Welcome to the
next generation

Mastersizer
3000

Smarter particle sizing

Malvern

Not just a new instrument – a new Mastersizer

The first Mastersizer system launched in 1988 and since then Malvern Instruments has led the field of laser diffraction particle sizing. We are immersed in the technology, the applications, and the possibilities that the technique brings to more than 10,000 Mastersizer users worldwide.

Mastersizer 3000 - the system has evolved

Fast, reliable and highly automated, laser diffraction is already the World's most widely used technique for particle size analysis. Now, the Mastersizer 3000 takes laser diffraction to the next level.

- One instrument for precise, high resolution wet and dry sample measurements from 10nm - 3.5mm
- Simple, intuitive software that drives **your** measurement and delivers **your** data, **your** way
- Release bench space with our highest ever optical performance in the smallest of footprints
- Increase lab productivity with rapid, operator-independent measurements that every user can rely on
- 'Gold standard' method development and application support from our dedicated global team

Highest performance in the smallest footprints

Advantage Mastersizer 3000

The innovative design and radical engineering in the Mastersizer 3000 instrument and accessories showcase Malvern's passion and expertise. We've translated market needs into an instrument that packs the most intensive performance into the smallest of footprints. Fast and precise, Mastersizer 3000 benefits everyone, from novice users to particle sizing experts.

| You asked for	Mastersizer 3000 delivers...
A broader measurement range:	A single instrument with a range of 10nm to 3.5mm. Exceptional resolution in the sub-micron range.
Rapid and efficient dry powder dispersion:	A completely new, user-configurable dry dispersion engine – Aero – that matches to your application. From fragile powders to coarse abrasives, Aero expands the application of dry powder dispersion.
Accuracy and reproducibility:	Accuracy and system-to-system reproducibility are better than 1%. A data acquisition rate of 10kHz that dramatically increases sampling, driving up reproducibility and ensuring accurate measurements, even for materials with the broadest size distributions.
A more compact system:	Innovative folded optics delivers our smallest Mastersizer footprint ever. The optical bench is just 690mm long.
Flexible user-independent operation:	Easily switched dispersion units with an auto-locking measurement cell for ease of changeover and maintenance. An automatic system initialisation feature ensures robust measurements, after any system change.
Real-time optimization of each and every measurement:	Intuitive 'browser-style' software that gives all users access to optimized performance. Real-time trend plotting confirms measurement to USP, EP, ISO standards.
Results displayed the way I want	The edit-in-place report designer presents all the information you need in the format you want
Top class support:	You never have to 'go it alone' with a Mastersizer. Significant applications intelligence is built in to every system. When required, troubleshooting and instrument diagnostics can be completed remotely and our unrivalled global network of experts deliver method development, applications and service support to you in person, where you need it and when you want it.

A new optical core

The Mastersizer 3000 measures particle size using the proven technique of laser diffraction. A particle size distribution is calculated from measurements of the angular intensity of scattered light produced by a sample. The optics required to capture this data lie at the heart of the system.

In a new, folded optical design, a blue solid state light source in the Mastersizer 3000 provides resolution in the sub-micron range, resolving materials down to 10nm in size. A rapid data acquisition rate significantly increases the amount of measurement data feeding into the analysis. Analytical reproducibility is improved, and even the most polydisperse samples are characterized accurately. Measurements are faster too.

Together, the unique optical features result in particle size data you can trust, across the complete dynamic range, from just a single instrument.

Mastersizer 3000 delivers:

