

PART 1 GENERAL

1.1 Section includes

A. Particle counter for monitoring 2 to 750 micron diameter particles in water.

1.2 Measurement Procedures

A. The method of counting particles will be by laser-illumination, light-blocking.

1.3 Alternates

A. Other methods of particle counting, such as those that use sapphire laminated to a substrate material or sapphire coating on a substrate material, are not acceptable.

1.4 System Description

A. Performance Requirements

1. Particle detection range: 2 to 750 micrometer diameter
2. Number of discrete bin sizes: 32
3. Count limits: 9,999,999 totalized count, updated at end of each count cycle, maximum
4. Sample/hold time: 1 second to 24 hours
5. Internal light transmittance: 99.0 percent, minimum

1.5 Certifications

A. Safety: UL/CSA approved 100-115 V, 50/60 Hz external wall-style power supply or 100-240 V, 50/60 Hz external NEMA-enclosed power supply certified with the instrument to EN 61010-1 (IEC1010-1).

B. Immunity: EN 50081-2: 1992 (Generic Immunity Standard) per 89/336/EEC EMC

C. Emissions: EN 50081-2 (Generic Emissions Standard) per 89/336/EEC EMC

1.6 Environmental Requirements

A. Operational Criteria

1. Sample flow rate: 100 mL/minute
2. Operating temperature: 0 to 50 degrees C (32 to 122 degrees F)
3. Pressure: 65 psig, not more than 1 minute; 55 psig, continuous

1.7 Warranty

A. The product includes a one-year warranty from the date of shipment.

1.8 Maintenance Service

A. Scheduled maintenance:

1. Calibration: as experience dictates

B. Unscheduled maintenance

1. Clean sensor
2. Clean brush
3. Replace sensor flow cell
4. Replace tubing

PART 2 PRODUCTS

2.1 Manufacturer

A. Hach Company, Loveland, CO model 2200 PCX Particle Counter

2.2 Manufactured Unit

A. The 2200 PCX Particle Counter consists of sensor/counters and counter electronics for counting particles in discrete sizes.

B. The 2200 PCX is housed entirely in a NEMA 4X enclosure.

C. The power supply for the 2200 PCX is external. AC power is not present in any enclosure containing the sample stream.

2.3 Equipment

A. The 2200 PCX Particle Counter uses 100-115 Vac or 220 to 240 Vac, 50 to 60 Hz, power.

B. The 2200 PCX operates in cumulative/differential counting/transmitting modes.

C. The 2200 PCX is capable of self-timing and can operate as an independent device.

D. The sensor, 750 by 750 micrometers, is volumetric and the sensing area is the entire cross-section of the sample flow path.

E. Cleaning of the sensor for maintenance can be performed without opening the enclosure.

F. The 2200 PCX is equipped with a field replaceable flow cell that can be installed without special tools.

G. The sensors are calibrated per ASTM F 658, using NIST traceable PSL spheres from Duke Scientific and have size resolution of better than 10% at 10 micrometers (per USP 788).

H. Indicators are provided for power, counting display (6-digit capacity), clean sensor, and alarm.

I. The electronics of the 2200 PCX have 12-bit A/D resolution.

J. Sensor/counters of the 2200 PCX can communicate to a data collection system using RS485 serial communications. Particle counts are transmitted in raw, total counts (not normalized to counts/mL).

K. The 2200 PCX can accept up to eight analog input signals from other measurement devices.

2.4 Components

A. Standard equipment:

1. Sensor/counter
2. Spare sensor cell
3. Power supply
4. Manual

B. Dimensions

1. 21 cm (8.3 inches) wide
2. 33 cm (13.8 inches) high
3. 18 cm (7 inches) deep

C. Weight: 25 pounds

D. Connectors (inlet and outlet): quick disconnect to 1/4-inch OD tubing

2.5 Accessories

- A. Flow control: active and passive/manual control devices
- B. Analog input/output card
- C. Computer: IBM-compatible
- D. Software for filter performance, report generation, communication for standalone operation of direct connection to SCADA system.
- E. Grab sampling instrument
- F. Junction box for permanent installation

PART 3 EXECUTION

3.1 Preparation

- A. Wall mount
- B. Indoor installation
- C. 120 Vac wall plug
- D. Distance sensor to computer: 1219 m (4000 ft.) maximum
- E. Computer setting: 9600 baud, no parity, eight data bits, one stop bit
- F. DC inputs to 2200 PCX with local display:
 - 1. +15 V @ 195 mA (3 W maximum)
 - 2. -15 V @ 40 mA (0.6 W maximum)
 - 3. +5 V @ 55 mA (0.3 W maximum)

3.2 Installation

- A. Contractor will install the particle counter in strict accordance with the manufacturer's instructions and recommendation.
- B. Manufacturer's representative will include a half-day of start-up service by a factory-trained technician.
 - 1. Contractor will schedule a date and time for start-up.
 - 2. Contractor will require the following people to be present during the start-up procedure.
 - a. General contractor
 - b. Hach Company factory trained representative
 - c. Owner's personnel

3.3 Manufacturer's Service and Start-Up

- A. Contractor will include the manufacturer's services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.
- B. Contractor will include a manufacturer's Service Agreement that covers all the manufacturer's recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
- C. Items A and B are to be performed by manufacturer's factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
- D. Use of manufacturer's service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION