

## Specifications for Nano Particle Size Analyzer

### The instrument

- The Nanoparticle Size Analyzer instrument is intended for accurate nano and micron size particle size analysis of a wide variety of samples (colloids, micelles, emulsions, suspensions, slurries, sludge's and various metallic, semiconductor and ceramic nanoparticles) and concentrations

### A. Detailed specifications of the machine

- The instrument should be capable of **accurately** measuring particle size distribution of a wide range of materials including colloids, micelles, emulsions, suspensions, slurries, sludge's and various metallic, semiconductor and ceramic nanoparticles etc
- Should be capable of measuring particle size from ~1 nm to ~6 micron or better
- Equipment should have high repeatability of  $\pm 0.1\%$  and accuracy of  $\pm 0.6\%$  or better
- Measurement through Laser diffraction method (dynamic/static light scattering principle)
- **Calibration standards:** Size (nanospheres), Molecular weight standards to be provided
- **Zeta potential** measurement capability
- **Molecular weight** measurement capability
- All required cables and connectors

### B. Computer and Software

- **Computer:** Compatible latest high performance computer with Windows operating system (excluding Windows Vista) and monitor. The computer should have minimum 8 GB RAM, CD/DVD writer, minimum 500 GB hard disk. The computer should be guaranteed for a period of 2 years from the date of Nanoparticle Size Analyzer commissioning. It is preferred that the computer is procured in India, integrated with the equipment and the required software's are to be installed.
- Suitable scanner and printer to be provided with details
- All catalogues related to Software / Hardware to be provided
- **Software: Following software's should be provided**
  - To operate the equipment
  - To analyze the data. The software should be capable of performing all the required **statistical analysis** (median, mode, mean, span, variance, standard deviation, geometric mean, geometric variance, geometric standard deviation, coefficient of variation (CV), Chi-square, % on diameter up to 10 points and diameter on % up to 10 points) of the data
- **Reinstallation CD's:** CDs containing all the reinstallation software and manuals should be provided
- Software upgrades as and when made available and any price involved should be quoted

### C. Power requirements

- Power 220-240 V AC, 50 Hz
- Suitable Indian make UPS (APC/ SOCOMEC) with backup power of upto 30 minutes to be quoted

### D. Qualification criteria & other aspects

- The vendor should have supplied minimum two Nanoparticle Size Analyzer instruments in India and details should be furnished. A certificate from the users should be furnished for, the satisfactory operation of the instrument for last two years.
- Should have agents in India to provide after sales service, support and maintenance.
- The machine should be guaranteed for a period of 2 years from the date of commissioning. During warranty period, if there is any repair to be carried out at the supplier's works, transportation cost of equipment/component besides repair / replacement charges, if any, should be borne by the supplier.
- AMC charges for 3 years beyond the warranty period of 2 years
- Photograph and catalogue related to each and every item should be enclosed.
- **Training:** For BHEL engineers at BHEL Corporate R & D. Training expenses, if any, to be provided

- Dimensions of equipment, weight and space requirements should be submitted in technical offer.
- Installation & Commissioning should be carried out at BHEL R&D. Pre-installation requirements should be furnished.
- Commissioning charges, if any, to be indicated.
- Compliance statement of specification to be submitted along with the offer. Failure to give compliance statement, the offer is liable to be rejected. All tender specifications to be compared with machine offered line by line and documentary evidence must be enclosed by the supplier along with quotation.
- Two hard copies of all the operational manuals related to the Nanoparticle Size Analyzer instrument should be provided.
- Supplier must be ISO 9001: 2001 certified

#### **E. Options**

- Viscosity of dispersed particles in solution
- Spares required for trouble free operation

#### **F. Technical & Commercial bid submission**

- F.1. Technical offer with all catalogues should be provided
- F.2. Compliance statement meeting the specification line by line should be provided (Failure to give compliance statement, the offer is liable to be rejected)
- F.3. Commercial bid with terms and conditions to be submitted in a separate Sealed Cover

**G. After the Nanoparticle Size Analyzer instrument delivery to BHEL R & D, if the instrument is installed in existing R & D building and later if it has to be shifted to the new building (Center for Nanotechnology and Applications) this has to be done by the supplier and related expenses should be specified. The shifting will be within 9 months of initial installation**

**H. Delivery:** The equipment should be delivered within 4 months from the date of placement of purchase order

Note: All covers should be clearly marked indicating the contents and should be SEALED.

For any Technical Clarification, please contact :

Shri K Venugopal, AGM( CNT) at E-mail ID : [venugopal@bhelrnd.co.in](mailto:venugopal@bhelrnd.co.in)