SIZER 3201 Plus

Particle Size Analyzer

Brief introduction of (Dry):

Sizer-3201 plus(Dry) particle size analyzer is a high performance particle size distribution analyzer. Dry dispersing systemadopts Venturi dispersing effect by measures fo shear, inertia, collision, etc, to ensure that the powders are in complete dispersing state when pass through testing zone. Even for the sample which is difficult to disperse such as NdFeb powder, it can be dispersed completely made by large scale integrated circuid technique which is specially designed, and it hashigh resolution and good accuracy; adopts whole process Mie theory and data processing mode of multiple distribution models; adopts a series of advanced technologies and manufacturing techniques including high precision data transmission and processing circuit etc., to make the instrument has outstanding features including accuracy and reliability, fast test speed, good repeatability, easy operating, etc. It is a new generation of particle size test instrument which integrates laser technology, computer technology and photoelectron technology

Main Specification of 3201 plus(Dry)

No	Item	Specification	No	Item	Specification
1	Measuring range	0.1-1000µm	6	Sample Feeding Method	Auto Electromagnetic Vibration
2	Repeatability Error	<3% (standard sample D50)	7	Gas Pressure	0.0-0.8Mpa
3	Accuracy Error	<3% (standard sample D50)	8	Gas Flowrate	400-6000L/min
4	Resolution	Single peak, Double-peak, Multi-peak	9	Laser and Life Time	Semiconductor Laser, 25000 hours
5	Focus Mode	Auto-Alignment	10	Detector and Number	Forward and Backward, 84 PCS

Main application fields of Sizer-3201plus

(1) Water-soluble samples: Such as medicine including raw material drug, Wastern medicine, traditional medicine, carrier of powder medicine, etc.

(2) Samples which physical and chemical changes will occur under the influence of water: Such as cement, starch, coffee, salt, alkali, flavouring, chemical products, etc.

(3) Samples which are hardly dispersed by wet dispersing: Such NdFeB powder, soft magnetic powder, permanect magnetic powder

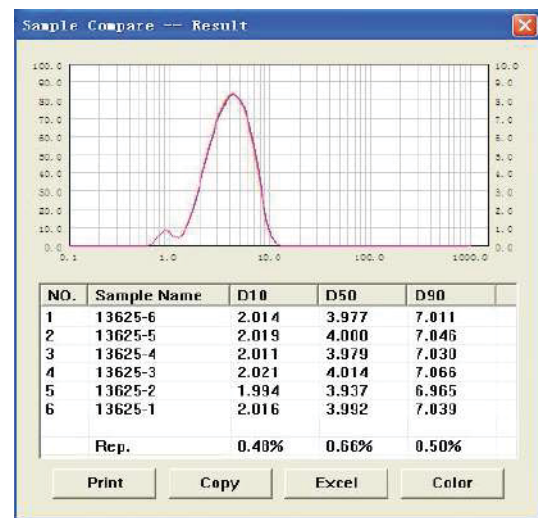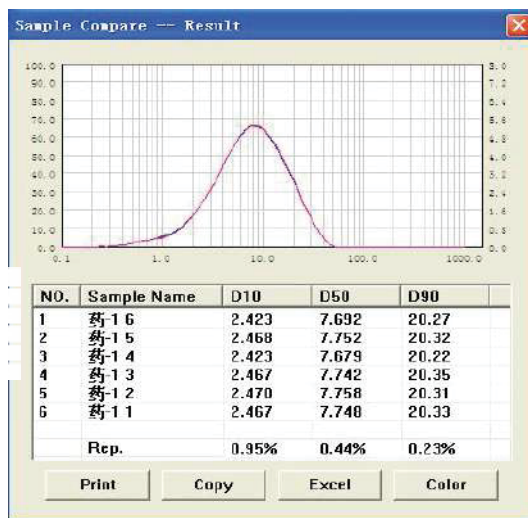(4) Others: Other samples which are not suit for dispersing by liquid.

