

## SYNC

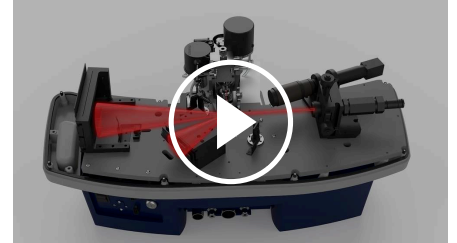
Combining Laser Diffraction with Dynamic Image Analysis

## A New Dimension in Particle Analysis

With the SYNC particle analyzer, Microtrac integrates its highly accurate tri-laser diffraction analyzer technology with its versatile dynamic image analysis capability to provide particle characterization practitioners with a unique measuring experience. The patented synchronous measurement technology allows users to make both a laser diffraction measurement and an image analysis measurement on a single sample, in the same sample cell at the same time:

- | One sample
- | One optical bench
- | One flow path
- | One sample cell
- | One analysis

The SYNC laser diffraction particle size analyzer is ideally suited for routine QC applications. It also provides valuable information to researchers as they develop new materials and processes. The powerful analyzer software provides both particle size distribution information as well as a multitude of morphological particle parameters. The patented BLEND routine allows users to examine materials over a wide range of sizes from 0.01 microns to 4000 microns.



[Click to view video](#)

### Product Video

## PARTICLE SIZE AND SHAPE ANALYZER SYNC

- | Particle size and shape analysis from 0.01 to 4000 microns using laser diffraction (ISO 13320:2020) and dynamic image analysis (ISO 13322-2)
- | Excellent sub-micron detection using blue laser technology. Ability to resolve narrow and multi-modal distributions in the sub-micron range
- | Detection of small amounts of oversized or undersized fractions in the particle size distribution
- | Patented synchronous measurement technology and BLEND distribution analysis. One measurement run in the analyzer yields particle size distribution and over 30 morphological parameters
- | Fast measurement time – typically 30 seconds
- | Fast and easy switch between wet and dry measurement modules. Change from wet to dry mode in less than 15 seconds
- | Full IQ / OQ validation package compliant with FDA 21 CFR Part 11 guidelines

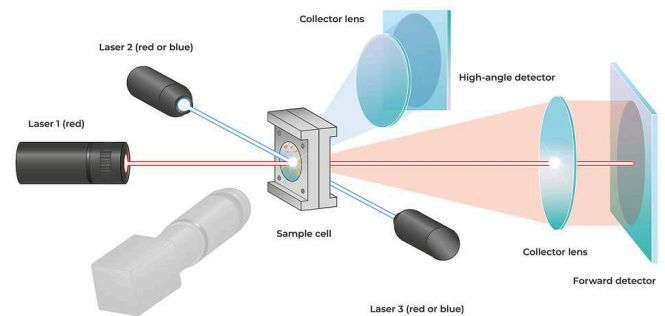


PARTICLE SIZE AND SHAPE ANALYZER SYNC

## LASER DIFFRACTION ANALYZER WITH THE PATENTED TRI-LASER SYSTEM

Particle size measurement by Laser Diffraction (LD) has become the most used technology in research and industry and is the de-facto standard for incoming and outgoing product quality control. During the measurement, the laser beam of the analyzer illuminates a well dispersed sample and the size distribution is calculated from the scattered light pattern. In Microtrac's laser diffraction analyzer technology, this scattered light is measured at various angles from 0 to 165 degrees. This is achieved by using two detector arrays and three lasers that illuminate the sample from different angles. The SYNC particle analyzer may be equipped with all red lasers or a combination of red and blue lasers.

Small particles scatter light at large angles while large ones scatter light at small angles. The scattered light intensity is collected continuously throughout the measurement. In Microtrac laser diffraction analyzers the evaluation is done using Microtrac's innovative modified Mie scattering theory. This algorithm produces accurate size distributions for both spherical and non-spherical particles as well as for both transparent and absorbing materials.

