Saturn DigiSizer® II
High-Definition, Laser-CCD Digital Particle Size Analyzer
The Saturn DigiSizer II is designed with superior sensitivity to quantify outlier particles. It can accurately resolve small differences between particles in a sample distribution that are unseen by competitive instruments. Light scattering device accuracy/sensitivity is very dependent on the amount of available detectors that measure the angle of the scattering pattern produced by the laser system. Most instruments use photodiodes or arrays and have less than 150 detectors - the Saturn DigiSizer features more than three million detector elements.

*The instrument for those who believe their product quality demands more than the currently accepted, industry error standards for particle sizing.*

Pair the Saturn DigiSizer II with the Particle Insight for additional particle shape information

**Particle Insight**
*Dynamic Image Analyzer*
Range - 1.0µm to 800µm (3 models for range coverage)
The Particle Insight can be used to determine all aspects of particle shape, such as aspect, smoothness, polygon order, and size.

- Unique high-frame-rate camera with high-resolution optics - Data for all shape parameters shown in real-time display
- Three-dimensional analysis with random orientation for measuring all aspects of particle shape
- Select from 28 size/shape parameters best suited to your materials
- All particles are captured on thumbnail images for post-run viewing and archiving
The application of CCD technology provides the ability to deliver highly detailed, high resolution results across the entire measurement range without a need for two light sources and the data coordination between those sources required by photodiode array systems. This eliminates variability, interpolation, and the limiting of collected data points for accurate sizing.

Unlike photodiode-based systems, the Saturn DigiSizer II is automatically aligned by remapping the CCD array so that the scattering angle assigned to each element is exact to less than a 0.005 degree relative to the central, unscattered light beam. No mechanical adjustment or alignment - manual or automatic is required.

 Millions of data points are created by a vast increase in detectors for the light scattering pattern. Log-based or spatial arrays used in photodiode systems limit the capture of all angular light scattering patterns and interpolate the data based on a magnitude of fewer data points.

Permanent alignment and stored SOPs ensure tighter results control from analysis to analysis, unit to unit, location to location. SOPs developed on the Saturn DigiSizer II can be transferred to multiple facilities with confidence.

Direct Application of Mie Theory - no need for correction algorithms or prior knowledge if the sample is a monomodal or multimodal distribution.

Advanced design features enable the Saturn DigiSizer II to measure a light scattering pattern over a broad range of scattering angles. Combined with the high angular resolution of the CCD, the detector system provides an effective resolution of several million pixels at different positions in the scattering pattern.

Permanently aligned CCD array with over 3 million detectors is far beyond the sensitivity of any other light scattering particle sizing instrument.

Typical geometry of photodiode-based detection.

Immediate measurement - user does not need to have prior knowledge of the size distribution before analysis.
This PSD History chart of 94 analyses of garnet illustrates the reproducibility of the Saturn DigiSizer II.

Patented reservoir rinse design sprays wall of chamber - not a simple fill-and-flush cycle as with other instruments.

High resolution of data permits Mie Theory to be applied directly – there are no compensation algorithms or concerns for the user to adjust for monomodal or multimodal samples.
Liquid Sampling Advantages vs. Dry Powder Analysis

- **Toxicity** - Handling samples in a wet state makes control easier, reducing the risk of inadvertent inhalation.

- **Friability** - Wet dispersion can provide more gentle dispersion for fragile particles. Particles can be fractured by the energy of a gas stream used with dry powders in an aerosol system.

- **Dispersion and Flow** - Liquid suspension provides a higher degree of dispersion, with an improved ability of flow motion for greater discrimination.

- **Aggregation** - Using dry techniques, cohesive and/or very fine particles (below 20 µm) can be difficult to disperse completely.

- **Industry Recommendations** - ISO-13320 recommends checking wet sample dispersion to validate dry dispersion.

Choice of liquid handling options accommodates sample needs – the standard unit includes a reservoir that is adjustable between 590 to 690 mL of dispersed sample. A low-volume option is adjustable between 100 to 120mL.

Superior data reduction and reporting available to meet 21 CFR Part 11 and ISO 13320 Standards – the Saturn DigiSizer II allows access to raw data. The scattering pattern can be presented in either a 2-D or 3-D display. For a quick assessment of the fit of theoretical models to experimental data, an overlay plot of measured data calculated from Mie theory can be obtained. Receive reports in graphical or tabular format.

Optional automated sample prep unit sonicates or stirs up to 18 samples unattended, prior to analysis. Increases repeatability and reproducibility as all samples are uniformly prepared.
**Low Volume Liquid Sample Handling Unit**
Optional accessory includes a reservoir that is adjustable between 100 to 120mL of dispersed sample. It can circulate particles from 0.04 to 750 \( \mu \)m in diameter. Very useful when sample quantity is limited, supply of dispersion liquid is limited, or if dispersion liquid is hazardous and disposal difficult.

**AquaPrep**
Highly-effective optional system for freeing water of dissolved gases. The removal of dissolved gases that subsequently lead to bubble formation is extremely desirable for obtaining the most accurate particle size data possible.

**MasterTech Autosampler**
Optional unit designed to increase throughput, repeatability and reproducibility. Up to 18 samples can be queued to run sequentially and unattended. Process includes automatic stirring, sonication, and transfer to the analysis system.

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**Specs**

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<tr>
<th><strong>Laser</strong></th>
<th><strong>Detector</strong></th>
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<tbody>
<tr>
<td>Type: Solid-state, Diode</td>
<td>Number of elements: 3,407,872</td>
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<tr>
<td>Wavelength: 658 nm</td>
<td>Alignment: Automatic, with no mechanical adjustment</td>
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<td>Power output: 6 to 9 mW</td>
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<tr>
<td>Beam type: Parallel</td>
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<tr>
<td>Beam width (in sample): 16 mm</td>
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<tr>
<td>Focal length, 200 mm (fixed)</td>
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<tr>
<th><strong>Electrical</strong></th>
<th><strong>Lens</strong></th>
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<tr>
<td>Voltage: 100/115/220/240 VAC</td>
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<tr>
<td>Frequency: 47 to 63 Hz</td>
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<tr>
<td>Power: 150 VA</td>
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<tr>
<td>Physical: Height: 50 cm (19.7 in.)</td>
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<tr>
<td>Width: 47 cm (18.5 in.)</td>
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</tr>
<tr>
<td>Depth: 65 cm (25.6 in.)</td>
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<tr>
<td>Weight: 45 kg (99 lbs)</td>
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