Microtrac S3500 SI

Laser Diffraction Particle Size and Image Analyzer

SL-PS-21 Rev. B

Two technologies - One instrument

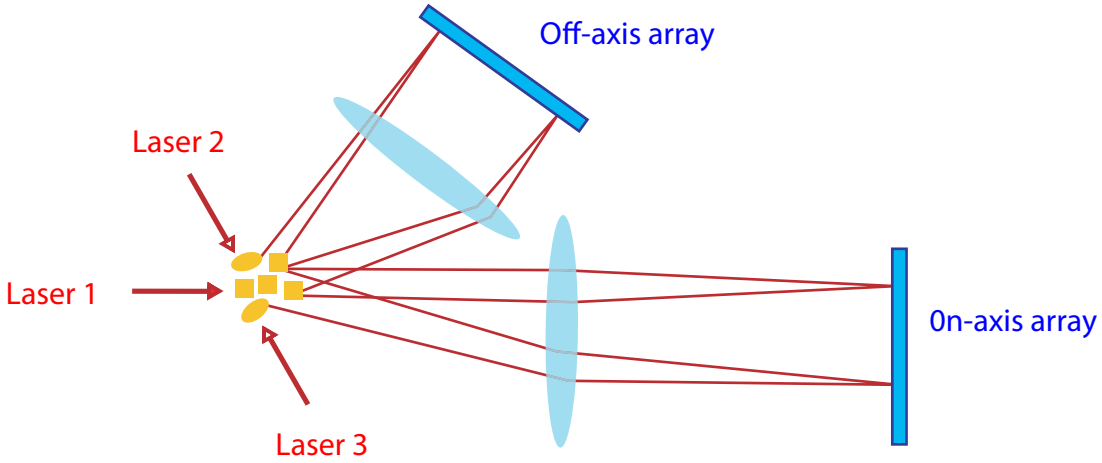
The **Microtrac S3500 SI** incorporates image analysis capability with the long established Microtrac laser diffraction technology. Users of the Microtrac S3500 tri-laser particle size analyzer now have the added advantage of being able to view the sample using state-of-the-art camera technology and imaging software. The sample is dispersed in the Microtrac Sample Delivery Controller (SDC) and circulated through both the image analyzer and the laser diffraction particle size analyzer. The measuring cells for both techniques are separate to ensure the user benefits from world class laser diffraction and image analysis technology

The main features of the Microtrac S3500 SI are

- **Resolution** - The patented Tri–laser, multi detector optical system for Laser Diffraction delivers unsurpassed resolution over the entire measuring range of the instrument. The Image Analyzer uses a 2456 x 2058 5M pixel full frame camera to ensure clear images at both high and low concentrations.
- **Range** - The Microtrac SI measures particles in the range of 0.02 to 2800 microns with Laser Diffraction and 0.75 to 2000 microns with Image Analysis.
- **Accuracy** - Microtrac S3500 SI utilizes full Mie compensation for spherical particles. It also applies proprietary Modified Mie calculations for non-spherical materials – the majority of real life materials.
- **Stability** - Optical bench design incorporating fixed detectors and lasers provides a rugged platform for consistently repeatable measurements. The enclosed optical path ensures protection of the optical components leading to little or no operator maintenance.
- **Flexibility** - The modular design permits selectable configurations based on application requirements. The S3500 SI system is easily up-graded to meet future requirements.
- **Automation** - Microtrac S3500 SI software allows programming, saving and recalling of Standard Operating Procedures (SOPs). This facilitates increased precision in sample preparation and operation through automated, multi sample accessories.

- **Microtrac TriLaser Diffraction PSA**
- **Microtrac High Resolution Image Analyzer**
- **Particle Size Distribution**
- **Shape Analysis**

Tri-Laser Technology



The TRI-LASER System developed by MICROTRAC allows light scattering measurements from the forward low angle region to almost the entire angular spectrum (approximately zero to 160 degrees). It does so by a combination of three lasers and two detector arrays, all in fixed positions. The primary laser (on-axis) produces scatter from nearly on-axis to about 60 degrees, detected by a forward array and a high-angle array, both of which have logarithmic spacing of the detector segments. The second laser (off-axis) is positioned to produce scatter beyond 60 degrees which is detected using the same detector arrays. The third laser (off-axis) is positioned to produce backscatter, again using the same detector arrays. This technique effectively multiplies the number of sensors that are available for detection of scattered light.