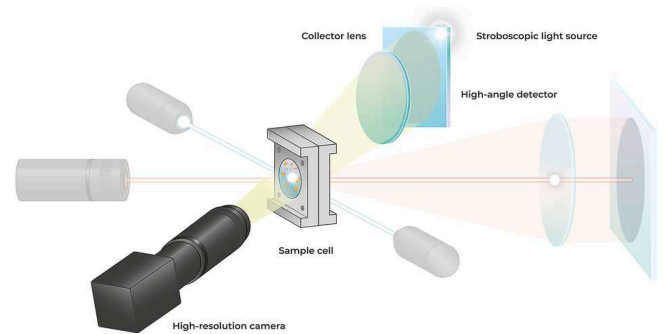


NEW OPPORTUNITIES

## INTEGRATED DYNAMIC IMAGE ANALYSIS

The characterization of particulate systems, once dominated strictly by size measurements, is evolving. Dynamic Image Analysis DIA, which determines important parameters related to particle morphology, provides detailed information regarding the physical properties of materials. These key properties and the resulting manufactured product can change drastically with no significant differences reported in the Laser Diffraction size distribution. Image analysis can rapidly identify problems and significantly reduce troubleshooting time. Particles in a flowing stream, backlit by a high-speed strobe light, are photographed by a high-resolution digital camera to create a video file of images for the flowing particles.

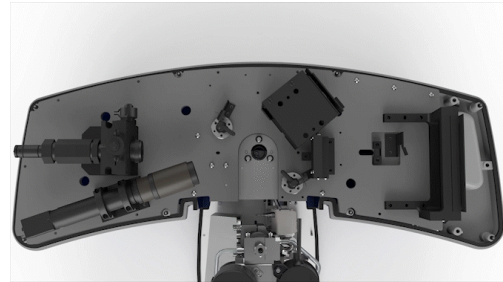
More than 30 size and shape parameters are acquired for every particle. Although the measurement technology of DIA is straightforward, the data analysis used to identify and solve problems is very powerful. The analyzer software includes filter functions to search, display, and evaluate particles with specific properties or a combination of properties. Data can also be presented in scatter plots, in which each data point represents a single particle image.



THE BEST OF TWO WORLDS

## COMBINING LASER DIFFRACTION WITH DYNAMIC IMAGE ANALYSIS

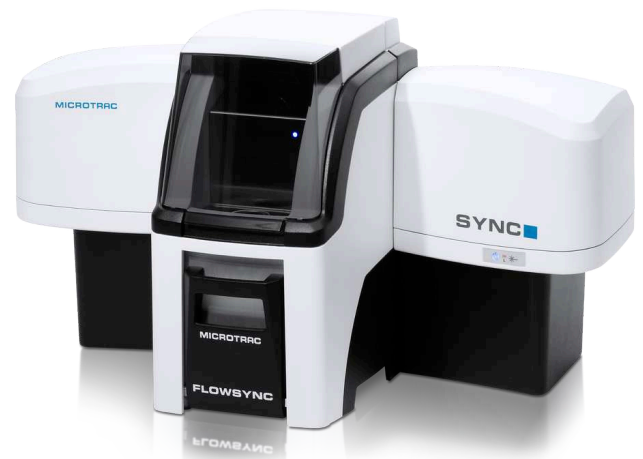
Microtrac's SYNC provides traditional users of laser diffraction analyzers with exciting new capabilities to characterize their materials. The proven Tri-Laser technology provides accurate and repeatable laser diffraction results from light collected over 165 degrees of angular scatter. When combined with state of art camera technology capturing images of the particle stream at the same time, the SYNC analyzer offers not only size data from its laser diffraction system but significantly more information about the shape of the materials and the quality of the dispersion. Material is either dispersed in a carrier fluid for wet measurements in the FLOWSYNC or dispersed in air for dry powder measurements in the TURBOSYNC.



