



# Malvern Zetasizer ZS Dynamic Light Scattering

## Operation instructions

## General measurement

1. Double click on DTS Zetasizer software
2. Use the proper sample holder ( check for scratches), load your sample (check and remove air bubbles, if using a square plastic cuvette check sample level ~1.0-1.5 ml.
3. To open sample compartment lid press the Button located in lower right. Insert your sample in the proper alignment (the arrow on the sample holder should face the front, since measuring light goes from front to back, for sample size use the diagram inside sample compartment lid as guidance.
4. In the **File** menu, select **New, Measurement File**, create filename.dts.
5. From the Menu Bar select **Measure, Manual**. Edit parameters as needed:
  - Measurement type: Size, Zeta potential or molecular weight.
  - Sample: Enter sample name.
  - Material: select the material you are measuring from the list, if the material is not listed you need to enter its refractive index and absorption by yourself. Please, do not change parameters for the materials that are already in a database.
  - Dispersant: select the solvent from the list, if solvent is not listed you need to enter its viscosity and refractive index. Please, do not change parameters for the materials that are already in a database.
  - Temperature: use 25°C, be careful with temperature limits on the plastic cuvette as it may melt plastic.
  - Cell: select the proper cell type using the description and picture.
  - Measurement: Measurement angle (173 backscatter), Measurement duration (Automatic), Number of Measurement [ .. ], Delay [ 0 ].
  - Advanced: accept default values
  - Data Processing: General purpose. Please, do not change any data processing values if you not aware or not sure of mathematics behind the data treatment.
  - Click Ok. A measurement window should appear.
6. Click on the Green **Start** button.
7. When measurement is done the instrument will beep once, Saved Data will appear on screen. For more measurements Click on the green Start button. If needed use setting to edit previous parameters.

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## Zeta potentials measurement

The two cells used for zeta measurements are the folded capillary cell and the dip cell. The dip cell will use square cuvettes to hold the sample. Though filling either cell is a simple task, there are a number of precautions to be aware of. Fill the cell as described below:

- Prepare the sample in a syringe of at least 1ml capacity.
- Use the clean capillary Cell holder (to clean Zeta potential capillary holder, use ethanol or methanol, then flush with di-water a few times).
- Place the sample syringe into one of the sample ports.
- To load your sample, invert the cell.
- **Slowly** inject the sample through the cell, checking that all **air bubbles are removed**. If a bubble forms under the sample port, pull the syringe plunger back to draw the bubble into the syringe
- body and then reinject.
- When sample reaches the top turn the cell upright and continue injecting slowly until it is full. **No** bubbles should be seen within the clear capillary area of the cell. If necessary tap the cell lightly to dislodge them.
- Check that the cell electrodes are still completely covered.
- Remove any liquid that may have spilt onto the electrodes.
- Place the thermal contact plates ( stored in the cuvette holder left side underneath)

1. Open sample compartment lid by pressing the Button located in lower right. Insert your sample in the proper alignment (the cell weld on the capillary sample holder should face the front.

2. From the Manual Measurement window, go to Setting to edit parameters as needed :

- Measurement type: Zeta potential.
- Sample: Enter sample name.
- Material: select the material you are measuring from the list, if the material is not listed you need to enter its refractive index and absorption.
- Dispersant: select the solvent from the list, if solvent is not listed you need to enter its viscosity, refractive index and Dielectric constant.
- General options: F(Ka) Model (Smolvchowski). Please, do not change it if you are not familiar with the mathematics behind the data treatment.
- Temperature: use 25°C, be careful with temperature limits on the plastic cuvette
- Cell: select Zeta Potential Cell type.
- Measurement: Measurement duration (Automatic), Number of measurement [ .. ].
- Data Processing: General purpose
- Click OK. A measurement window will appears

3. Click on the Green **Start** button.

### Shutting down procedure

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1. When done, only Exit the Malvern software.
2. **Do not turn off instrument, do not turn off computer.**