SOLE SOURCE JUSTIFICATION

PURCHASE AND SUPPLY OF THE EXOID

OVERVIEW

The Exoid, designed and manufactured by Izon Science, is the only commercially available tunable nanopore-based particle measurement system in the world. The Exoid is Izon's latest measurement instrument. Its predecessor is the qNano, which was discontinued in March 2021. The Exoid has several unique capabilities that are necessary for nanoparticle measurement, which is a key aspect of research, development, and quality assurance across a range of industries.

The underlying method is called Tunable Resistive Pulse Sensing (TRPS). The measurement principles of TRPS are entirely different to light-based technologies and enable multiple physical properties to be measured at a uniquely high resolution.

TRPS is the principle of resistive pulse sensing combined with size-tunable pores at the nanoscale, and tunable pressure and voltage across the nanopore. TRPS enables users to directly measure the physical properties of individual nano- and micro-sized particles in solution. The correct particle size distribution, particle concentration (defined across a size range) and zeta potential can be measured on a particle-by-particle basis for a wide range of particle types. Traceable calibration with certified particles of a known size and concentration serves as a built-in validation step, enabling highly reproducible and reliable measurements.

The combined use of pressure and electrophoresis allows highly precise and accurate multi-parameter measurement not available with any other systems. Users control particle movement and velocity through the tunable pore via fine control of electric and/or pressure-driven mechanisms at variable types of pore geometry, thus offering a detailed description of particle mixtures in solution with single-particle resolution.

SPECIFICATIONS

Particle Size

- Correct measurement of nano- and micro-sized particle dispersions in dilute and high concentration complex mixtures is possible with each single particle measurement related back to a traceable calibration standard.
- Particle size range detectable: 40 nm to 11 µm.
- Particle types: synthetic and biological particles.

Sample Concentration (particles/mL)

- Measurement of nano- and micro-sized particle concentration (in particles/mL) can be determined.
- Particle concentration reported over a defined particle size range allowing accurate data comparison.
- The preferred approach is to provide the accurate number of particles for each size range.
- Concentration range: 10^5 - 10^{11} particles/mL (Note: this is dependent on nanopore size).

Zeta Potential

- Measurement of zeta potential distribution of nano-and micro-sized particles in solution, on a particle-by-particle basis with single particle resolution is possible. A range of electrolyte conditions can be examined.
- Analysis size range: 40 – 2000 nm.

Instrument Dimensions

- The Exoid is portable and compact (~30 cm x 30 cm base, 25 cm height).

Electrolyte

- A wide range of electrolyte solutions can be used, such as PBS, HEPES, MES, and KCl.
- Electrolyte strength: 10 - 300 mM (Note: operation of larger nanopores NP800 and above requires a lower molarity electrolyte).

Sample Volume

- The sample must be diluted to an appropriate concentration. 35 µL is required for each measurement.

Computer System

- A computer with the appropriate instrument control software installed (Exoid Control Suite, ECS) is required to operate the instrument. Computers are normally provided with the package and software licenses and upgrades are included. The minimum PC requirements are as follows:
  - 16 GB RAM
  - i7 Processor
  - 256 GB SSD
  - Dedicated GPU with at least 1GB graphics memory
  - Windows 10 Pro

Power Supply

- Normal wall-socket power, on universal AC 100 to 240 V, 47 to 63 Hz electrical supply. Converts to 24 V DC.

Training and Support

- Izon Science Support Centre: online support resources.
- Izon Academy: online courses and measurement certification.
- Remote video support available.
- Onsite training and support can be provided at additional cost.

Manuals

- Instructions for operation are provided as PDFs on Izon's online support portal.

Warranty

- 24-month warranty is provided by the manufacturer.

Shipment

- Exoid box dimensions: ~40x41x39 cm
- Weight (boxed): 13 kg
- Weight (unboxed): 10.8 kg