The main features of Microtrac S3500 SI software are:

Measurement Criteria: Particle and carrier optical properties such as refractive index and shape are easily programmed for different materials. Sample analysis time, sample ID and data presentation options are easily accessed through the SETUP/SOP icon.

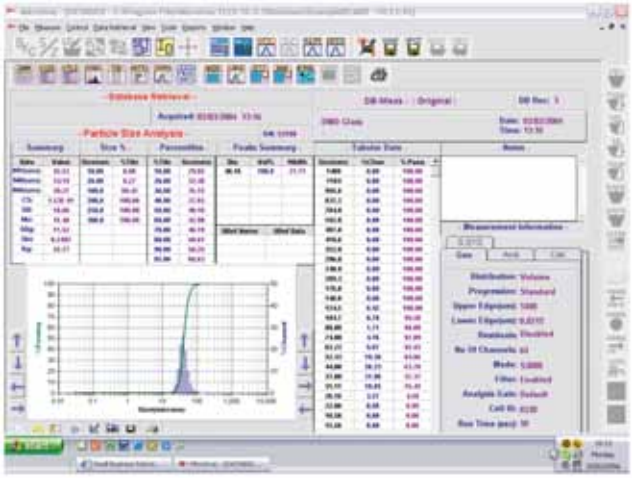
Automatic Measurements: Automated measurement sequences can be programmed in combination with a selection of sample delivery systems. Levels of automation can be selected by the user.

Standard Operating Procedures (SOPs): The software facilitates the programming, saving and recall of measurement setups in accordance with standard operating procedures.

Database Management: Measurements are saved in Microsoft Access Encrypted Database Format. Analyses are easily recalled through a comprehensive search function for either review or comparison.

Export functions: Data can be automatically or manually exported in either ASCII, excel or HTML formats. The user decides the export destination.

Data Tolerance: Pass/Fail function is available for quality control applications, providing process managers with the capability to set upper and lower size limitations for material specifications.

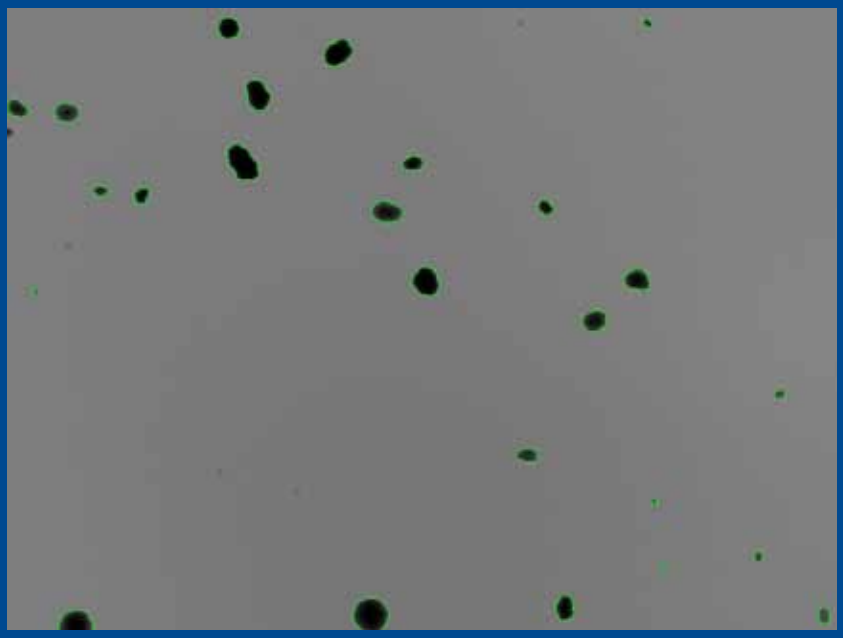


Statistical Analysis Package: Live display of analyses as they are performed providing statistical analysis on an ongoing basis.

