



Flame Photometers from Sherwood Scientific



The Sherwood Model 410

has been accepted world wide as the standard manual Flame Photometer. It can measure Sodium, Potassium, Lithium, and with interchangeable filters, Calcium and Barium and is used in laboratories serving a very wide variety of industries. In the clinical field the

addition of a Lineariser module enables direct reading of Sodium as well as Potassium and Lithium values.

The Model 410 has all the safety features required in a modern flame photometer and helps the user with a convenient work-area for the standards and samples. Operation of the instrument is straight forward with auto ignition and manual optimisation of the gas/air mixture.

The measurement of clinical samples can be semi-automated with the use of the Model 805 Diluter which can take serum, plasma and pre-diluted urine samples and apply 200:1 dilution.

The model 410 has an analogue output for continuous monitoring of the single channel displayed. Standard output is 200 millivolts FSD this can be replaced with a 5 volt output to interface with "auto-analyser" systems.



The heart of both the Models 410 and 420 is the design and construction of the nebuliser, mixing-chamber and burner assembly. This gives a flawless plume of aerosol for noise-free operation.

The Sherwood Model 420

has been developed from the Model 410 with the objective of improving the 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 measured and displayed simultaneously. The Model 420 retains the heart of the Model 410 as described above but now adds a new auto flame optimisation and sophisticated software to achieve much enhanced operation.

The time taken to set up and calibrate the instrument is much reduced; this is achieved by the automatic ignition and optimisation of the flame conditions.

The analytical performance is improved by the use of a Lithium Internal Standard signal which reduces any fluctuation in flame conditions and dilution errors. The readings on both channels are linear over the working range of the Model 420.

There are several monitoring and control functions included in the software 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 and an instantaneous reading can be printed at any time. In Peak mode the Model 420 automatically detects a stable reading for transmission to a printer or computer and the display is frozen until the next sample is introduced



Flame photometry

has been the proven standard method for the analysis of Sodium and Potassium for the last 70 years. The accurate and reproducible analyses of these elements are crucial in the Clinical and many Industrial fields.

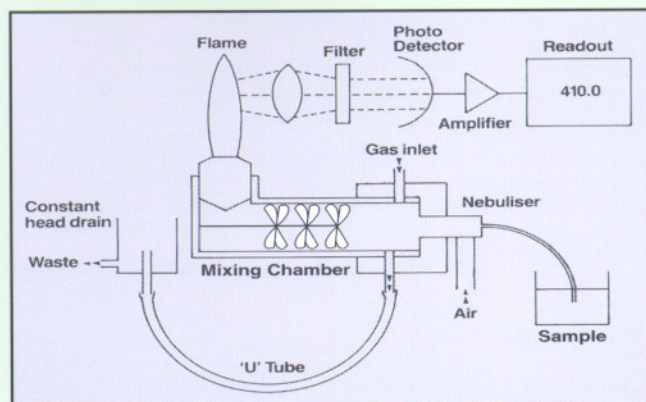
Sherwood Heritage

The Model 100 developed by EEL in 1950, brought Flame Photometry to 50,000 laboratories worldwide. Allowing for the first time the measurement of Sodium and Potassium to be made within minutes rather than the lengthy and difficult gravimetric procedure used previously.



Starting with the Model 100 Flame Photometer for the past 50 years a succession of instruments, developed in the UK, has advanced flame photometry incorporating for the first time; dual element readout (Model 150 1970); Internal Standard reference (model 430 1970); automatic ignition safety features (Model 410 1985). These have been the products of a succession of companies; EEL, Corning and from 1995 Sherwood Scientific Ltd.

Components of a modern Flame Photometer



The aqueous sample is aspirated into the Nebuliser where it is vapourised and mixed with air and fuel in the Mixing Chamber. Here it encounters baffles designed to prevent all but the smallest aerosol mist reaching the flame. Larger droplets hit the baffles and are eliminated through the drain tube. This fine aerosol, intimately mixed with the gas, approaches the heat of the flame where the water content evaporates until only microscopic particles of hydroxides or oxides of the elements to be measured feed into the flame. Here they are thermally dissociated into molecules or atoms electrons of which are energised by the heat from the flame. As the energised species pass into a cooler part of the flame they lose energy in the form of light of characteristic wavelength as the atoms return to their "ground state".

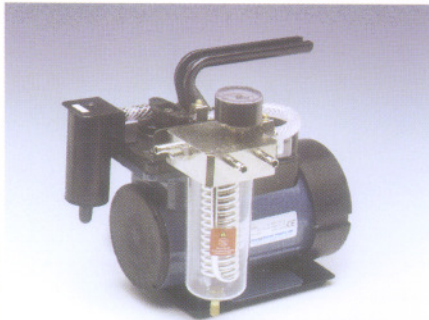
Date: 10-Jun-1999
 Time: 13:17:34
 M420
 Flame Photometer
 Delay = 30 sec
 Blank
 Time: 13:18:17
 Na= 0.0
 K = 0.0
 Calibration
 Mode: Peak + Ref
 Time: 13:19:03
 Factor: 0.9806
 Na= 75.0
 Factor: 0.7982
 K = 75.0
 Ref. : 98.1
 Sample: 1
 Mode: Peak + Ref
 Time: 13:19:44
 Na= 75.6
 K = 74.6
 R.Factor: 0.991
 Sample: 2
 Mode: Peak + Ref
 Time: 13:20:40
 Na= 75.3
 K = 74.6
 R.Factor: 0.992
 Sample: 3
 Mode: Peak + Ref
 Time: 13:21:37
 Na= 75.3
 K = 74.4
 R.Factor: 0.993
 Sample: 4
 Mode: Peak + Ref
 Time: 13:22:33
 Na= 74.0
 K = 73.5
 R.Factor: 1.012
 Sample: 5
 Mode: Peak + Ref
 Time: 13:23:32
 Na= 75.2
 K = 74.6
 R.Factor: 0.997
 Sample: 6
 Mode: Peak + Ref
 Time: 13:24:28
 Na= 75.6
 K = 74.9
 R.Factor: 0.989
 Sample: 7
 Mode: Peak + Ref
 Time: 13:25:25
 Na= 74.9
 K = 74.1
 R.Factor: 0.994
 Sample: 8
 Mode: Peak + Ref
 Time: 13:26:24
 Na= 74.5
 K = 73.9
 R.Factor: 0.997
 Sample: 9
 Mode: Peak + Ref
 Time: 13:27:20
 Na= 74.8
 K = 74.4
 R.Factor: 1.001
 Sample: 10
 Mode: Peak + Ref
 Time: 13:28:18
 Na= 74.8
 K = 73.9
 R.Factor: 0.998

Data Output

The Model 420 readout is by two clear LED displays each of which can be continuously monitored via the analogue signal output which can be varied from 0.05 to 5.0 Volts. The readings can be transmitted via RS232 when requested by the operator. With the optional printer, the date of analysis is printed at each calibration and the time is printed for each sample. QC and repeat samples are identified on the printout. Error codes and other diagnostic information is also printed out to aid the analyst

Accessories

Specially designed Air Compressors are available for both models including a Model 856 which includes a water-cooled trap for operations in humid atmospheres.



Design Features

- Nebuliser/Mixing/Burner
- Large accessible work area
- Gas Control/Optimisation
- Display
- Result display
- Result Held?
- Internal Standard
- RS232 (Printer/Computer Option)
- Analogue Output Voltage
- Sample delay
- User Help codes
- QC and Repeat sample Numbering

Safety Features

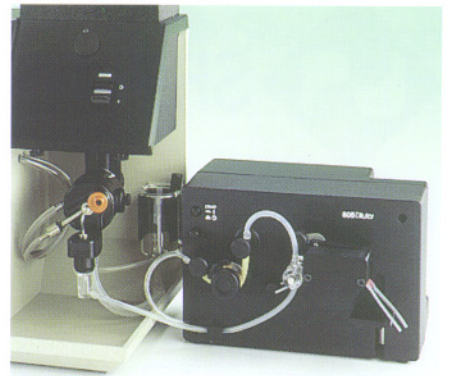
- Optical Instant Flame-On Detector
- Air Pressure Detector
- "Cool" Chimney
- Full CE compliance

Accessories

Performance

- Sensitivity
- Detection Limits (S/N =2)
- Specificity
- Drift
- Reproducibility
- Gas

The Model 805 Continuous Flow Diluter is ideally suited to the Model 420 for Clinical analysis where the user simply offers the undiluted serum/urine sample to the inlet of the M805 and this is diluted and directly aspirated into the flame



Automated analysis

A fully automated system can be realised using the Model 420, Model 820 Autosampler and the printer giving both analogue trace and printed output.



Model 410

- Same
- Yes
- Manual
- Single channel
- Manual estimation
- No
- No
- No
- Fixed
- Manual
- No
- No

- Yes
- Yes
- Yes
- Yes

- Compressors
- Diluter
- Lineariser

- 0.1ppm Na & K=100 units
- Na, K 20ppb
- Interference less than 0.5%
- Other elements at same concentration
- 2%
- 1%
- Propane/Butane/Natural Gas

Model 420

- Same
- Yes
- Automatic
- Dual channel
- Auto Peak
- Yes
- Yes
- Yes
- User adjustable
- User adjustable
- Yes
- Yes

- Yes
- Yes
- Yes
- Yes and Yr 2000

- Compressors
- Diluter
- Built in basic instrument
- Printer
- Turntable

- Same
- Na, K 20ppb
- Same
- <1%
- <0.5% (peak mode)
- Butane/Propane/LPG



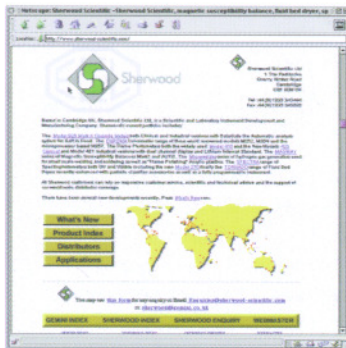
Based in Cambridge, the Centre of Scientific Excellence in the UK, Sherwood Scientific is a Development and Manufacturing company with a history of successful innovations.

Sherwood manufactures the world famous CHROMA Colorimeters, Flame Photometers, Chloride Analyser and Spectrophotometer. Originally introduced by EEL in the 1950s, these products were further developed by Corning and now Sherwood. Sherwood Scientific also manufactures the MICROWELDER gas generator-based flame welding system used in jewellery, electronics and acrylic sign manufacturing; a range of Laboratory Fluid Bed Dryers; and the world's most sensitive Magnetic Susceptibility Balance.

Each instrument is individually tested by running actual samples before being shipped to one of over 100 countries where Sherwood Scientific has selected distributors.


Sherwood Scientific is represented in most of the markets in the world through a network of leading distributors. These distributors and their customers attend courses on existing and new products

at Sherwood's modern training facility in Cambridge. Sherwood and its local distributors can also be contacted via the Internet where news of products, applications and other information is regularly updated.



<http://www.sherwood-scientific.com>



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