

FAST AA

High Throughput Automated Sample Introduction for PerkinElmer Flame AA Instruments

FAST AA Benefits:

- High speed automated analysis
- One load-inject-rinse cycle takes ~ 8 seconds
- 440 samples per hour, up to 25% more than manual analysis
- Reliable pumped sample introduction
- Fast washout and low carryover

Flame Atomic Absorption (FAA) instruments offer extremely high throughput—often around 10 seconds per analysis—for samples requiring the determination of just one or a few elements. The FAA is easy to use, has a relatively low operating cost, and produces results that align well with historical data collected over the last 40 years.

In busy laboratories, many FAA instruments are manually operated. This is because sample uptake and washout with conventional autosamplers takes longer than a human moving a short self-aspiration capillary into each sample tube. The additional cost, space requirements, and slower speed offset most of the benefits of conventional FAA automation.

To improve productivity of FAA instruments, ESI introduces the *FAST AA* high-speed automation system (Fig. 1 and 3). The *FAST AA* vacuum loads samples from the test tube to a sample loop located near the AA nebulizer. When the valve injects the sample, it is introduced to the AA nebulizer at a rate of about 5 ml/min for fast injection and fast washout (Fig. 2 and 4). Rapid injection and washout result in a *FAST AA* throughput of over 440 samples per hour—up to 25% higher than manual analysis for a single element determination.

A variety of high capacity autosamplers are available to appropriately match the sample requirements of your lab and capabilities of the *FAST AA* (Table 1). Linear standard curves and excellent recovery of standard solution concentrations obtained using *FAST AA* illustrates the systems precision and accuracy (Fig. 5 and Table 2), as well as long-term stability (Fig. 6).



Figure 1. PE FAA with the ESI FAST AA Valve

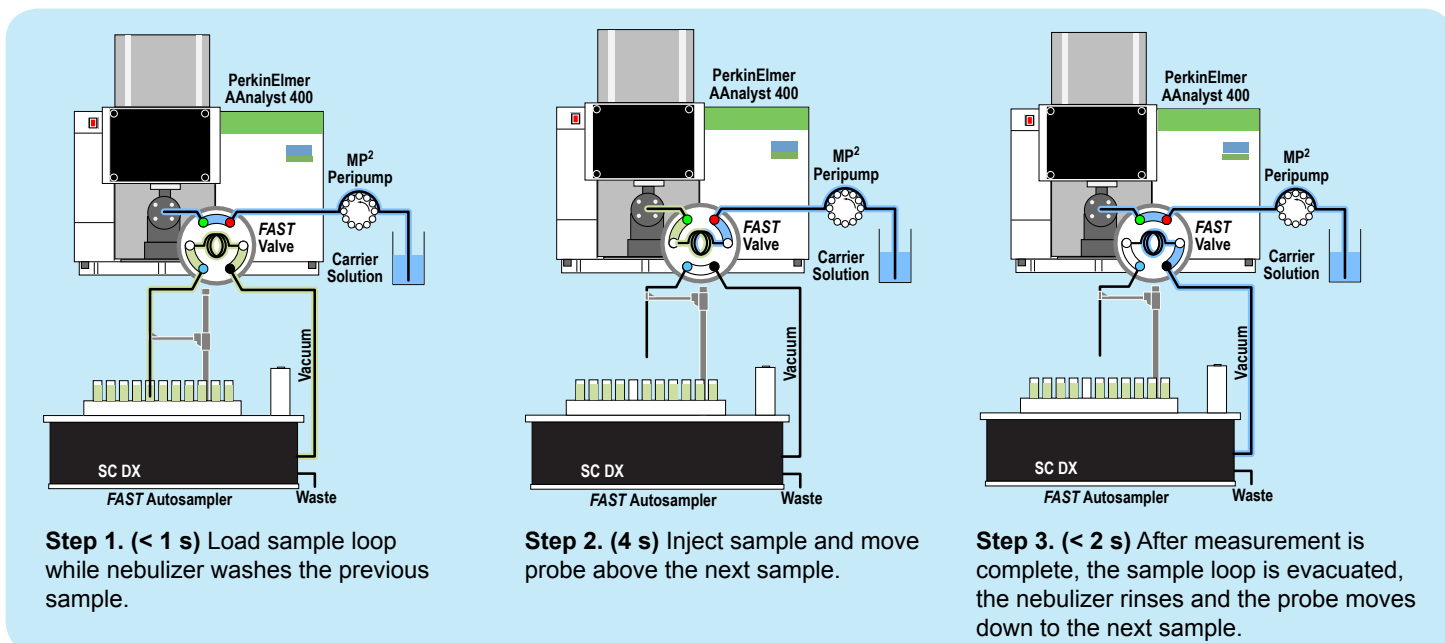


Figure 2. Three-step high-speed flame AA automation. The entire cycle takes ~ 8 seconds.

