

Malvern Zetasizer Nano ZS

General

1. The system must have temperature control using Peltier elements as standard, giving control over the range 2°C to 90°C.
2. The optics must be fully pre-aligned with no user adjustment required.
3. The system must use an avalanche photodiode detector to maximize the concentration sensitivity of the system to give a scattering count rate from Toluene exceeding 100,000 photon counts per second (100kcps)
4. There must be the option available to upgrade the internal laser with an internally fitted 50mW 532nm laser.
5. A quartz flow cell must be available to enable use with an autotitrator.
6. The instrument footprint must not exceed 350mm in width by 650mm in depth.
7. The instrument height must not exceed 300mm.
8. The system must use a digital correlator with a minimum sample time of 25ns, a maximum delay time of over 4000s and a maximum number of channels greater than 4000

Size measurements

9. An option of an Autotitrator must be available to automate the measurement of size as a function of pH, conductivity or additive concentration.
10. The system must include a measurement cell capable of handling both aqueous and organic solvents with a working volume range of 12 microlitre to 1.5 millilitre.
11. The maximum allowable sample concentration must be > 30% by weight for sizing applications.
12. The position of the sampling volume within the measurement cell must be variable, with both automatic and manual control, to minimize signal interference and measure the sample with minimal or no dilution required.
13. The system must utilize a backscattering arrangement (greater than 170 degrees) to maximise sensitivity.
14. The system must have a minimum sample concentration value of 0.1 mg/mL lysozyme or 0.1 ppm for sizing applications.
15. The system must include a logarithmic digital correlator with symmetric normalisation to minimize sample measurement time without a reduction in either the resolution of the

resulting size distribution or the dynamic size range of 0.6nm to 6000 nm diameter with a single instrument.

Zeta potential measurements

16. It must be possible to measure the zeta potential of particles over the size range 5 nm to 10 microns.
17. The system must use the method of Phase Analysis Light Scattering (PALS) to improve the repeatability of measurements of low mobility samples
18. The repeatability of results with a zeta potential standard must be demonstrated to deviate less than 3 mV from the average value over a series of 5 measurements.
19. The option of a low volume 'dip cell' must be available that will enable measurements of 0.7 ml of sample in disposable plastic or glass cuvettes of samples in aqueous or non-aqueous dispersants
20. An option of an Autotitrator must be available to automate the measurement of zeta potential as a function of pH, conductivity or additive concentration..
21. The system must be capable of conducting zeta potential measurements using a disposable folded capillary cell.

Molecular weight measurements

22. The system must have an option to measure molecular weight over the range 1×10^3 to 2×10^7 Daltons using the Debye plot method.

Software

23. The user must have the ability to measure the sample with manually defined parameters, or by defining a 'Standard Operating Procedure (SOP)
24. A macro language must be available to enable custom calculations to be added to reports.
25. A method must be available of providing a customised configuration so that each operator can have a different set-up.
26. The software must be compatible with Windows 2000 and XP operating systems.
27. Trend plots must be available to allow plotting any one measured parameter from selected records vs a second parameter.
28. Overplots of up to 20 size or zeta potential distributions must be possible.
29. It must be possible to export measured data or results to word processing packages or spreadsheets using a template or cut and paste.
30. Access to all measured data including correlation functions, fitted data points, residuals and all experimental parameters must be available and stored for subsequent examination.
31. It must be possible to change the selection of data points and the size algorithm used for subsequent recalculation.
32. The ability to edit sample data parameters to allow recalculation of data must be available.
33. A mode of operation compliant with the recommendations of 21 CFR part 11 must be available
34. A range of algorithms must be provided to calculate the size distribution.
35. The calculation of the cumulants mean defined in ISO13321 must be used.
36. A method of linking SOP's and other actions such as the addition of titrants in order to automate a custom method must be available