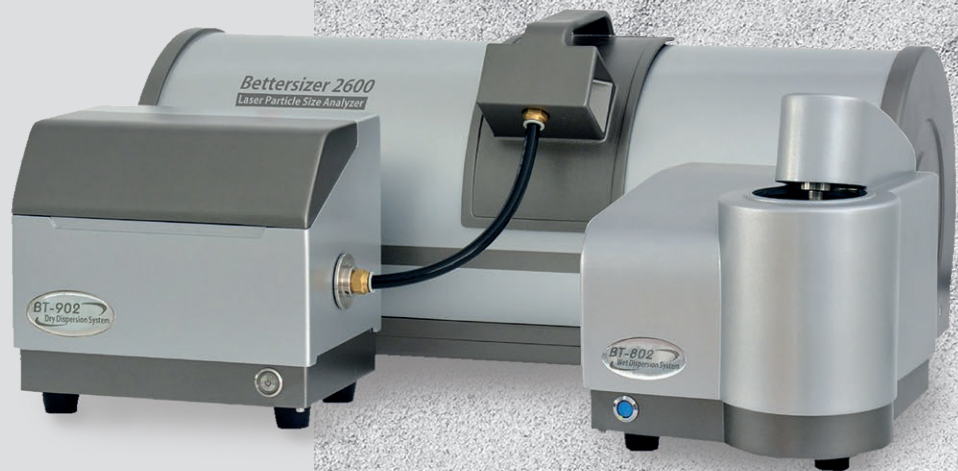


Bettersizer 2600

- Measuring range: 0.02 - 2,600 μm
- Exact measurement of large and small particles due to new, patented combined Fourier and reverse Fourier setup
- Small volume dry module for low sample quantities
- Easy switching between dispersion units
- Perfect price-performance ratio



Particle size

by means of laser diffraction
wet and dry dispersion

Bettersizer 2600 Overview

Bettersizer 2600 - precise particle size measurements using static light scattering

The Bettersizer 2600 is an up-to-date particle size analyzer which uses the principle of static light scattering and operates according to ISO 13320.

The smart combination of two traditional setups - Fourier and reverse Fourier setup - allows the precise measurement of fine and coarse particles, even with broad particle size distributions.

For dispersing, the wet and dry moduls for regular and small volumes can either be used separately or in combination. The well-engineered, flexible design allows a change of the modules in few seconds.



Figure 1 Bettersizer 2600 with dry measurement cell (left) and wet measurement cell (right)

Key Benefits

- Unique combination of Fourier and reverse Fourier setup
- Dispersion: wet and/or dry
- Measurement range: wet: 0.02 - 2,600 μm^* ; dry: 0.10 - 2,600 μm^*
- Broad scattering angle range (0.016° - 165°) with high detector density (92 pcs.)
- Simple operation and data management for quality control
- Ideal price-performance ratio

* The measuring range depends on the sample.

Measurement principle and technology

Combined Fourier and reverse Fourier setup

The Bettersizer 2600 features a unique and innovative setup of the innovative optical bench: the light, focused through the lens into the detector plane, is scattered by the particles and detected in forward and lateral direction (reverse Fourier setup). Compared to common laser diffraction setups, the backscattered light falls back through the lens and is collimated (Fourier setup). Beyond that, the measurement cell is arranged in a 35° angle to the incident laser beam.

This smart setup allows on one hand the detection of scattered light in a broad range of angles of 0.016 - 165°. On the other hand, the particles do not have to be in one plane compared to a sole reverse Fourier setup. Thus, the exact and simultaneous measurement of fine and coarse particles is very easy.