Trending: Ability to trend individual size parameters over a specific time period or material type.

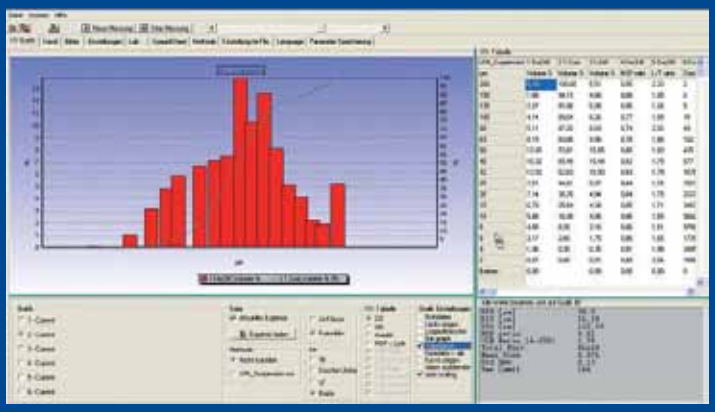
Report Generation: Microtrac software provides the user with the ability to design custom reports.

High Resolution Image Analysis



Sample is dispersed in the either a Sample Delivery Controller (SDC) or Ultra Small Volume Recirculator (USVR) for dispersion and flows through the Microtrac S3500 SI system. The recirculaor fluid dynamics deliver a homogeneous sample to the Microtrac S3500 SI Image Analysis sample cell. The sample cell is illuminated by a stroboscopic light and a 5-million pixel full-frame camera that records and stores the images. The images are processed by the Microtrac S3500 SI imaging software to provide the user with comprehensive information on particle shape and size.

Microtrac S3500 SI Image Analysis Software



The Microtrac S3500 SI software provides results on particle size by length, width, area, circumference and particle shape. The software also provides for the presentation of data on a wide range of shape properties like aspect ratio, ellipse ratio, compactness, roundness, circularity, concavity and convexity. The data can be exported in either ASCII, Excel or HTML formats. Users can select different report formats.

On passing from the Image Analysis sample cell, the sample moves to the Laser Diffraction sample cell. The flow path of the sample and the architecture of the sample cell ensures that both the Laser Diffraction and Image Analysis measurements use exactly the same sample concentrations and dispersions. There are no compromises on either measurement -

Two Technologies - One Instrument

Specifications

Meauring Range Laser Diffraction	0.02 to 2816 Microns
Basic Range:	0.688 to 995 um
High Range:	2.75 to 2816 um
Standard Range:	0.24 to 1408 um
Special Range:	0.086 to 1408 um
Extended Range:	0.021 to 2000 um
Enhanced Range:	0.021 to 2816 um
Measuring Range Image Analysis	0.75 to 2000 Microns

Detection Systems

Laser Diffraction: Two fixed photo-electric detectors with logarithmically spaced segments placed at correct angles for optimal scattered light detection. 0.02 to 163 degrees using 151 detector segments.
Image Analysis: 5M pixel camera, 2456 x 2058, 15 images per second.

Light Sources

Laser Diffraction: Up to three Laser Photodiodes, 780nm wavelength
Image Analysis: Stroboscopic LED

Typical Analysis Time	10 to 30 seconds. Laser Diffraction, 1 minute Image Analysis
Electrical	AC input: 90 – 132 VAC, 47 - 63 Hz, single phase 200 to 265 VAC, 47 – 63 Hz, single phase
Power Consumption	25 VA maximum
Environmental	Temperature: 10 to 35^0 C (50 to 95^0 F) Humidity: 90% RH, non-condensing maximum Pollution Degree 2
Physical Specications	Case Material Steel and impact resistant plastic Exterior Surfaces finished with corrosion resistant paint or plating
Dimensions	14H x 22W x 18D in (360H x 560W x 460D mm)
Weight	70 lbs (32 kg)

Your local Microtrac Representative is

WWW.MICROTRAC.COM