Good repeatability:

(1) reasons for good repeatability: a) Laser, detector and signal trasmission system are stable and reliable. b) Stable and effective dispersing system. c) Automatic alignment system keeps the instrument always in optimum condition. d) Sampling rate can reach 3500 times/second, and mass data can effectively reduce the influence of repeatability caused by little abnormal data.

(2) Repetability verification example: a) Repeatability of continuous test for same sample

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Kindly reminder: About Repetability
Repeatability is primary index of particle size analyzer. It is worthless for particle size analyzer if repeatability is not good. Repeatability is related to the instrument, also, related to the operator, voltage, water quality and interference. It is a reflecting of integrated factors.

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b) Repeatability of re-sampling teas

NO.	Sample Name	D10	D50	D90
1	药-1 6	2.423	7.692	20.27
2	药-1 5	2.468	7.752	20.32
3	药-1 4	2.423	7.679	20.22
4	药-1 3	2.467	7.742	20.35
5	药-1 2	2.470	7.758	20.31
6	药-1 1	2.467	7.748	20.33
	Rep.	0.95%	0.44%	0.23%

NO.	Sample Name	D10	D50	D90
1	13625-6	2.014	3.977	7.011
2	13625-5	2.019	4.000	7.046
3	13625-4	2.011	3.979	7.030
4	13625-3	2.021	4.014	7.066
5	13625-2	1.994	3.937	6.965
6	13625-1	2.016	3.992	7.039
	Rep.	0.40%	0.66%	0.50%

Good accuracy:

(1) Reasons for good accuracy: a) Adopts semi-conductor laser of stable output, good monochromaticity and high efficiency which improves the precision of measurement greatly. b) the number of photodetectors reach 84 pcs, plus high performance software, can carry out auto test accurately no matter it is single peak, double-peak sample. c) Complete sample preparation system includes circulation, ultrasonic dispersing, stirring, auto water supply, etc. d) Use standerd sample to verify and result is identical with value.

(2) Examples for multiple verifications of accurecy a) Accuracy which approved by national Accreditation:Satisfied.

Letter of Notice for Ability Verification Plan Results					
Test Item	Sample	Lab Result (μ m)	Designated Value (μ m)	Deviation Percentage (%)	Result Evaluation
Main Diameter D_{Mean}	2017FT-A1	13.55	14.06	-3.6	Satisfied
	2017FT-A2	12.26	12.55	-2.3	Satisfied
Median Diameter D_{50}	2017FT-A1	13.49	14.04	-4.1	Satisfied
	2017FT-A2	12.27	12.54	-2.2	Satisfied
Note: if absolute value of deviation percentage is less than or equal to 10%, it is satisfied result: if absolute value is more than 10%, it is unsatisfied result.					

b) Compare with test results of overseas advanced laser Partical size analyzer: Good consistency.

MedicineA	D10	D50	D90
Malvern	1.318	7.202	17.810
Sizer	1.342	7.146	18.570

Lactose	D10	D50	D90
Malvern	39.890	60.499	91.083
Sizer	38.880	62.480	90.140
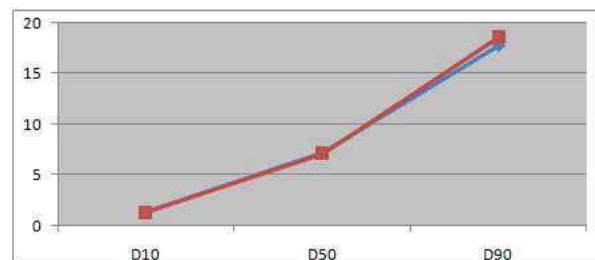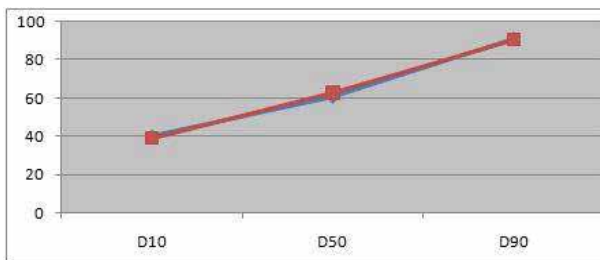
c) Use Sizer standerd sample to verify accuracy and test value is indentical with standerd value.
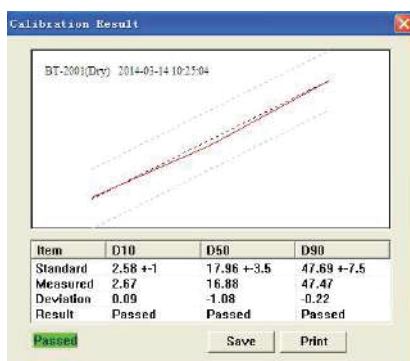
Good quality, easy operation and liability exemption service:

(1) Reasons for low failure rate: a) Use international stansard materials and famous brand or imported components such as imported optical fiber semiconductor laser, imported Fourier lens, integrated circuid that can be traced. Have continuous 48-hour aging test before leaving the factory. c) Use advanced technologies to guarantee the quality such as anti-dry ultrasonic, auto alignment, dew-point temperature detecting and abrasive tools, etc d) passed CE, FDA 21 CFR Part 11 and ISO9001-2008 Certification.

(2) Easy operation: Auto test, auto alignment, continuous testing, conversion of report format, etc. It will take only ten minutes to learn and the result will not be affected because of different operators. Auto alignment system can ensure that light path always in optimum condition which nakes the test more accurate.
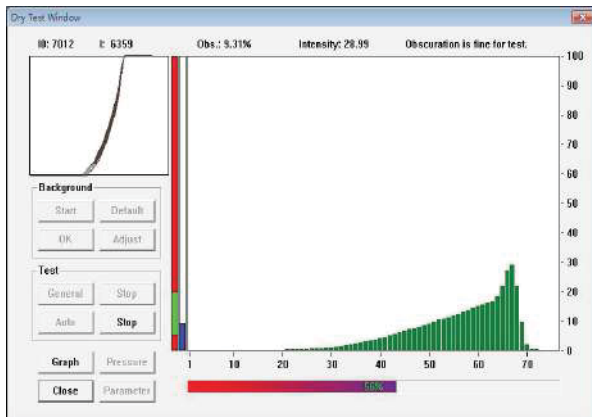
(3) Commitments for free liability exemption service: Free liability exemption warranty one year. Within, arrival in 24 hours, door-to door service, visit at fixed period, regular call back service from 30 professional after-sales service engineers and supply spare parth at cost price in the long term.

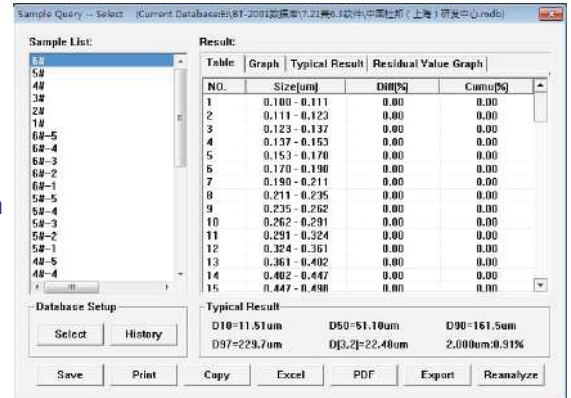## Unique technology and reliable quality
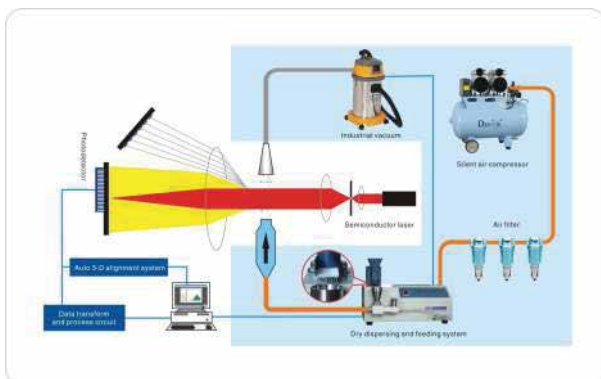
(1) Unique dry dispersing technolohy: It adopts dry dispersing system which is uniquely designed the measures of shear inertia, collision etc. to ensure that the powders are in completely dispersing state when pass test window. It adopts oil free and silent air compressor with high efficient water filter to huarantee that pure compressed air is produced. Meanwhile, it has the advantages of low noise, auto start, auto stop, long running time, etc.

