

# Particle Size Analysis - (Mastersizer)

## Laser Particle Size Analysers..

The state of the art technology incorporated by Malvern into the Mastersizer range delivers speed of measurement, exceptional reproducibility and an ability to compare the results to other techniques. Particles within a wide size range from sub-micron to a few millimetres are measured accurately and non-destructively, allowing you to recover your sample if it is expensive or in short supply.

## The Mastersizer range

### The Mastersizer 2000.

An instrument with a proven history over more than a decade as the world's most widely used particle sizing instrument, the Mastersizer 2000 is still regarded as one of the most flexible and user friendly particle sizing instruments available. The Mastersizer 2000 particle size analyzer has set the standard for simple, straightforward operation. Modular in design, it has a wide range of automated sample dispersion units for the measurement of wet and dry samples. These are controlled through SOPs, providing ease of method development and transfer.

- Broad particle size range suitable for many different applications.
- Wide range of sample dispersion options for emulsions, suspensions and dry powders.
- Fully automated simple SOP operation for ease of use and method transfer.
- Full validation documentation available including compliance with 21 CFR Part 11.
- Backed up by extensive applications knowledge across many different industries.



The Mastersizer 3000 is the latest generation of the world's most popular particle sizing instrument. Incorporating expert engineering and applications know-how into every stage of its design, it delivers:

- Class-leading particle sizing performance in a compact footprint.
- Intuitive software with built-in expertise to ease your workload.
- Flexible reporting to display your data the way you want it.
- Rapid and effective wet dispersion.
- Fast, reliable particle size measurement of fragile and cohesive dry powders.
- Mastersizer know-how throughout, for results you can rely on.



The Mastersizer 3000E provides a cost-effective, entry level particle sizing system which can be upgraded as required. It is available with two different performance levels:

### Mastersizer 3000E Basic

- Particle size range from 0.1 – 1000µm
- Manual dispersion units only
- Basic software, with updates and bug fixes only
- Anytime upgrade option to Mastersizer 3000E Extended

### Mastersizer 3000E Extended

- Automated wet sample dispersion units supported
- All the advanced software functionality offered with the Mastersizer 3000, including updates, bug fixes and upgrades



Specification	Mastersizer 2000	Mastersizer 3000	Mastersizer 3000E
Particle size	Suspensions, emulsions, dry powders	Suspensions, emulsions, dry powders	Suspensions, emulsions, dry powders
Size range	0.02 to 2000 microns	0.01 to 3500 microns	0.1 to 1000 microns
Accuracy	Better than 1%	Better than 1%	Better than 1%
Precision / repeatability	Better than 1%	Better than 0.5% variation	Better than 0.5% variation
Measuring Principle	Mie Scattering	Mie and Fraunhofer Scattering	
Optics	Red light source: Max. 4mW He-Ne, 632.8nm Blue light source: Max. 10mW LED, 470nm Lens arrangement: Reverse fourier (convergent beam)		Red light source: Max. 4mW He-Ne, 632.8nm Lens arrangement: Reverse fourier (convergent beam)
	Effective focal length: 300nm		
Detection Systems	Red light: Forward scattering, side scattering and back scattering. Blue light: Wide angle forward and back scattering.	Log spaced array arrangement Angular range: 0.015 - 144 degrees Automatic alignment	Log spaced array arrangement Angular range: 0.032 - 60 degrees Automatic alignment
Typical measurement time	< 10 seconds		
Optical Alignment System	Automatic rapid align system with dark field optical reticle and multi-element alignment detector.		
Sample dispersion unit interchange system	Sample dispersion units automatically recognized, configured and enabled on insertion of measurement cell cassettes into optical unit.		
Power	110/240V, 50/60 Hz, 60 VA.		
Dimensions (LxDxH), weight	1293 x 255 x 375mm, 31kg (excluding dispersion units)	690 x 300 x 450mm, 30kg (excluding dispersion units)	690 x 300 x 450mm, 30kg



# Mastersizer Accessories

## Accessories for MASTERSIZER 3000 and 3000E

### HYDRO EV Flexible Volume Wet Dispersion

The Hydro EV has a unique dip-in centrifugal pump and stirrer design that achieves full and rapid dispersion in standard laboratory beakers, allowing close matching of the dispersant volume to the application requirements. Following measurement, the dispersion head can be raised out of the beaker, enabling quick cleaning and sample recovery.

Compatible with 250 ml, 600 ml and 1000 ml laboratory beakers.

40 W in-line sonication probe, for rapid agglomerate dispersion.

Dip-in centrifugal pump and stirrer design.



### HYDRO LV Large Volume Wet Dispersion

Intended for applications where sample availability is not an issue, The Hydro LV is ideal for measuring larger particles and broad size distributions, which demand larger sample volumes to ensure representative measurement.

600 ml dispersant volume

40 W in-line sonication probe, for rapid agglomerate dispersion

Powerful centrifugal pump system ensures bias-free sampling

Automated dispersant supply



### HYDRO MV Medium Volume Automated Dispersion Unit

Designed for applications that require smaller sample sizes, the Hydro MV is especially valuable when the supply of test material is limited or when dispersant usage must be minimized.

120 ml dispersant volume.

40 W in-line sonication probe, for rapid agglomerate dispersion.

Powerful centrifugal pump system ensures bias-free sampling.

Automated dispersant supply.



### HYDRO SM Small Volume Entry Level Wet Dispersion Unit

For applications where sample volume needs to be minimized, the Hydro SM is a manually controlled pump and stirrer dispersion unit featuring:

### AERO S State of the art dry powder dispersion (MASTERSIZER 3000 only)

The Aero S is a completely new dry powder disperser developed using state-of-the-art powder dispersion understanding. Modular in design, it is easily configured for different applications, delivering efficient sample dispersion for both robust and fragile materials.

Standard disperser suitable for both cohesive and fragile particle measurements.

Impaction systems available for robust material dispersion.

Precise dispersion pressure control, to  $\pm 0.1$  bar delivers outstanding reproducibility.

Range of sample feed trays and hoppers enable measurement of different sample volumes.

Enclosed cell delivers bias-free measurements whilst minimizing user exposure to the sample.



MASTERSIZER 2000	HYDRO S	HYDRO G	HYDRO MU	HYDRO SM	SCIROCCO
<b>Dispersion type</b>	small volume general-purpose automated sample dispersion unit	large volume general-purpose automated sample dispersion unit designed for the measurement of larger, denser material	large volume manual sample dispersion unit using standard laboratory beakers as the sample container	manual small volume sample dispersion unit	dry powder feeder enabling the automatic measurement of dry powders
<b>Capacity</b>	50—120ml	800 ml	600—1,000ml	50—120ml	Dry
<b>Operation</b>	All functions controlled by the system software. Fully automatic operation via SOPs, manual operation via on-screen operating dialogues. Compatible with Autosample		All functions manually controllable via built-in splash proof membrane keypad.	Pump/stir manually controlled by stand-alone tacho control unit with digital read-back.	Automatic via SOPs Manual via computer on-screen dialogues.