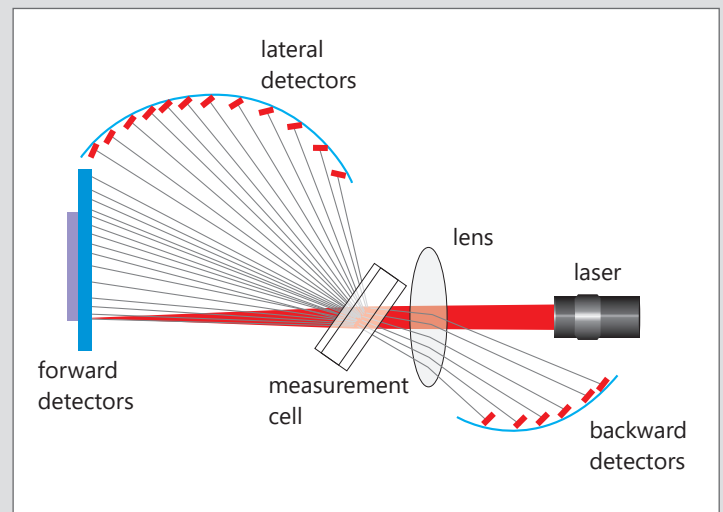


Figure 2 Schematic design of the optical bench

Bettersizer 2600 Dispersion

Wet dispersion

For a wet measurement, the particles are dispersed in a liquid medium. The sample is placed in the bath of the dispersion module and, if necessary, additionally dispersed with the aid of the integrated ultrasound. Various external modules are available.

BT-802 – fully automated standard dispersion module with integrated ultrasound and centrifugal pump for sample delivery and a bath volume of 600 ml; suitable for sufficient sample volumes, and materials that are dispersible in water or alcohols.

BT-80N – special dispersion unit for small volumes (80 ml), suitable for polar and non-polar solvents; equipped with regulatable ultrasound (up to 50 W, adjustable amplitude).

Small Volume Wet Dispersion Module – module for very small volumes (up to 8 ml), equipped with stirrer.



Figure 3 Bettersizer 2600 with plug-in wet measurement cell BT-802



Figure 4 Easy change of the dispersion unit

Dry dispersion

If no suitable liquid dispersing medium can be found for measuring dry powders or granulates or if for other reasons a dry measurement is desirable, the dry dispersion units of the Bettersizer 2600 offer the possibility of the dispersion in air. During this kind of sample preparation, the sample is pre-dispersed via a vibrational feeding tray, falls into a shaft, and is transported through a closed horizontal measurement cell via pressurized air (Venturi nozzle). Dispersion ensues by collision of the particles with the walls and among each other as well as by shearing.

Switching between dispersion modules requires just a flick of the wrist. Also for dry dispersion, different external modules can be selected.

BT-902 – the automated standard dry module with convenient feeding tray and adjustable feeding rate and pressurized air nozzles; air flow can be adjusted for dispersion (up to max. 5 bar); suitable for all conveyable powders and granulated materials.

BT-903 – an automated dry module for small powder quantities; ideal for powders in research area or for pharmaceutical applications.



Figure 5 Bettersizer 2600 with plug-in dry measurement cell BT-902



Figure 6 BT-902 open with dry feeding system



Figure 7 Easy change of the dispersion unit

Bettersizer 2600 Software

Intuitive and powerful software

- Simple operation with clear user interface
- Real-time mode for the determination of the optimal measurement conditions
- Working with Standard Operation Procedure (SOP)
- Fully automatic measurement routine with automatic centering of the detector set
- Automatic data backup and editable reports
- Evaluation according to Fraunhofer and Mie with direct conversion option
- Automatic cleaning routine
- Switching from wet to dry dispersion with one click
- Superposition function with statistical evaluation
- Assessment of the fit quality for result verification (Mie analysis)
- Concentration-based refractive index determination