Collision

Collision
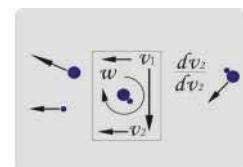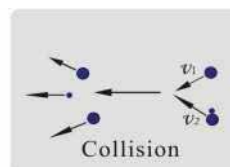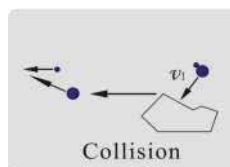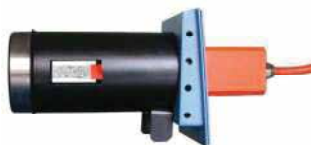
(2) Auto alignment technology: Auto alignment individually invented by Analytical is composed od stepping motor, precise guide rail, subdivision controller and software system. Its function is to let the center point of photodetector which is installed on it always keep optimum location, to guarantee accuracy and precision of the measurement.
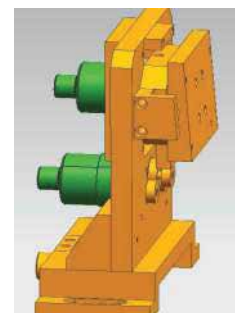
(3) Software system: The functions of the software system for Sizer-3201 plus 9(Dry) are very powerful. Herein, Only list the conversion of report format for example. Just click Excel, PDF, Copy and Export button, the conversion of report format can be realized. It is convenient for communication such as email, etc. The system has saved optical parameters of hundreds, and almost covers all common sasmples, to eansure that the test result is more accurate.

(4) Reliable dry feeding system: The operations of Sizer-3201plus dry feeding system which matches Sizer-3201 plus (Dry). Including sample feeding, gas feeding, pressure test, sample collection, ect,.are controlled by computer uniformly. The operations are completed automatically according to the procedures set in advance and convenient for operating.

Laser Particle Size Analyzer(Wet)

Introduction of (Wet):

particle size analyzer is an intelligence dry and liquid dual-purpose particle size analyzer. Dry dispersing system adopts Venturi dispersing effect, through the measures of shear, inertia, coll ision, etc. to ensure that the powders are in complete dispersing state when pass test window. It adopts aerodynamics technology to prevent the lens from pollution and has outstanding characteristics of accuracy and good reliability, good repeatability, easy operation, fast test speed, etc. It is high performance dry particle size laboratories of colleges and universities as well as research institutes to use.
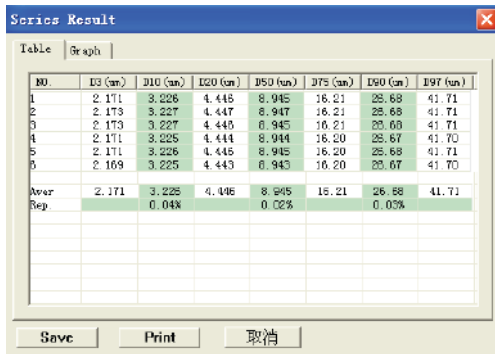
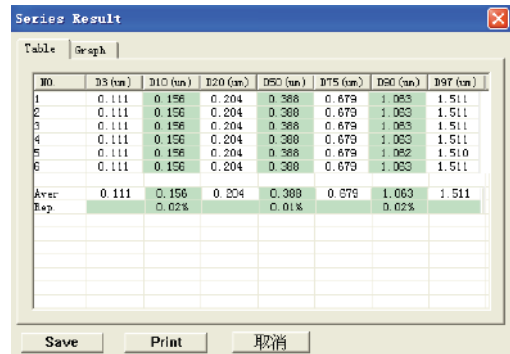## Repeatability:

Excellent repeatability is a eved thanks to:

(1) Laser, detector and signal transmission system are stable and reliable.
(2) Consistent and effective dispersing system.
(3) Automatic alignment keeps the instrument always in optimum condition.
(4) Sampling rate up to 3500 times/second ensures outstanding repeatability

Repeatability Verification:

(1) Repeatability of a serial test for same samples

About Repeatability

Repeatability is primary index of particle size analyzer. It is worthless for particle size analyzer if repeatability is not good. Repeatability is related to the instrument, also, related to the operator, voltage, water quality and interference. It is a reflection of integrated factors.

