AccuSizer® A7000 DI Direct Inject Particle Count/Size Analyzer

Particle size analyzer and integrated auto-sampler for high sample throughput of slurries

The A7000 DI Direct Inject system was designed for high throughput particle size analysis of alumina and other slurries.

The system (Figure 1) consists of the following components:

- LE400-05 light extinction/scattering sensor
- Pulse height analyzer/counter
- Autosampler
- AD dilution fluidics

Samples are loaded into the rack and all analysis steps are fully automated using flexible protocols. There are three modes of operation; single stage or exponential dilution with the autosampler or manual one at a time analysis.

Detailed protocols allow users the control to create methods according to their specific needs. Data is accurate and repeatable, and cleanliness is easily achieved through the use of pipette tips and a two-stage rinsing station for the mixer between samples. Rigorous testing has proved the system is reliable and low-maintenance even in high throughput laboratory conditions.

This system is designed to achieve the most accurate and repeatable size results for alumina slurries or similar samples. The mechanical stirrer only mixes the sample immediately prior to and during the sampling. Cross contamination is eliminated by using individual pipette tips for each analysis and two-stage washing of the mechanical mixer.

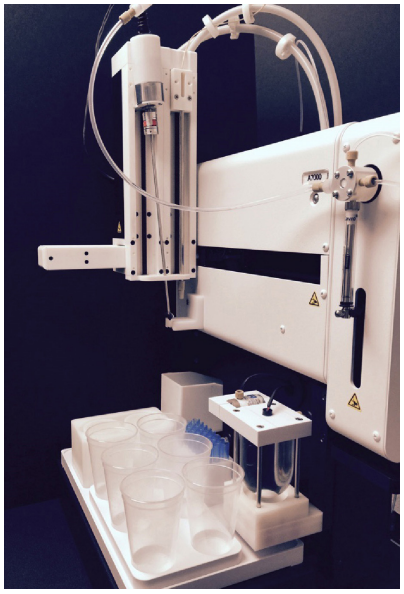


Figure 1. A7000 DI Direct Inject system

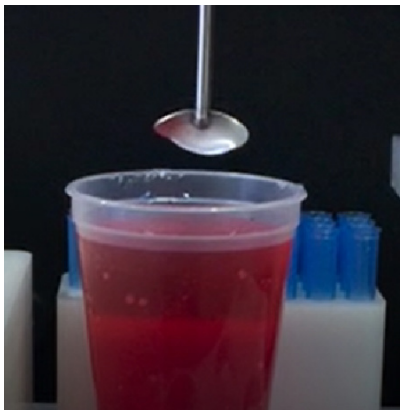


Figure 2. Mechanical mixer, pipette tips in background

Automated analysis sequence:

- Sample tube picks up pipette tip
- Mechanical stirrer agitates sample bottle
- 150 µL – 1 mL sample removed from sample bottle
- Sample directly injected into AD fluidics
- Single stage or exponential dilution
- Sample analyzed with LE400-05 sensor
- Cleanup

The entire process takes less than 3 minutes/sample.