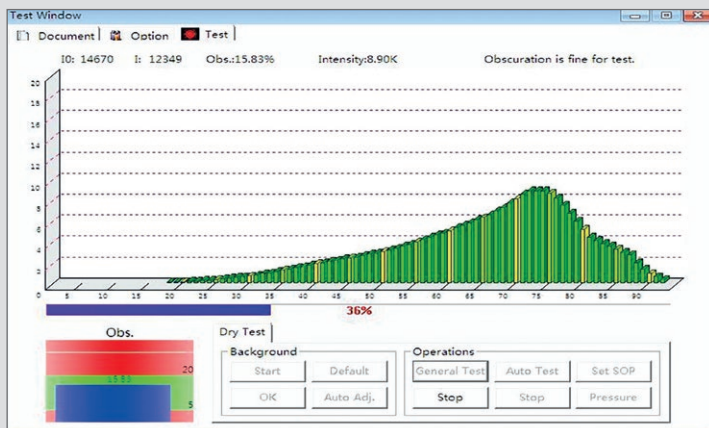


Figure 8 Real-time scattered light signals and obscuration value display during measurement

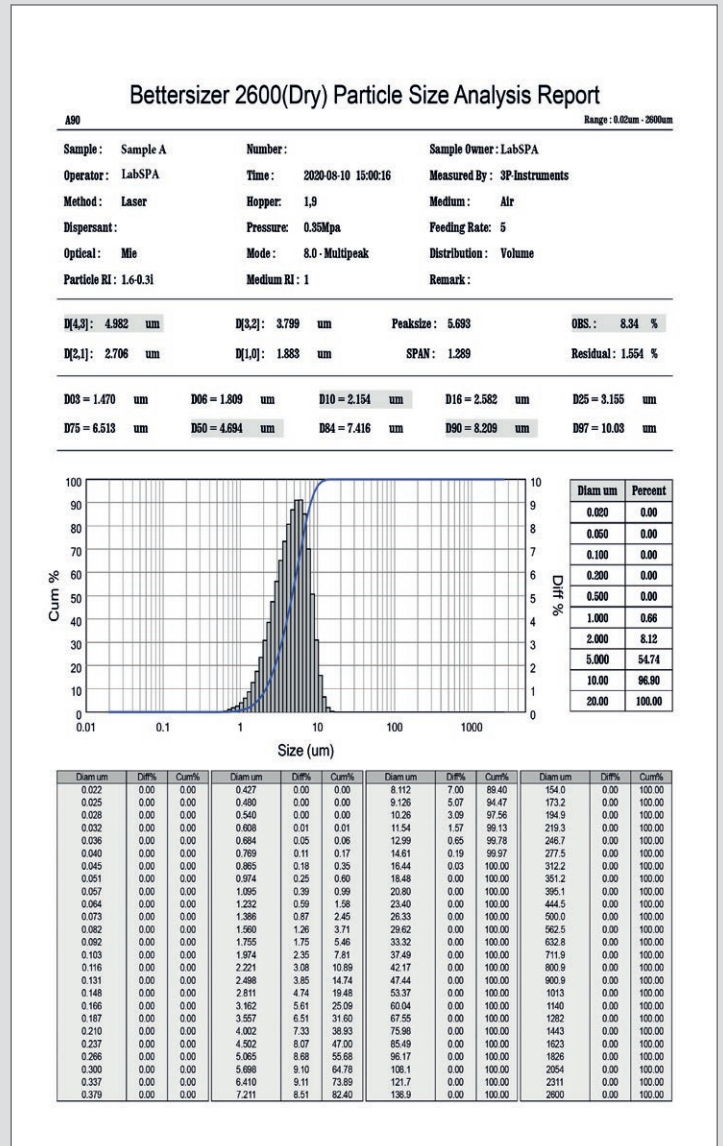


Figure 9 Automatically generated report for the evaluation of a measurement

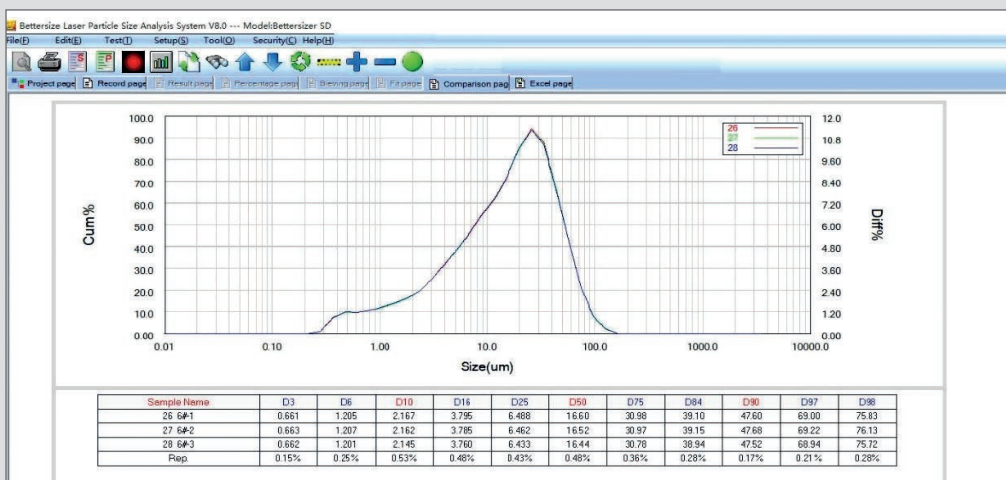


Figure 10 Overlay plot of particle size distributions of different measurements and characteristic D-values in the software

Advanced User Level Concept - Compliant with FDA 21 CFR Part 11

The rights of the users can be configured on the basis of a selection of defaults (Senior, Intermediate, Common) and can also be changed individually. This prevents unauthorized data manipulation and ensures compliance with 21 CFR Part 11.

Login Name	User	Remarks
Admin	Admin	
Guest	Guest	
User 1	User 1	
User 2	User 2	
User 3	User 3	

Group	Remarks
Advanced	
Intermediate	
Beginner	
Viewer	

Figure 11 Overview of the different users and user groups

Group Name:	Advanced	OK						
Remarks:		Cancel						
List:	<table border="1"> <thead> <tr> <th>Login Name</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>User 1</td> <td></td> </tr> <tr> <td>User 3</td> <td></td> </tr> </tbody> </table>	Login Name	Remarks	User 1		User 3		Add Delete
Login Name	Remarks							
User 1								
User 3								