As the sample stream passes through a single measurement cell in the optical module of the analyzer, it is interrogated by the lasers. The stream is simultaneously illuminated by stroboscopic LED to allow the high-speed camera to take images of the same material. This allows users the flexibility to determine particle size distributions from an ensemble sample dispersion as well as the ability to examine single as well as groups of particles from the hundreds of thousands of images captured by the camera. The user ultimately has the ability to look individually at a laser diffraction or an image analysis, or at a combination of both using the patented BLEND feature. This combination provides QC users of the analyzer the ability to qualify their data using two methodologies at the same time and provides R&D users with a powerful tool to characterize new materials.

## MAXIMUM PERFORMANCE BY DESIGN

- | Laser diffraction analyzer with the patented Tri-Laser design (red & blue lasers available)
- | Detector array covering 0 - 165 degrees
- | Stroboscopic light source and integrated camera for dynamic image analysis
- | Same bench & dispersion system for laser diffraction & image analysis
- | Wet and dry analysis, easy change
- | Small footprint



## PARTICLE SIZE AND SHAPE ANALYZER SYNC

### OPTIMUM SOLUTIONS FOR EVERY INDUSTRY

Versatility is a great strength of laser diffraction analyzers. This makes the method suitable for a variety of applications in both research and industry. Microtrac laser diffraction particle analyzers are characterized by especially convenient, easy-to-learn operation. Thanks to their robust design, the instruments are practically maintenance-free and fit for 24/7 operation.

The high sample throughput and the extremely wide measurement range from nanometers to millimeters are the reasons for the method's popularity in so many laboratories. However, drawbacks of laser diffraction analyzers are poor resolution for large particles, limited sensitivity for oversize and the inability to measure particle shape. These downsides of laser diffraction, however are the strengths of image analysis. Thanks to the unique combination of both techniques, the SYNC particle analyzer provides information which is not available from laser diffraction alone and improves the overall accuracy of size measurement.



*pigments*



*capsules*



*metal powder*

- | paints / pigments
- | ceramics
- | chemicals
- | industrial minerals
- | metal powders
- | construction materials
- | cosmetics

- | pharmaceuticals
- | glass / glass beads
- | coatings
- | food
- | 3D printing
- | foodstuffs

- | emulsions
  - | polymers
  - | battery materials
- ... and many more!

To find the best solution for your particle characterization needs, visit our application database

CONNECTIVITY & MODULARITY

**CHANGE BETWEEN DRY & WET MODULES**

No other particle analyzer allows more rapid change from wet to dry and vice versa.

The modules can be removed from the analyzer with a single movement and reinstalled just as easily. All necessary cables and hoses are permanently connected to the back of the analyzer. This means that no changes to the measuring instrument or modules are required during the actual changeover.

Removal of measuring cells or tedious plugging and un-plugging of mechanical and electrical connections is no longer necessary. This makes the process a real plug-and-play operation.



PARTICLE SIZE AND SHAPE ANALYZER SYNC

**VERSIONS & ACCESSORIES**

**FLOWSYNC & FLOWSYNC MINI**

SAMPLE DISPERSION UNIT FOR WET MEASUREMENTS

The FLOWSYNC models' automated filling, de-aerating, pre-circulating and circulating operation means that each sample is handled with a consistency that improves the repeatability of particle size distribution and imaging data. The FLOWSYNC has a volume of 200 ml and the FLOWSYNC MINI a volume 40 ml.

**Consistency:** Only the FLOWSYNC has an in-line ultrasonic probe with variable power. It disperses agglomerated materials to ensure consistent sample dispersion during measurements.

**Versatility:** Users can program, save and recall unlimited SOP routines for fill, disperse, measure, rinse and run commands.

**Connectivity:** An integrated fill pump allows the user to connect any water or solvent source. The recirculator fills, de-aerates and dilutes automatically.

**Auto-Dispersion:** The fluid dynamics of the FLOWSYNC / FLOWSYNC MINI feature a built-in turbulence to ensure that all particles are moving constantly within the system, negating the need for an external stirrer.

**Resistiveness:** The FLOWSYNC / FLOWSYNC MINI can be operated with a wide variety of carrier fluids. In addition to water and alcohol, this includes organic solvents like hexane or toluene.

**Self-Cleaning:** The washing feature ensures that the walls of the sample vessel are thoroughly cleaned during the rinse cycle. This eliminates cross contamination from one sample to the next.



## **SMALL VOLUME CELL FOR USE WITH FLOWSYNC**

# ANALYZE PRECIOUS OR LIMITED SAMPLES WITH CONFIDENCE

The Microtrac Small Volume Cell (SVC) is engineered for use with the SYNC Particle Size Analyser Series, offering a reliable solution for valuable, limited, or hazardous samples. The SVC allows precise analysis with sample volumes as small as 8 mL – perfect for applications where material or suspending fluid is scarce, costly, or toxic.

- | **Minimal Sample Requirement:** Handles small aliquots - ideal for high-value or limited-quantity materials (8 mL)
- | **Enhanced Safety:** Compatible with toxic or expensive suspending fluids.
- | **Efficient Dispersion:** Built-in stirrer keeps samples in suspension for accurate measurement.
- | **Wide Particle Size Range:** 0.01 to 500 microns (density dependent).
- | **Robust Construction:** Stainless steel, quartz glass, and Teflon – compatible with most organic and inorganic solvents.
- | **Easy integration:** Replaces standard wet cell in FLOWSYNC or FLOWSYNC MINI.
- | **Smart Identification:** Integrated SmartCell ID chip for seamless operation.



## TURBOSYNC

## DISPERSION MODULE FOR DRY MEASUREMENTS

The TURBOSYNC delivers a properly dispersed sample to the measuring cell of the analyzer, allowing for consistent and repeatable analyses. A moving sample tray introduces the powder into the measurement system.

**Flexibility:** Compressed air and flow condition settings up to 50 psi (345 kPa) allow the operator to achieve optimal dispersion, even for highly agglomerated materials. Dispersion conditions can be fine-tuned for measurement of even the most fragile materials.

**Small sample volumes:** Volumes can be as small 0.1 cm<sup>3</sup>. This is ideal for applications where the material is expensive or produced in small volumes.

**Large sample volumes:** The removable tray can hold larger quantities of powder. If required, multiple trays can be processed and combined into one measurement record.

**Automatic sampling:** The Microtrac FLEX software facilitates the automation of measurement cycles. Simply place the sample in the tray and press RUN. All data is saved on the system PC or can be exported to user networks.

**Rapid Measurements:** Measurement time is usually 10 - 40 seconds, depending on the properties of the material.

**Repeatability:** Consistent control of aspiration settings deliver excellent sample-to-sample and instrument-to-instrument repeatability.

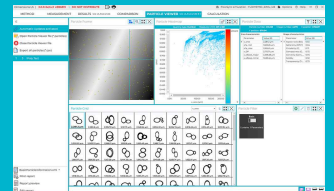
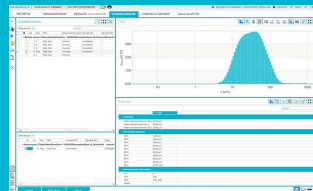
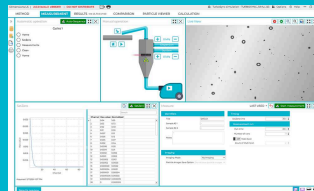
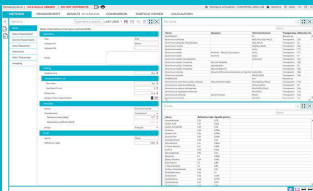
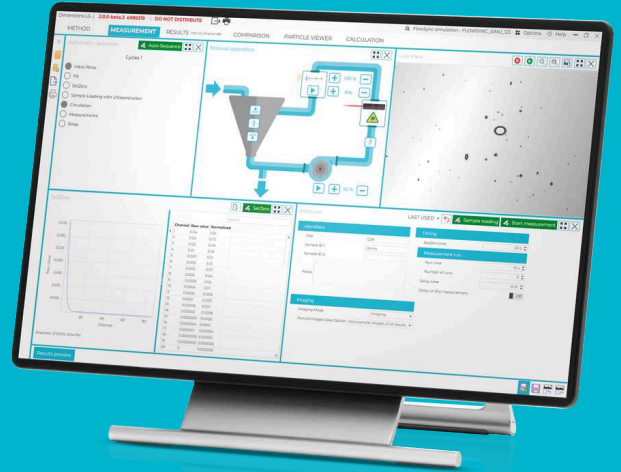


INTUITIVE USE WITH JUST A FEW CLICKS

## DIMENSIONS LS FOR SYNC

The DIMENSIONS LS software comprises six clearly structured Workspaces for method development, operation of the SYNC instrument, result presentation and evaluation of several analyses. The Workspaces for result evaluation remain accessible during analysis.