- 10nm - 3.5mm measurement range
- 10kHz data acquisition rate
- 20mW blue solid state light source
- 690mm optical bench length
- Rapid system initialisation
- Completely enclosed optics
- Automated measurement control
- Better than 1% accuracy and reproducibility
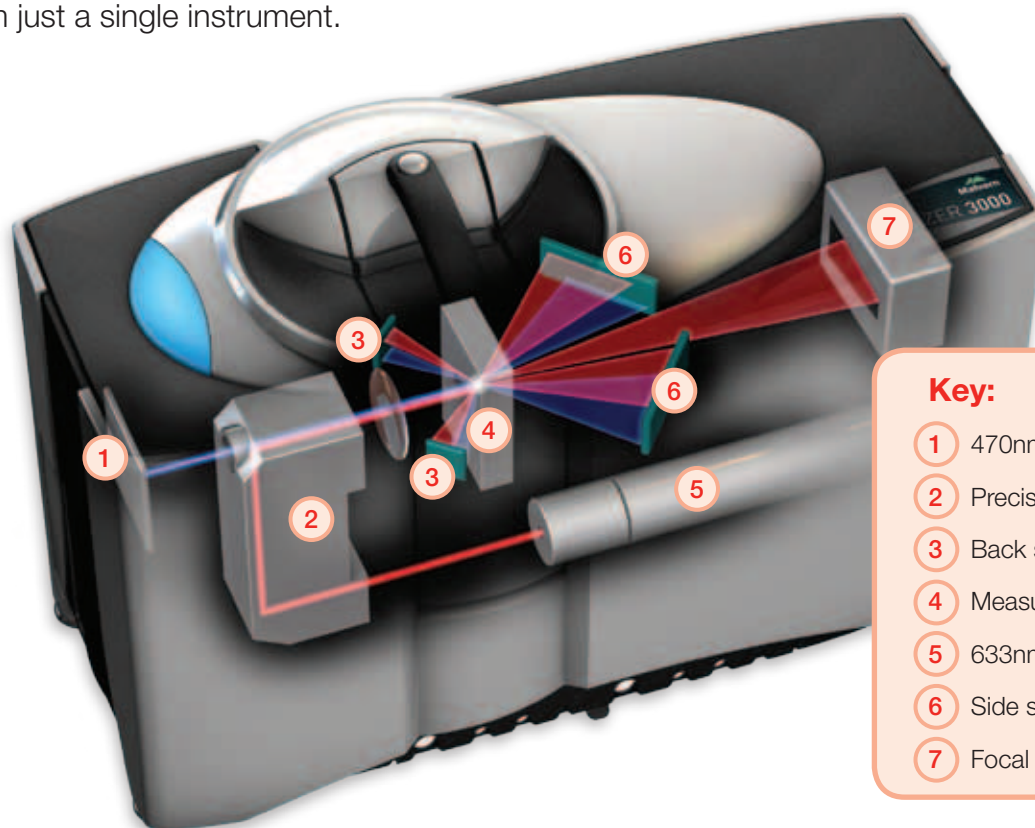
Key:

1. 470nm blue light source
2. Precision optics
3. Back scatter detectors
4. Measurement cell
5. 633nm red laser
6. Side scatter detectors
7. Focal plane detectors

# Lightening your analytical workload

Laser diffraction measurement is no longer an expert task - that's part of the technique's appeal. Importantly, SOPs (Standard Operating Procedures) and automation have propelled it into the QC environment. Now, the Mastersizer 3000 software takes 'ease of use' even further. Supporting the user every step of the way, from method development through to routine measurement, it makes the full capabilities of laser diffraction accessible to all.

Effortless work, not guess work

The Mastersizer 3000's measurement manager gives you the power to manipulate dry and wet dispersion parameters in real time, during analysis. With instant feedback of relative standard deviations (RSDs), you know when repeatability targets (ISO 13320/USP) are met and can store the optimal measurement settings in an SOP for later, automated use. In addition, a unique Data Quality tool provides a critical assessment of your measurement data and results, delivering Malvern's applications expertise direct to you at the point of measurement.
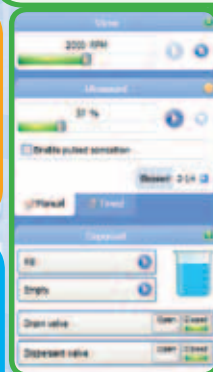
1. Observe

View measurement parameters and particle size distribution: Instant feedback of results
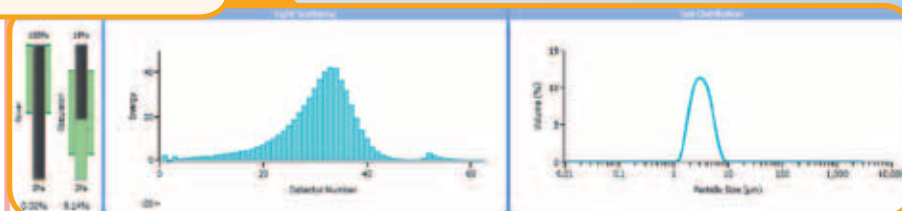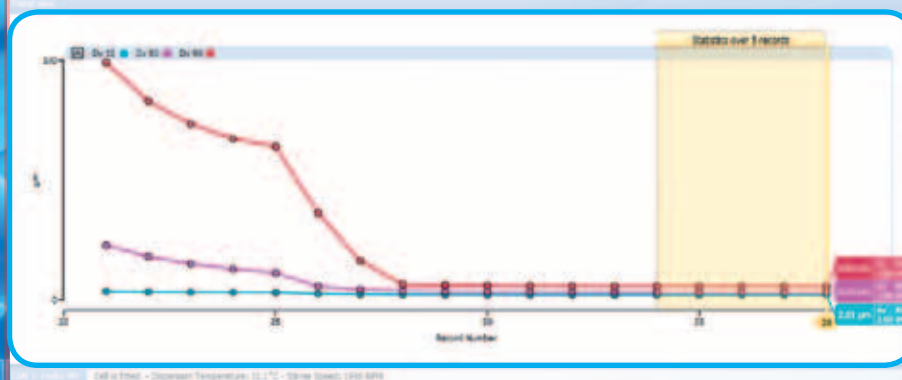
2. Interact