Authority:	<input checked="" type="checkbox"/> SOP Database <input checked="" type="checkbox"/> PMT Database <input checked="" type="checkbox"/> RI <input checked="" type="checkbox"/> Particle Size Test (Manual) <input checked="" type="checkbox"/> Particle Size Test (SOP) <input checked="" type="checkbox"/> Particle Size Test (Auto-Sampler) <input checked="" type="checkbox"/> Refractive Index Measurement <input checked="" type="checkbox"/> Performance Qualification <input checked="" type="checkbox"/> Print the result <input checked="" type="checkbox"/> Export the result <input checked="" type="checkbox"/> Particle Size Classification	Senior Intermediate Common Tick Untick						

Figure 12 Assignment of rights to individual users

Use of Standard Operational Procedures (SOP)

Using an SOP saves time and standardizes test conditions, minimizes errors caused by different users, and improves the reproducibility of test results.

Before using an SOP, the measurement conditions such as the duration of ultrasonic dispersion, the stirring speed, the background measurement and the storage of the results can be specified.

Figure 13 Dropdown selection of the correct SOP before measurement

Figure 14 Menu for setting the measurement conditions such as optical and test parameters

Figure 15 Menu for defining the dispersion settings

Bettersizer 2600 Accessories

Autosampler BT-A60



The autosampler doses fully automatically up to 60 samples no matter if they are dry powders or pre-dispersed liquid dispersions. The included barcode printer ensures that the results are recorded for the corresponding sample. The sampler is cleaned by ultrasound to avoid contamination.