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(2) Repeatability of re-sampling tests
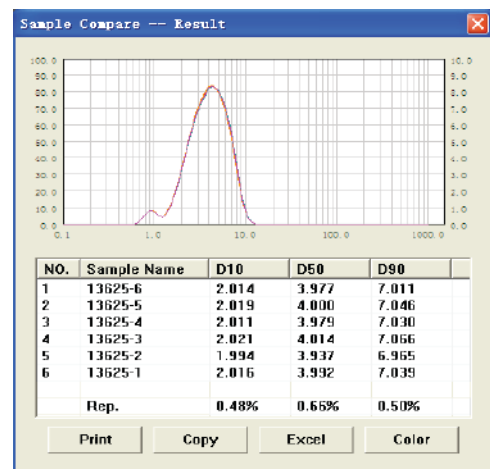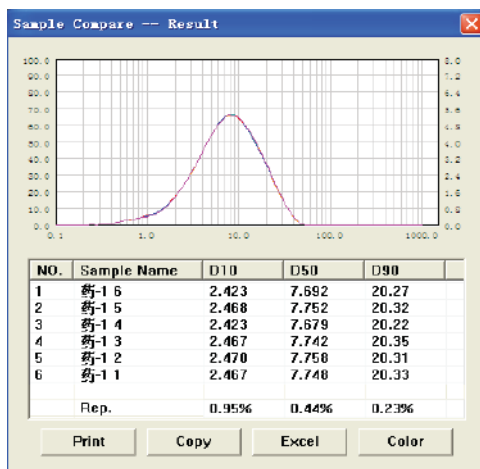
Accuracy

Excellent accuracy is achieved thanks to

(1) The use of a dual lenses optical system (DLOS) invented by Analytical Technologies, it improves the precision of the analysis compared to single lenses system

(2) The use of 84 detectors plus high performance software, provides excellent resolution regardless the sample has a single model or multi model distribution.

(3) Complete sample preparation system including circulation, ultrasonic dispersing, stirring, auto water supply and auto cleaning.

(4) Use of size standard to verify the accuracy of the results.

Verifications of accuracy

Letter of Notice for Ability Verification Plan Results					
Test Item	Sample	Lab Result (μ m)	Designated Value (μ m)	Deviation Percentage (%)	Result Evaluation
Main Diameter D_{Mean}	2017FT-A1	13.55	14.06	-3.6	Satisfied
	2017FT-A2	12.26	12.55	-2.3	Satisfied
Median Diameter D_{50}	2017FT-A1	13.49	14.04	-4.1	Satisfied
	2017FT-A2	12.27	12.54	-2.2	Satisfied
Note: if absolute value of deviation percentage is less than or equal to 10%, it is satisfied result: if absolute value is more than 10%, it is unsatisfied result.					

b) Compare with test results of overseas advanced laser Partical size analyzer: Good consistency.

Caco3	D10	D50	D90
Other brand	0.981	5.144	19.122
Sizer	0.943	4.936	19.22

| Silicon Dioxide	D10	D50	D90
Other Brand	39.89	60.499	91.083
Sizer	37.08	60.64	93.83
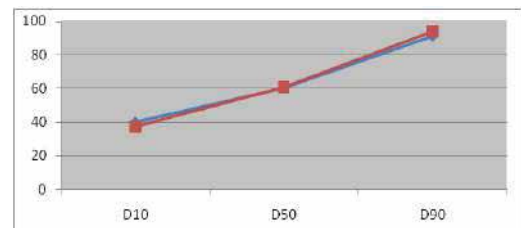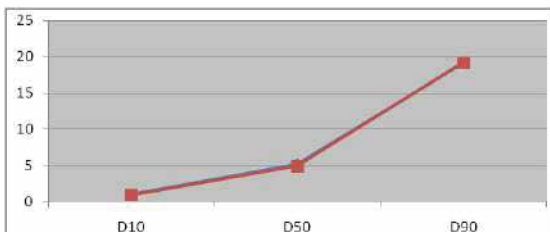
c) Use Sizer standard sample to verify accuracy and test value is identical with standard value.

