Zetasizer Nano-ZS – User Instructions

1. Activate the instrument computer by logging in to CORAL. If needed, log in to the local instrument computer – **Username: zetasizer. Password: zetasizer.**

2. Instrument is usually on. If the instrument is off, turn on the instrument and wait 30 minutes for the laser to stabilize. An unstable light source is more likely to introduce errors in the measurements.

   When turning on the instrument, a beep will indicate the instrument has been turned on, followed by another beep when the instrument has finished the setup routine. Two final beeps will indicate the instrument has reached the default temperature of 25°C.

3. Start the Zetasizer software by clicking the DTS desktop icon: 

4. Close any open windows with measurement data from the previous user.

   From the *File* menu select *close* until all the measurement data is removed from the window OR Click the lower "X" in the right corner of the data window until all your measurement data is removed from the window.

   If you want to add/delete the report options, click View → Workspaces → Zeta (or Size) → Report Pages: check the items you want to see on your data window.

5. Choose the appropriate cuvette cell for your sample and measurement type. Ask, if you're not sure which to use. *Purchase the DTS 1070 cuvettes at the front desk in 250 Duffield Hall during regular business hours. They cost $24.00 and you'll enter the cost using CORAL> supplies> check out.*

Cell #	Cell Type	Appropriate Solvents	Min. Vol.	Temp range	For?
ZEN0112	Low volume disposable sizing cuvette	water or alcohol ONLY	400 µL	10-50˚C	size
PCS1115	Glass cuvette with square aperture	organics, water, alcohol	1mL	10-90˚C	size
ZEN0040	Disposable micro cuvette (40µL)	water or alcohol ONLY	40 µL	10-50˚C	size
ZEN2112	Low volume glass cuvette (12µL)	organics, water, alcohol	12µL	10-90˚C	size
DTS 1070	Clear disposable zeta cell	water or alcohol ONLY	900 µL	10-70˚C	zeta&size
ZEN1002	Zeta Dip Cell	organics, water, alcohol	1mL	10-90˚C	zeta

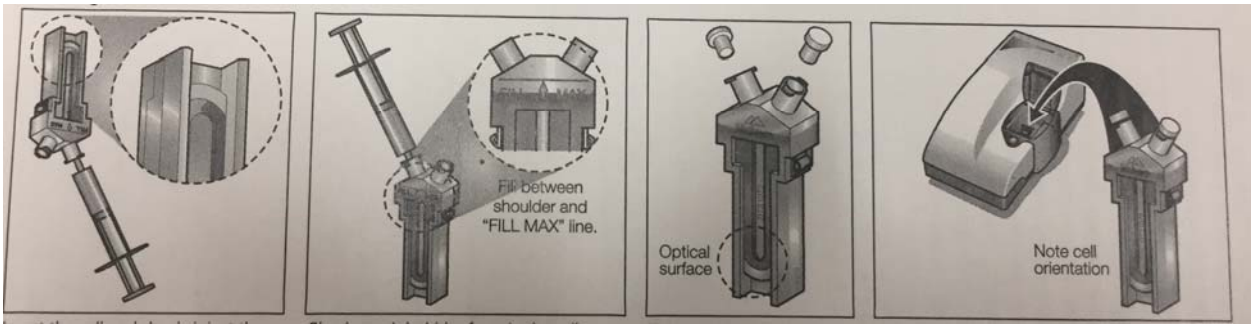
6. Fill your cuvette with your prepared sample. Put on cap(s) if available. Remove all bubbles.

   Follow these steps to fill a DTS1070 cell after cleaning it:

   a) Invert the cell and slowly inject the sample from its syringe to just over half way.

b) Turn the cell upright and continue injecting the sample slowly until the liquid reaches the electrode. Remove syringe and check no air bubbles form in the cell. Tap the cell gently to remove bubbles.

c) Put on two caps, one firmly, one loosely, to avoid pressurization of the cell.