Full control of all dispersion parameters at your fingertips: Real-time control over your method development

3. Optimize

Rolling trend plotting and statistics: Rapid method optimization in line with ISO 13320 guidance

Wet or Dry - a solution for every application

Malvern is proud of its reputation for providing outstanding applications support. This means not just help with methods and analysis, but also translates into novel, practical design of dispersion accessories for both wet and dry measurement with the Mastersizer 3000.

Wet dispersion

The baseline for dispersion assessment, allowing efficient de-agglomeration without particle break-up. Malvern Instruments has three options for wet dispersion: the Hydro MV and LV for medium and large volumes respectively, and the Hydro EV, an exchangeable volume unit that can be used with standard lab glassware.

All benefit from in-line sonication for rapid sample dispersion. Full software control delivers unparalleled measurement reproducibility.

Hydro MV

Hydro EV

Hydro LV

Dry dispersion

With no requirement for liquid dispersants, dry dispersion is intuitively appealing. It offers a fast and environmentally neutral approach to sample preparation.
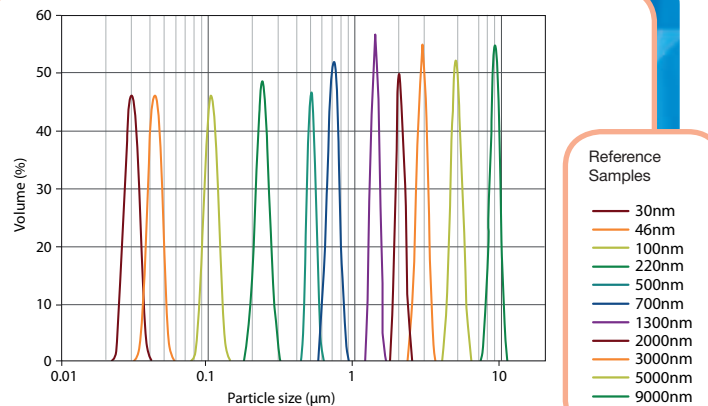
The new Aero reflects state-of-the art dry dispersion knowledge. Rapid and efficient, it minimizes impaction, to reduce primary particle damage. Aero extends the range of applications for which dry dispersion is appropriate; even relatively friable particles can be reliably dispersed. It is supported by the fastest data acquisition rates available. Dry measurements become stable faster, and even those samples with very wide size distributions are measured accurately.

Aero S

You can trust Mastersizer to deliver

Accurate

This data is for a series of separate standards and nano-materials. Each sample is correctly resolved by the Mastersizer 3000. This is what we mean by exceptional resolution, and it extends across the entire measurement range.

Reference Samples

- 30nm
- 46nm
- 100nm
- 220nm
- 500nm
- 700nm
- 1300nm
- 2000nm
- 3000nm
- 5000nm
- 9000nm