Reliable performance and easy operation

Reasons for low failure rate:

(1) Use of high quality components.
(2) Components are inspected and recorded for traceability.
A 48-hour failure test before instruments leaves the factory.
(3) Use of advanced technologies such as dry burning-resistant ultrasonic, auto alignment, dew-point temperature detecting and others
(4) Comply with CE, FDA 21 CFR Part 11 and ISO 9001-2008 certification.
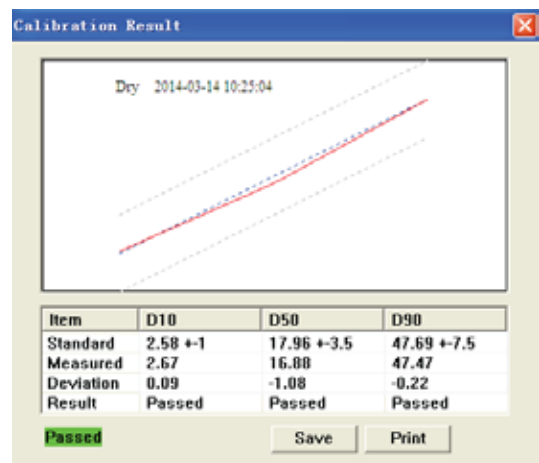
Easy operation:

Intelligent standard operation procedure (SOP) design: Just add sample, system can complete the operations such as water supply, dispersing, circulation, concentration adjustment, test, drainage, cleaning, print, storage, etc. If the concentration is high, the system will dilute automatically. If the concentration is low, the system will show "add the sample", to guarantee that the concentration always keeps optimum status. The direct effect of full-automation is not just for easy operation. More importantly, it reduces the errors caused by human factors and improves test precision.
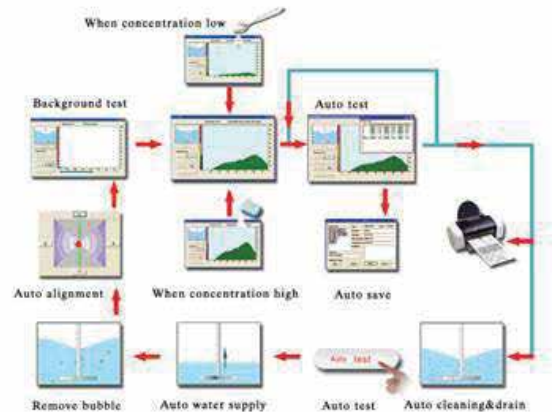
Unique technology and reliable quality
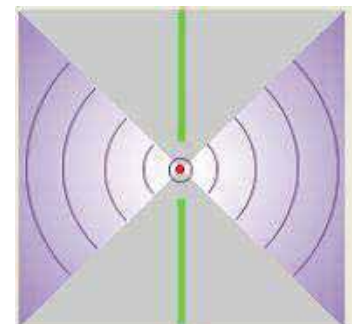
Reliable circulating and dispersing system:

Sizer-3201 automatic liquid circulating and dispersing system which matchesin cluded anti-dry ultrasonic disperser,centrifual circulating pump, auto water supply system, auto drianage system and auto overflow system. It applies to all kinds of samples and ensures that sample can be dispersed completely. The accurancy and repeatability of the test is guaranteed.
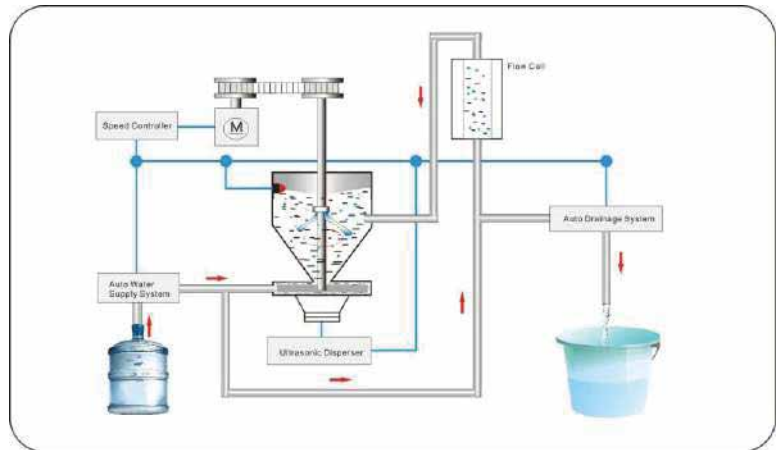
Unique conversion technology between dry and liquid: The instrument provides Sizer-3201 wet feeding system and Sizer-3201 feeding system. Just change feeding system and set corresponding software, then conversion between dry and wet can be completed quickly.

Auto alignment technology:

Auto alignment system individually invented by Analytical is composed of stepping motor, precise guide rail, subdivision controller and software system. Its function is to let the center point of photodetector which is installed on it always keep optimum location, to guarantee accuracy and precision of the measurement.

Software system:

The functions of the software system for Analytical SD are very powerful. Herein, only list the conversion of report format for example. Just click Excel, PDF, Copy and Export button, the conversion of report format can be realized. It is convenient for communication such as email and so on.

Specification

Testing parameter	Material
Particle size distribution	Suspension, emulsion, dry powder
General	Sizer
Theory	Laser diffraction
Analysis theory	Mie and Fraunhofer
Testing speed	3kHz
Typical measurement time	$\leq$ 10 second
Size Range	0.1 - 1000um
Number of size classes	More than 100 customized grades
Accuracy	Wet $\leq$1% (GBRM D50), Dry $\leq$3% (GBRM D50)
Repeatability	Wet $\leq$1% (GBRM D50), Dry $\leq$3% (GBRM D50)
Resolution ratio	Single peak, double peak multi-peak
Optics	
Red light	Max. 3mW Semiconductor optical fiber laser, 635nm
Lens arrangement	Single lens
Lens design	F-Theta Lenses
Effective focal length	223mm
Arrangement	Log-spaced array
Quantity	84-pieces (forward, sideway)
Light path adjustment	Intelligent automatic alignment
Dispersion type	Wet & Dry
Dispersion system	Ultrasound 50W, 38KHz Dry buring-resistant protection system
Water circulation	Centrifugal pump, 500-2500ml/min, auto water intake and rinsing
Water capacity	600 ml
Dispersion system available	Solvent compatible system
Air flowrate	400-6000L/min
Air compressor	Gas container $\geq$ 60L, Pressure $\leq$ 8bar
Vacuum Cleaner	Wet dust collector or bag filter
Air filter	3um, 0.3um, 0.01um
21 CFR Part 11	Wet $\leq$1% (GBRM D50), Dry $\leq$3% (GBRM D50)
Resolution ratio	Single peak, double peak multi-peak

21 CFR Part	Enable
SOP Designer	Enable
Report	More then 14 formats report
Auto test	Enable
Data export	EXCEL, PDF, WORD, JPG and etc.
Laser class	Class I laser product
Supply voltage	220VAC
Dimension	720mm x 300mm x 280mm (L x W x H)
Weight	26kg
Computer interface	At least a USB 2.0 port required
Operation system	Windows XP, Windows 7,8 or 10
Hardware specification	Intel Core 15, 4GB RAM, 250GB HD

Nano-particle analyzer

Features

Sizer 3201 nano-particle analyzer based on dynamic light scattering technology for analyzing nano sized materials. Sizer 3201 nano-particlecan measure sizes down to 1nm. The high-power laser light source and high sensitivity
PMT provide rapid and accurate testing results.

Specification

(1) Measuring range: Particle size from 1nm to 9500nm

(2) Less than 5 minutes per test.

(3) A small quantity of sample required - 5ml and 1ml sample cell volume available.

(4) High-precision temperature control system provides accuracy of ±0.5°C.

(5) Intuitive software interface.