

WATER SUPPLIES DEPARTMENT
STANDARD SPECIFICATION E-78-05
FLUORIDE MEASURING INSTRUMENTS

1. **DESIGN**

The fluoride measuring instrument shall be used to measure the concentration of fluoride ion in the sample. The ion-selective electrode (ISE) method shall be employed and the fluoride-selective sensor shall produce an output signal which is proportional to the fluoride ion concentration.

The fluoride measuring instrument shall be microprocessor-based, with the measuring system using two electrodes in which one shall be the fluoride measuring electrode and the other shall be the standard reference electrode. The measurement output shall be temperature compensated automatically and continuously using an integrated temperature sensor.

To ensure accurate measurement values, the instrument shall be operated in the range of pH from 6 to 9. The instrument shall be capable of being calibrated by means of standard solutions in a form of 2-point calibration which applies zero drift and slope correction to the sensor output.

Measurement range shall normally be 0.1-3 ppm, unless otherwise specified. Measurement resolution shall be 0.01 ppm and measurement accuracy shall be $\pm 5\%$ of reading.

The instrument shall be designed to avoid erroneous readings caused by air bubbles. The fluoride measuring electrode shall be removable from the sensor body for maintenance and inspection. If the sensor is not integrated inside the transmitter, at least 15m sheathed control cable shall be provided for connecting the sensor to the transmitter.

2. **CONSTRUCTION**

(a) **Fluoride Sensor**

The power supply for the fluoride sensor shall be provided by the fluoride transmitter.

The sensor shall have at least IP65 enclosure to IEC 60529 and the enclosure shall be fabricated from chemical resistant materials or other approved and equivalent material suitable for operation with the sample solution. Electronic components and wiring terminals shall be installed in an isolated compartment sealed off from the wetted parts of the sensors.

(b) Fluoride Transmitter

The fluoride transmitter shall have at least IP54 enclosure to IEC 60529 and shall be suitable for operation at 220V 50Hz a.c. supply.

The fluoride transmitter shall be equipped with both analogue and digital interfaces for remote indication and recording. The analogue interface shall be a 4-20 mA d.c. signal capable of driving a 450-ohm load. The digital interface shall support MODBUS, Profibus or HART protocol.

The fluoride transmitter shall have at least a 3-digit integrated display unit for instant display of measurement result. At least two signal limit alarms adjustable from 0% to 100% of the whole measurement range and one equipment failure alarm shall be provided. Apart from local indication, the transmitter shall incorporate for each alarm a pair of volt-free relay output contacts rated of at least 2A 220V a.c. for remote annunciation if fieldbus communication is not required.

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

- End of this Specification -