable Sherwood Scientific to offer courses to our distributors on all products and to undertake consultancy projects in analytical measurement and process control. The history of Sherwood Scientific can be traced back more than 70 years to applications of the selenium photocell in early Flame Photometers – now the largest and most diverse of our product lines. The company's heritage encompasses the Lab Scale Fluid Bed Dryer and Magnetic Susceptibility Balance developed under the auspices of Johnson Matthey, and acquisition and development of Corning and CIBA Corning instruments: Flame Photometers and Chloride Analysers.

PRODUCTS

FLAME PHOTOMETERS

Building upon the acclaimed Corning M410, we now manufacture the widest range of Instruments and Accessories: single and multi-channel, with analogue and digital outputs, free-standing and software controlled units and automated analysis packages for Sodium, Potassium, Lithium, Calcium, Barium, Cesium, Rubidium and Strontium analysis

MODEL 501 FLUID BED DRYER

This is a bench top, lab-scale, programmable Fluid Bed Dryer. The microprocessor controlled base unit accommodates the widest range of tub configurations and materials. We select inlet and outlet filters to complement a broad variety of sample types and particle sizes. With in-tub temperature and humidity feedback capability coupled to a software package providing real-time drying condition feedback. This unit allows rapid development of drying protocols and understanding of material drying behaviour.

CHLORIDE ANALYSERS

Our Chloride analysers use coulometric titration technology; offering the best available means of Chloride determination in food, pharmaceutical and industrial products etc. In addition sweat chloride measurement is also possible, (with samples as small as 20ul), as required for assistance with Cystic Fibrosis confirmation.

MAGNETIC SUSCEPTIBILITY BALANCE

For those studying magnetic properties of materials, our Magnetic Susceptibility Balance offers unsurpassed sensitivity and reliability. We truly are world leaders in this field of analytical chemistry

Sherwood Scientific is represented by a worldwide network of distributors, details of whom can be found on our website. Please contact us for further information or visit us at

www.sherwood-scientific.com

for full product information, application & technical advice and basic theory of principles of operation.

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