- Sampling volume: 0.5 – 5 ml
- Capacity sample vial: 10 ml

Video:



Detached small volume dry dispersing unit BT-903



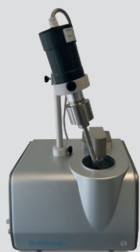
With this unit, small sample volumes can be dosed quickly and reliably.

- Particle size range: 0.1 – 2,600 μm
- Incl. air compressor and industrial vacuum cleaner

Video:



Additional external ultrasound



By means of this external, controllable ultrasound option, the measurement of difficult-to-disperse and reagglomerating systems is made possible.

- Additional ultrasound unit for BT-802/BT-803
- Adjustable up to 200 W

Solvent-resistant small volume dispersing unit BT-80N



The BT-80N external small volume dispersion unit is ideally suited for reproducible particle size measurement in polar and non-polar solvents. Due to the small volume of liquid, the consumption of solvent is low. The effective and controllable ultrasonication allows the measurement of difficult to disperse and reagglomerating systems.

- Sample volume: approx. 80 ml
- Stainless steel stirrer vessel with centrifugal pump and quick-lock mechanism
- Ultrasound: infinitely variable power up to 50 W
- Variable pump or stirring speed
- Display for function monitoring (stirring speed and ultrasonic strength)
- Suitable for aqueous, polar and non-polar solvents

Small Volume Wet Dispersion Module



This unit is designed for valuable or small-volume sample measurements in solvents or water. The module consists of an ABS shell, stirring motor, cuvette (8 ml), stirrer, etc.

- Maximum volume: 8 ml, sample mass: 0.005 - 0.1 g
- Suitable for samples dispersed in water or organic phase

Automatic Recycling Unit A.R.U.



With the online dispersant recycling A.R.U., you can easily and quickly reduce solvent consumption, e.g. of isopropanol.

- 2 x 20 l stainless steel pressure vessel
- Mounted on a stainless-steel frame

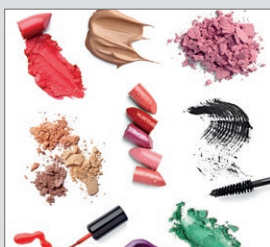
Bettersizer 2600 Specifications & Applications

Specifications	
Measurement principle	static light scattering combined Fourier- and reverse Fourier optic
Analysis	Fraunhofer or Mie
Applications	suspensions, emulsions, dry powders
Size range	wet: 0.02 - 2,600 μm ; dry: 0.1 - 2,600 μm (sample dependent)
Number of size classes	> 100
Time of measurement	< 1 min
Accuracy / Repeatability	wet: < 0.5 % / < 0.5 %; dry: < 1.0 % / < 1.0 %
Feeding / Dispersion / Volume (Standard unit)	wet: centrifugal pump / ultrasonic bath (50 W) / 600 ml dry: venturi-system, 0 - 5 bar
Number of laser / -type / -wavelength / -powder / -class	1 / fibre-laser / 635 nm (red) / 3 mW / class 1
Detector system	Log-space arrangement, 92 (forward, sideward and backward)
Effective focal length	223 mm
Detector channels, -angle range	92 (forward, sideward and backward), 0.016 - 165°
Conformity	21 CFR Part 11, ISO 13320, CE
Data export	Excel, PDF, Word, JPG and more
Dimension (L x D x H) / weight	705 x 318 x 295 mm / 23 kg
Recommended computer specification	Windows 7 or higher, Intel Core i5, 4 GB RAM, USB 2.0