7. Open the lid of the Zetasizer by pressing the round metallic button next to the lid.
8. Insert cuvette in instrument

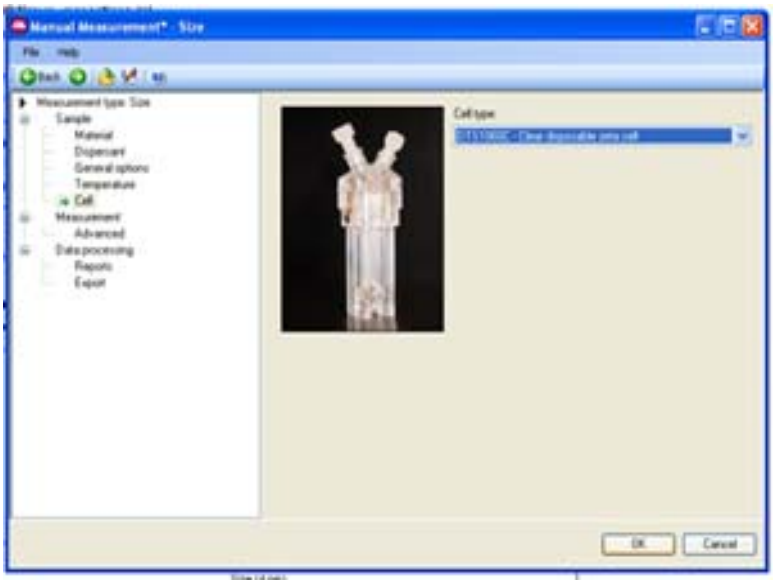
   The light path goes from front to back, align your cuvette appropriately. For the DTS1070 cell, the Malvern logo faces towards the front of the instrument. Press down until the cell clicks into place.

   NOTE: Sample preparation is critical to obtaining good data. Information on sample preparation can be found in Chapter 6 of the manual.

9. Create new measurement file in your personal folder: **File→ New→ Measurement File**. (If you are using the instrument for the first time, create a personal folder in C:\Documents and Settings\zetasizer\My Documents\Malvern Instruments\DTS\Measurement Data

10. Go to **Measure** menu and select **Start SOP** or **Manual**

11. Change each parameter tab as needed.



For manual measurement the options are described below:

a. Measurement type:
   - Size, zeta potential, or molecular weight.

b. Sample
   - Label the sample. The data for this measurement will contain this label.

c. Material
   - Select the material you are measuring from the list.
   - If the material has not been listed, you will need to find the refractive index and absorption for that material.

d. Dispersant
   - Select the liquid your sample is dispersed in from the list.
   - If the dispersant you are using has not been listed, you will need to find the viscosity, refractive index, and (for zeta potential measurements) dielectric constant for that material. The CNF has a viscometer and refractometer to assist with these measurements. They are located on the bench behind you, and please get trained before using them (even though they don't require you to log in to CORAL).

e. General Options
   - Choices depend on measurement type.

f. Temperature
   - Temperature limits for cuvettes are listed on page 1 of these instructions.

- If the temperature is being changed from 25˚C, or if your sample has recently been stored at a different temperature, give the sample 3-5 minutes to equilibrate.

g. Cell

h. Measurement
   - Set the number of runs per measurement to Automatic unless your sample is changing over time (fewer runs) or if it is somewhat polydisperse (more runs)
   - More than one measurement is recommended to verify the consistency of your results.

i. Advanced
   - These settings should be at the default and do not need to be changed.

j. Data Processing
   - Choices depend on measurement type.