- | Simple method development
- | Clearly structured result presentation
- | Various evaluation options
- | Intuitive workflow
- | Simple data export
- | Multi-user capability



### PARTICLE SIZE AND SHAPE ANALYZER SYNC

## TECHNICAL DATA

**Measuring range**

0.01  $\mu\text{m}$  - 4 mm

**Measuring principle**

Laser Diffraction (ISO 13320)  
Dynamic Image Analysis (ISO 13322-2)

**Precision\***

Spherical glass beads D50 = 642 microns, precision as CV = 0.7%  
Spherical glass beads D50 = 57 microns, precision as CV = 1.0%  
Spherical latex beads D50 = 0.4 microns, precision as CV = 0.6%

<b>Laser class</b>	Red 780 nm, blue 405 nm Class 1 laser product per CFR 1040.10 & IEC60825-1
<b>Laser power</b>	Red laser 0.35 to 2 mW nominal Blue laser 4-8 mW nominal
<b>Detection system</b>	Two fixed photo-electric detectors with logarithmically spaced segments are placed at correct angles for optimal scattered light detection from 0 to 165 degrees using 151 detector segments.
<b>Data</b>	Volume, number and area distributions as well as percentile and other summary data
<b>Data format</b>	Stored in ODBC format in encrypted Microsoft Access Databases to ensure compatibility with external statistical software applications.
<b>Data integrity</b>	Data integrity may be ensured using FDA 21 CFR Part 11 compliant security features including password protection, electronic signatures and assignable permissions
<b>Type of analysis</b>	dry and wet analysis
<b>Measuring time</b>	~ 10 to 30 seconds
<b>Power requirements</b>	AC input: 90 - 264 VAC, 47 - 63 Hz, single phase
<b>Power consumption</b>	25 W nominal, 50 W max., depending on options installed
<b>Environmental conditions</b>	Temperature: 5° to 40° Celsius (50° to 95° Fahrenheit) Humidity: 90% RH, non-condensing maximum Storage Temperature: -10° to 50° Celsius (14° to 122° Fahrenheit) (dry only) Pollution: Degree 2
<b>Standards</b>	Laser Diffraction (ISO 13320) Dynamic Image Analysis (ISO 13322-2) Representation of results of particle size analysis (ISO 9276-6)
<b>Image analysis</b>	5.2 megapixel (2560 x 2048), 60 fps at max resolution
<b>Wet operation</b>	Volume: 200 ml nominal Flow rate: 0 to 65 ml/sec with water Inlet pressure: 50 psig (345 kPa) maximum
<b>Dry operation</b>	100 psi (689 kPa) maximum pressure 5 CFM (8.5 m3/h) at 50 psi (345 kPa) minimum flow rate Free of dry contaminants, moisture and oil
<b>Vacuum</b>	Vacuum must meet or exceed 50 CFM (85 m3/h)

## Physical specifications

Case Material: Impact resistant plastic  
Exterior surfaces are finished with corrosion resistant paint or plating  
Chemical Compatibility: Class I

## Dimensions (W x H x D)

~ 820 x 460 x 500 mm (32.3 x 18.1 x 19.7 in)

## Weight (Measuring unit)

FlowSync: 19.5kg (43lbs)  
TurboSync: 13.6kg (30lbs)  
Sync: 23.6kg (50.8lbs)

\*Depending on sample material and sample preparation



[Click to view video](#)

[www.microtrac.com/sync](http://www.microtrac.com/sync)