Applications



Building materials



Personal care and cosmetics



Soils and sediments



Glass and ceramics



Carbon and oil



Food and beverages



Paints and inks



Pharmaceuticals



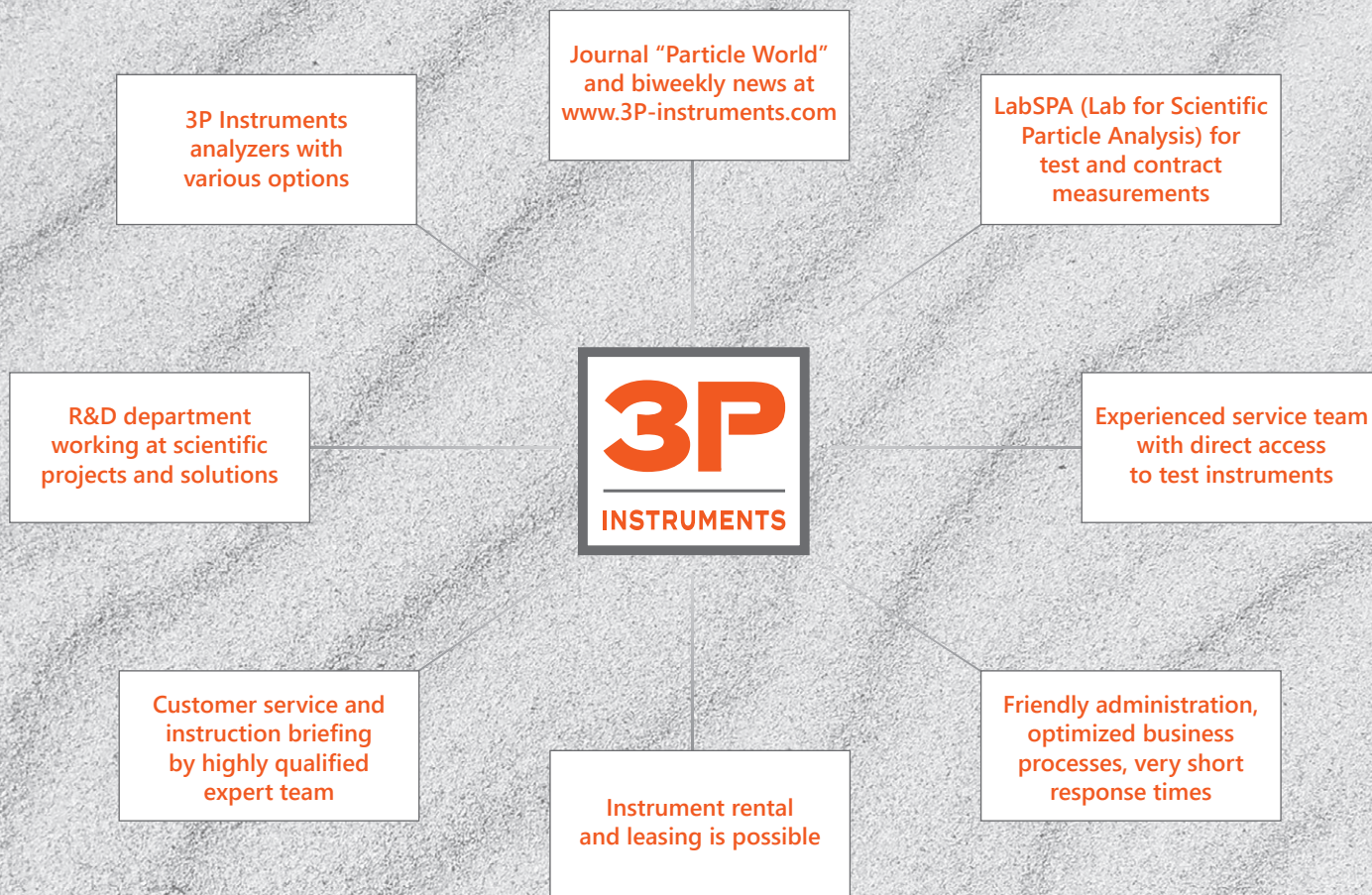
Polymers and metals



Electronics

Your partner in particle characterization

3P Instruments has over 30 years of profound expertise in the characterization of emulsions and dispersions, of particles and powders as well as surfaces and pores.



We are happy to provide further information on the other particle sizers of the Bettersizer series.



Bettersizer S3 Series



Bettersizer ST



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