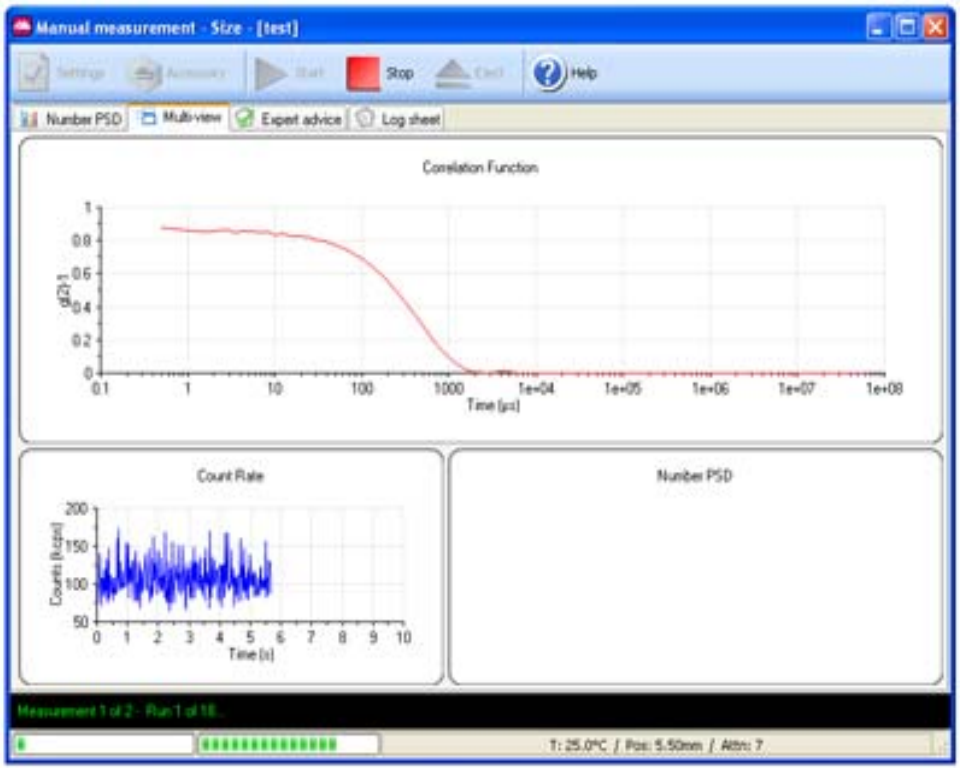
k. Report/Export

12. Save as SOP if you want to save these settings

13. Click **Ok**

14. Measurement window will now show on screen. Instructions and information will display in green text in the lower left hand corner.

15. Press Start to begin a measurement. To go back to the measurement parameters, click Settings.



16. Check the Count Rate and the Correlation factor as measurements are being taken to determine data quality. See manual pages 4.20-4.22 and the Expert Advice Tab for help with interpretation.

17. When measurements are completed the instrument will beep once.

18. Review your measurements. Data is automatically saved as measurements are taken. Right click on the selected data lines and choose Create Average Result to generate one line of average data. Then select the new line to see the reports of the average data. The Expert Advice will tell you whether the measurement had any problem or not. For a good size measurement, pdl is usually smaller than 0.1.

19. Unload measurement data from the DTS software before you close down

    Click the lower "X" in the right corner of the data window until all your measurement data is removed from the window

20. Remove cuvette

21. Recover sample or dispose of appropriately.

22. Clean the cuvette(s) you have used – see below for more details

23. Close the software, put all parts back in drawer, clean up bench space and log out of CORAL.

Cleaning the cuvettes

When done, be sure to clean the cuvettes properly.

1. Disposable plastic cuvettes

   Discard solvent appropriately and dispose of cuvettes

2. Zeta potential plastic cuvette (DTS 1070)

   The cuvette costs $24.00 and some people re-use them. Some have reported that the cell was good for ~ 40 measurements or until the electrodes are no longer functional (depending on the sample).

   To clean the cuvette, use a Luer-lock syringe to rinse with 3 washes of the same solvent used for the measurement using a 30-ml syringe followed by 3 washes of Milli-Q water. Dry with by expressing air through the cell with the same 30-cc syringe.

3. Universal dip cell

   Only use this cuvette prior to talking to the tool managers. Special instructions required.

4. Glass/quartz cuvettes

   The cleaning procedure for glass or quartz cuvettes is dependent on the sample that was measured, so cleaning is sample specific. However, the following advice should be followed.

   Rinse the cuvette with the same dispersant that was used for the measurement, i.e. if the sample was dispersed in water - use clean water to rinse it.

   Clean the cuvette in an ultrasonic bath of clean solvent. Rinse with 5 x 10 volumes of Milli-Q water.

   Once clean, dry the cuvette by blowing out the water with an empty 30-cc syringe.

   The smaller and more dilute the sample being measured, the more important the cleanliness of the cuvette.

Be careful not to scratch the surface of ANY cuvette!