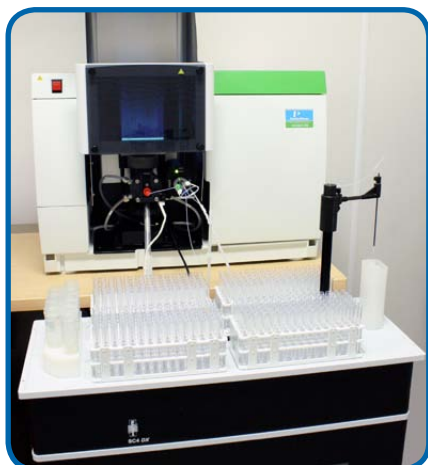


Figure 3. SC-4 DXS FAST AA System with PerkinElmer AAnalyst 400

Ordering Information:

AAF-400 Systems include:

- FAST valve and valve support for AAnalyst 400
- MP² precision peristaltic pump
- Connection for PE AA nebulizer
- Tee for optional online addition of ionization buffer or diluent
- SC-DXS Autosampler with mobile stand

Table 1. FAST AA systems are available with four autosamplers of increasing sample capacity.

FAST AA 400 System Configurations		
Part Number	Autosampler	Sample Capacity (8ml tubes)
2AAF-400	SC-2 DXS	180
4AAF-400	SC-4 DXS	360
8AAF-400	SC-8 DXS	720
14AAF-400	SC-14 DXS	1260

Table 2. 10 automated analyses in 75 seconds.

Analysis of 10 Samples in 75 seconds FAST AA PerkinElmer AAnalyst 400		
Concentration	Time	Cu 324.75 (ppm)
Blank	1:37:43 PM	0.00
1 ppm	1:37:51 PM	1.00
2 ppm	1:37:59 PM	2.00
6 ppm	1:38:07 PM	6.00
Blank	1:38:15 PM	0.01
Blank	1:38:24 PM	-0.00
Blank	1:38:33 PM	-0.01
2 ppm	1:38:41 PM	2.04
2 ppm	1:38:50 PM	2.03
2 ppm	1:38:58 PM	2.06

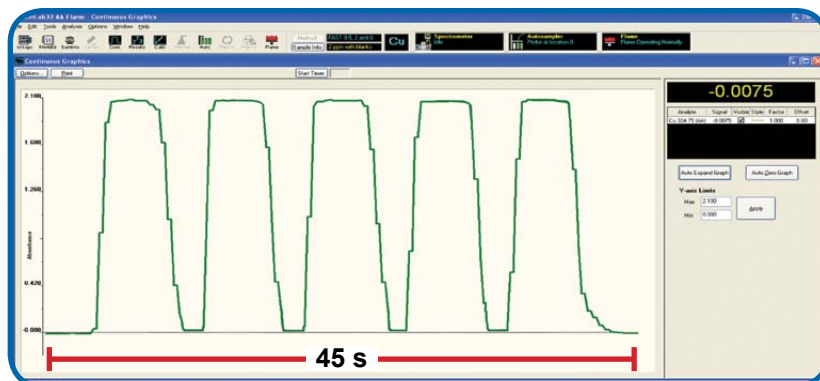


Figure 4. Continuous graphic display of injection and washout of 5 samples in < 45 s.

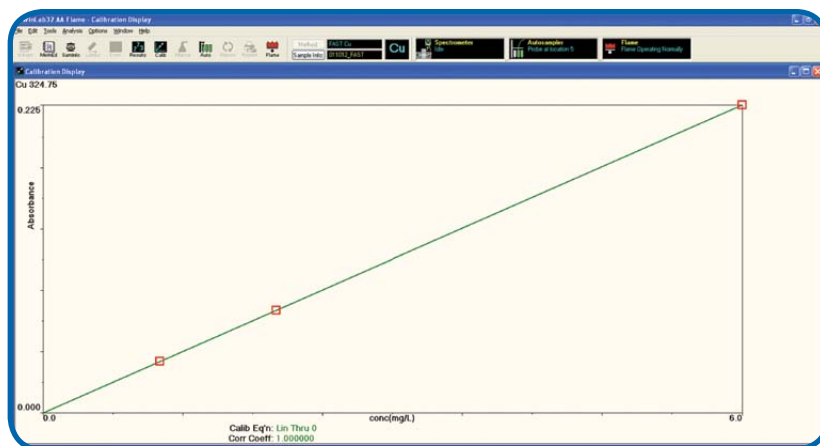


Figure 5. High-speed linear calibration curve using FAST AA system

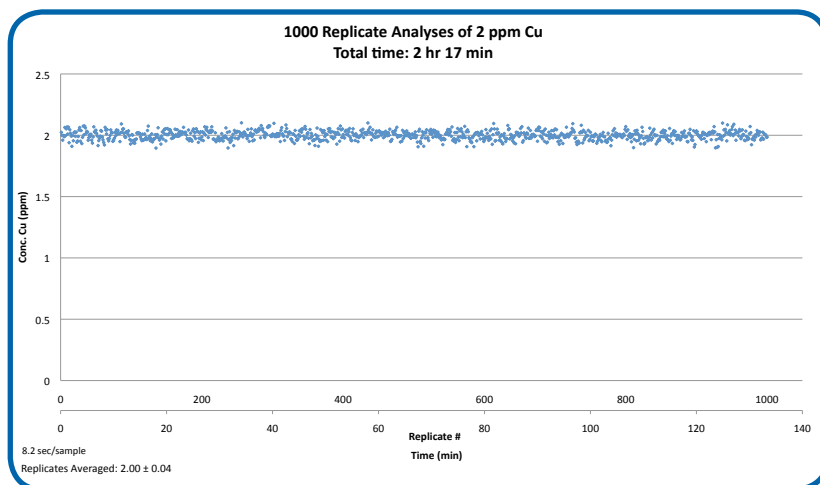


Figure 6. Reproducibility of automated 8 Second FAST AA