Mastersizer 3000 Laser Diffraction Particle Size Analyzer-Wet

Warning: This instrument may only be operated by those who have been trained by AAF staff and have read and signed the AAF laboratory policies.

1. Make sure the instrument has been on at least for 20 min.
2. Computer should be on. [Use your UWM account to login]
3. Connect the cell (Aero S for dry measurement and Hydro EV for wet measurement.
4. Open the software Mastersizer 3000
   A) Click on view and select 2-pane Vertical as your window layout
   B) Create a new measurement at Home→ New →Measurement files and save it at Windows (C:)/DATA/User Data/Your PI's Name/Your Name
   C) For more information, Check the user manual at Tools→User Manuals
5. Select the cell: on the bottom right of the screen check that the appropriate cell is connected to the instrument (choose CAN1: Hydro EV for wet measurement and CAN 2: Aero S for the dry measurement.
6. On the bottom right of the screen check that Usb is connected
7. Manual measurement: Wet measurement (skip to 9 if you already have an SOP to run)
   A) Check that the background is stable and the cell is clean
      i) Place a beaker containing 500ml of clean dispersant under the stirring unit
      ii) Choose Manual measurement.
      iii) Enter the sample information: Type sample name under Identification, select spherical (typical) for shape of the sample from the options in Particle Type. In Material, Brows database and select your material. If the sample material is not included in the database, click on Add on top right of the screen window and input Material name, Refractive index, Absorption index, and Density. Select your dispersant from the list or Add the Dispersant name, Refractive index and Level sensor threshold as a new dispersant (Talk to AAF staff to make sure the tubing is compatible with your dispersant).
      i) Under Measurement enter the Method for your data collection, Background measurement duration and sample measurement duration (The right measurement time will produce representative data at the same time optimizes instrument productivity). You may disable the blue light if your sample particle size is very coarse (blue light is for fine particle size <7µm). Under sequence specify the number of measurements (the number of times the measurement will be repeated) and other delay times during measurements. Set the Obscuration limit depending on your sample particle size (0.1-10 typical).
      ii) Under Accessory disperse your sample by setting appropriate stirring speed (2000 rpm is typical) and ultrasound power and duration (be aware that excess ultrasound can break fragile particles to smaller sizes and high stirring speed can present gas bubbles to the cell, confused with large particles.) Set the cleaning type depending

on your sample. (Cleaning cycle needs to be repeated until the background is stable, Normal is typical and runs the cleaning cycle 3 times).

B) Click OK

C) Initialize the instrument (Click  to start)

D) Measure the background (Click  to start) and check the background is stable (A good background is less than 100 on detector 1, less than 20 on detector 20 and continuously decreasing curve.) Background measurement captures the scattering from the cell windows.

E) After background subtraction the graph should randomly fluctuate around zero.

F) Follow the pop-up messages and add sample until obscuration is in range.

G) Measure the sample (Click  to start)

H) Clean the system (Follow the pop up messages on the screen until the system is clean)

8. Develop your Method and create your SOP
   A) Once you measured the particle size you can right click on the data file and extract the SOP, make any desired changes and save the SOP at (C:)/DATA/User SOP/Your PI's Name/Your Name.
   B) To run SOP, click on Run SOP and select the saved SOP and click OK.
9. Run your SOP by clicking on Run SOP and selecting the desired SOP and click  .
10. Verify your data
11. Clean-up (Follow the cleaning instruction for the corresponding cell accordingly)
12. Save your measurement files and open a new file for the next user (Otherwise their data will be saved in your file)