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## TEST METHOD FOR PARTICLE SIZE REFERENCE MATERIAL LUDOX TM ON LA-950

LUDOX silica is a well known and characterized colloid that has been studied using various particle size analysis techniques including acoustic spectroscopy, laser diffraction, and dynamic light scattering. One such product, LUDOX TM-50, is a 50 wt% suspension of colloidal silica in water. It can be used as a “real world” reference material to test the performance of laser diffraction particle size analyzers. As with many colloids, good dispersion is critical for LUDOX TM to meet specifications. The importance of using a simple salt solution to dilute this material is shown below. LUDOX TM-50 has been tested and incorporated as a particle size reference material for the LA-950.

### Test Requirements

Applicable instruments: LA-950

Dispersant fluid: De-ionized water

Pre-dispersed sample: LUDOX TM 10 wt% in 0.01N KCl

Sample: LUDOX TM

Materials: Measurement cell

### Instrument Setup

- Sample Information
  - Sample Name: LUDOX TM-50 10 wt% in 0.01N KCl
  - Material: Colloidal silica
- Calculation parameters
  - Refractive Index
    - Material: 1.47-0.0i
    - Dispersant: 1.33 (Water)
  - Iterations
    - Form of Distribution: Manual
    - Iteration Number: 15
  - Graph
    - Distribution base: Volume
    - Density distribution graph: Standard
- Measurement parameters
  - Transmittance(B)
    - Upper: 95%
    - Lower: 90%
  - Feed Liquid Level: Low
  - Automatic Dilution Light: Blue
  - Data acquisition times (Sample)
    - LD: 5000
    - LED: 5000
- System parameters
  - Circulation speed: 3
  - Agitation speed: 1



### Measurement Procedure

1. Fill circulation system with de-ionized water.
2. Click *De-bubble* to remove dissolved
3. Start *Circulation and Agitation*.
4. Wait 10 seconds.
5. Click *Alignment*.
6. Verify that the instrument is clean by checking the detector baseline and real-time window.
7. Click *Blank*.
8. Add the diluted LUDOX TM dropwise until the blue LED %T is in the correct range.
9. Click *Measurement*.
10. Collect three consecutive measurements to verify repeatability.
11. Collect measurements on three unique samplings to verify reproducibility.
12. Rinse the instrument.

### Example data

The LUDOX TM particle size distribution will provide a single peak near 30 nanometers when properly prepared using 0.01N KCl salt solution.

Figure 1 shows an example of poor LUDOX TM dispersion.

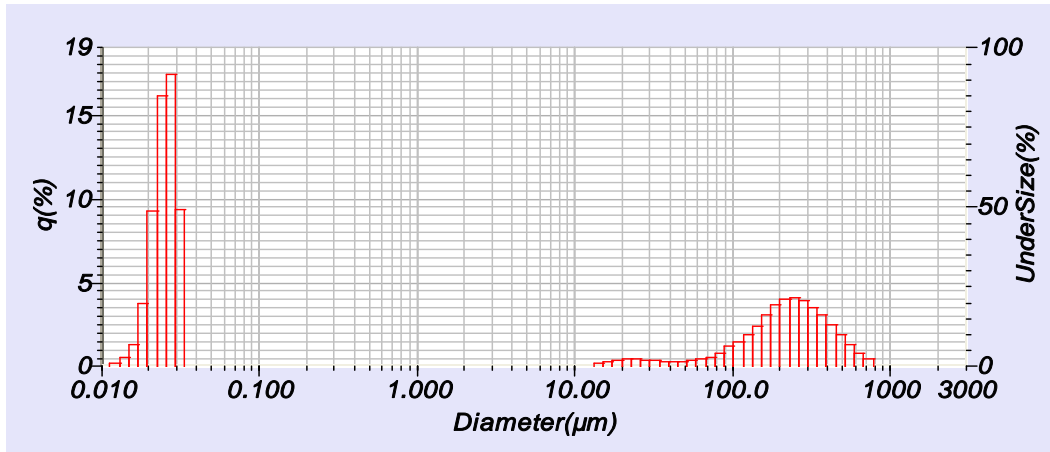


Figure 1: A typical particle size distribution result for LUDOX TM measured without 0.01N KCl diluent. Note the presence of agglomerates between 10-1000μm.



Figure 2 shows a typical particle size result for well-dispersed LUDOX TM. The median size (D50) should be within 10% of the nominal value. In this example the median diameter is 32 nanometers.

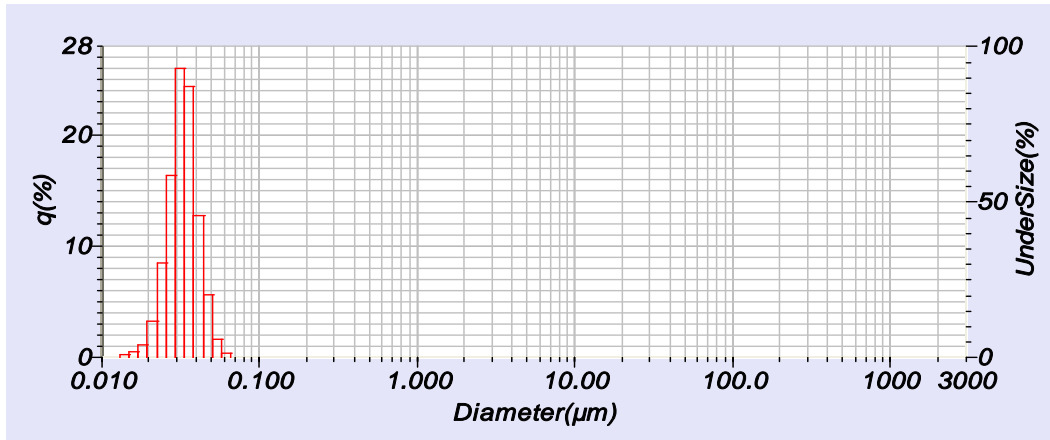


Figure 2: LUDOX TM-50 diluted to 10 wt% in 0.01N KCl. Properly prepared LUDOX TM possesses only particles in the nanometer scale.

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