WATER SUPPLIES DEPARTMENT

STANDARD SPECIFICATION E-78-03

TURBIDITY MEASURING INSTRUMENTS

1. DESIGN

Turbidity meter shall be used to measure the concentration of suspended particles in water. Light scattering principle to ISO 7027 shall be employed for turbidity measurement.

The turbidity measuring system shall be microprocessor-based consisting of a continuous process nephelometer in which a single wavelength light beam shall be emitted from an infrared LED source for passing through the water sample with measurement to be made on the amount of light scattered 90 degree by the turbidity particles.

The measurement of the instrument shall be in Nephelometric Turbidity Units in the range of normally 0-1 NTU, 0-10 NTU and 0-100 NTU to be specified.

The resolution and system accuracy of the instruments shall be as follows:

Operating Range	Up to 0-2 NTU	Greater than 0-2 NTU and up to 0-10 NTU	Greater than 0-10 NTU
Resolution	0.01 NTU	0.01 NTU	0.1 NTU
System Accuracy	$\pm$ 5% of reading	$\pm$ 0.1 NTU (for filtered water application) $\pm$ 0.2 NTU (for other applications)	$\pm$ 5% of reading

The system response time for a 90% step change shall be less than 90 seconds at the design sample flow rate. For sludge effluent measurement, the range shall be in percentage dry weight of solid content.

The instruments shall be designed to avoid erroneous readings caused by stray light, air bubbles, coarse particles and electromagnetic interference.

Connecting cables between the turbidity sensor and transmitter shall be supplied. The allowable distance between the sensor and the transmitter shall be not less than 15 m.

The instruments shall be capable of being calibrated by means of standard solutions or a secondary standard device placed in the light path.

2. CONSTRUCTION

(a) Turbidity Sensor

Turbidity sensor shall operate on low d.c. voltage derived from the turbidity transmitter.

The enclosure of the turbidity sensor shall be fabricated from chemical resistant materials compatible with the sampled water. Electronic components and wiring terminals shall be installed in an isolated compartment sealed off from the wetted parts of the measuring instrument. The detector head assembly shall be removable from the sensor body for maintenance and inspection.

A mechanical wiper shall be built-in with the turbidity sensor for automatic cleaning. The cleaning time and frequency shall be adjustable and programmable at the turbidity transmitter.

Flow-through type sensor shall have IP65 enclosure to BS EN 60529 suitable for wall mounting by stainless steel brackets. Integrated bubble trap shall be provided with the sensor to eliminate any incoming gas bubbles before the sampled water enters the measuring chamber to enhance the accuracy in measurement. A drain cock shall be provided at the bottom of the instrument.

Dip type sensor shall have IP68 enclosure to BS EN 60529. Stainless steel mounting accessories shall be provided for the installation of the equipment.

(b) Turbidity Transmitter

The turbidity transmitter shall have IP65 enclosure to BS EN 60529 and shall be fabricated from glass reinforced plastic or aluminium with epoxy finish. The transmitter shall be suitable for wall mounting and operation at 220V 50Hz a.c. supply. Stainless steel mounting brackets shall be provided for the installation of the equipment.

The turbidity transmitter shall have a 4-20 mA d.c. analogue output capable of driving a 500 ohm load for remote indication and recording.

A 4-digit backlit LCD indicator integrated with the turbidity transmitter for instant display of the measured turbidity value shall be provided. Two signal limit alarms adjustable from 0-100% of the whole measurement range and one equipment failure alarm shall be provided. Alarm of the turbidity transmitter shall include local alarm indication and a volt-free relay output contact rated at 2A 220V a.c. for remote alarm annunciation.

Dedicated keys shall be provided at the turbidity transmitter to allow configuration, calibration, interrogation and access to all built-in functions of the turbidity measuring system.

- End of this Specification -