Reproducible

Many laser diffraction instruments are central to the particle laboratory, relied on by many, for multiple applications. Here, Aero is alternately dispersing a fine and coarse product grade. The relative standard deviation is much less than 1% for Dv50 reported for each grade. Precise, rapid and reproducible measurement, with no cross-contamination.
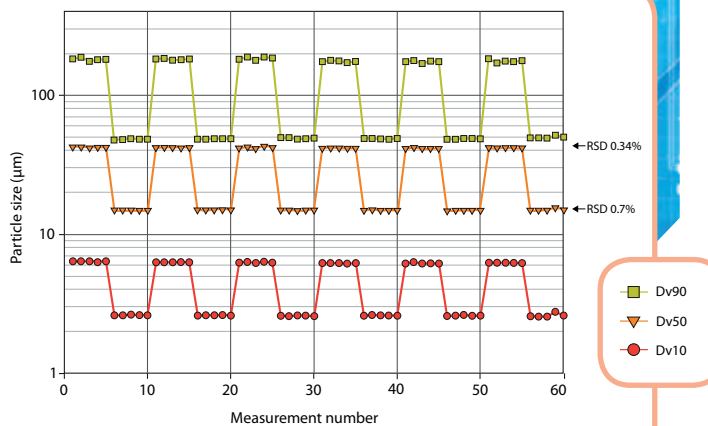
- Dv90
- Dv50
- Dv10

Rapid

Fast particle dispersion and optimised sample handling, yield improved stability and shorter measurement times. This data contrasts how Dv90 changes with time with Mastersizer 3000 and with a typical laser diffraction system during sonication. Note the time frame required to achieve stability. Faster measurement, more accurate data, greater productivity.

- Typical system
- Mastersizer 3000
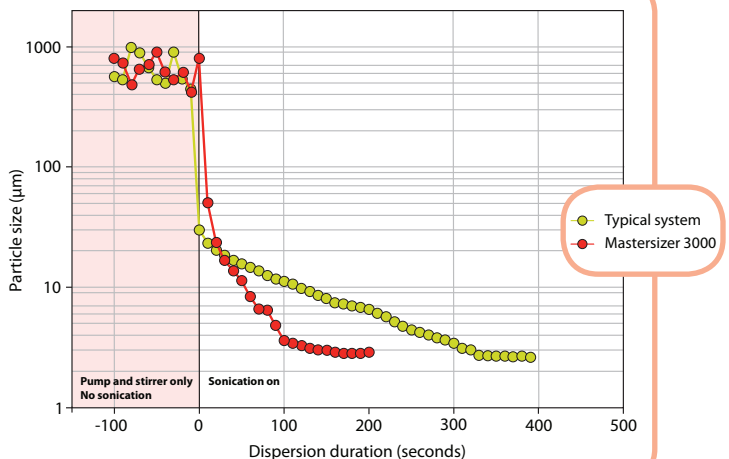
Specifications — Mastersizer 3000

	Parameters measured	Materials
	Particle size distribution	Suspensions, emulsions, dry powders

	Parameter	Specification
General	Principle	Laser light scattering
	Analysis	Mie and Fraunhofer scattering
	Data Acquisition Rate	10kHz
	Typical measurement time	<10 sec
Optics	Red light source	Max. 5mW He-Ne, 632.8nm
	Blue light source	Max. 20mW LED, 470nm
	Lens arrangement	Reverse Fourier (convergent beam)
	Effective focal length	300mm
Detector	Arrangement	Log-spaced array
	Angular range	0.015 – 144 degrees
	Alignment	Automatic
Size	Size range (full range)	0.01 – 3500µm *
	Size range (dry powder mode)	0.1 – 3500µm *
	Number of size classes	100 (user adjustable)
	Accuracy	Better than 1% †
	Repeatability	Better than 0.5% variation ††
	Reproducibility	Better than 1% variation ††
Software	21 CFR part 11	Enables an operating mode that assists with ER/ES compliance
System compliance	Laser class	Class 1, EN 60825-1:2001 and CDRH
	Regulatory testing	RoHS and WEEE compliant
		ICES / CE / C-Tick / FCC / VCCI compliant
		Meets requirements of the European Low Voltage directive
	IP Rating	IP41D in use
System	Optical Bench Dimensions	690mm x 300mm x 450mm (LxWxH)
	Mass	30kg
	Power required	100/240V, 50/60Hz
	Product storage conditions	-20℃ to +50℃, 10% – 80% RH (non-condensing)
	Operational conditions	+10℃ to +35℃, 10% – 80% RH (non-condensing)
Computer Specification (recommended)	Computer interface	At least 1 high speed USB port required
	Operating System	Windows 7 professional (32 bit and 64 bit)
	Computer specification	Intel Core i5 Processor, 4GB RAM, 250GB HD, CD-ROM or DVD +/-RW drive, Wide Screen Monitor.

Notes

* Sample and sample preparation dependent.
† Accuracy defined for the recovery of the mean size of a narrow log-normal distribution. Sample and sample preparation dependent.
†† Sample and sample preparation dependent.

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distributor details

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