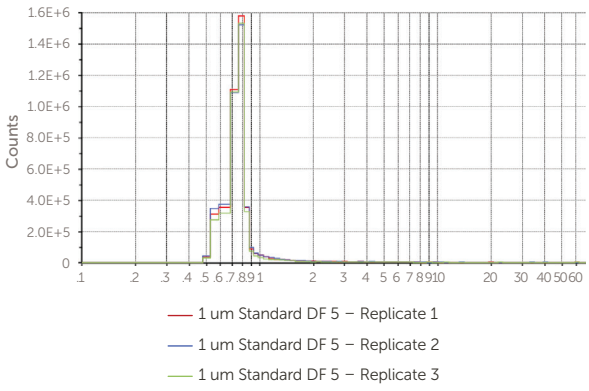
SPECIFICATIONS

Configurations	Includes sensor, counter, direct inject fluidics module with autosampler and pump module. Syringe volumes of 0.5 – 25 mL, 1024 size channels.
Sensor	LE400-05; 0.5 – 400 µm light extinction and scattering, summation calibration, particle sensitivity to 10 ppt, concentration limit 9000 particles/mL, size accuracy 2%, count accuracy 10%, recommended flow rate = 30 mL/min, but can be calibrated at other flow rates depending on configuration.
Sample	150 µL – 25 mL (or larger with multiple syringe pulls). Direct inject has support for 2 pipette volumes {1000 µL, 100 µL}. The pipette volume dictates the maximum allowable injection volume defined within the protocol of the AccuSizer® software.
Options	Autosampler (2×3 rack) Magnetic stirrer for autosampler IQ/OQ documentation 21 CFR Part 11 software Custom report generation
Software	Complete control of software (Figure 3) User defined autosampler definitions (Figure 4) Automatic calibration function
Power	100 – 120 VAC, 60 Hz or 220 – 240 VAC, 50 Hz

Repeatability study using alumina

Sample	Mean	Mode	Median	Total counts	Concentration
A	7.085 µm	0.780 µm	0.772 µm	36032	7.2064/mL
B	7.802 µm	0.780 µm	0.772 µm	36241	7.2482/mL
C	7.679 µm	0.780 µm	0.772 µm	33660	6.7320/mL
Mean	7.522 µm	0.780 µm	0.772 µm	35311	7.06/mL
Std. dev.	0.313 µm	0.000 µm	0.000 µm	1171	0.2341/mL
RSD	0.416 µm	0.000 µm	0.000 µm	3.316	4.161/mL

Overlay of three sample runs



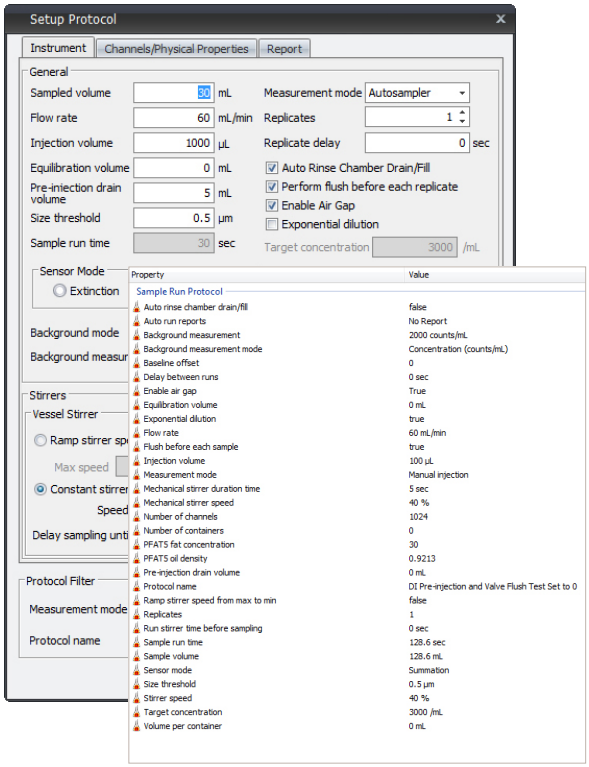


Figure 3. Protocol window and protocol information window

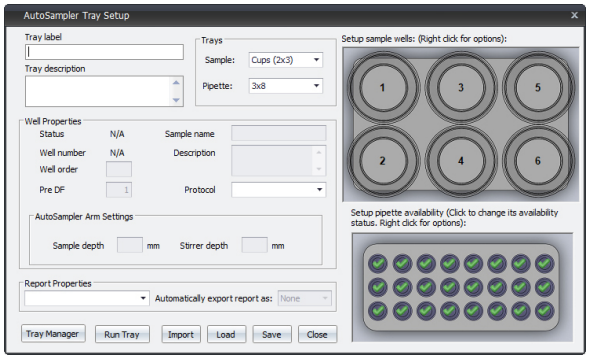


Figure 4. Autosampler tray setup window

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