

Information about the equipment for website

**Name of equipment:** Thermo Scientific Orion 5 - Star Meter

**Make:** Thermo Scientific (Thermo Electron Corporation)

**Model:** Orion 5-Star pH/ISE/Cond/DO Bench top Meter

Working Principal:

F ISE, the ion-selective membrane is a single crystal of Lanthanum Fluoride ( $\text{LaF}_3$ ) doped with Europium Fluoride ( $\text{EuF}_2$ ) which produces holes in the crystal lattice through which F ions can pass. When immersed in a fluoride solution and connected via a voltmeter to an AgCl/KCl external reference electrode immersed in the same solution, the negative F ions in the solution pass through the crystal membrane by normal diffusion from high concentration to low concentration until there is an equilibrium between the force of diffusion and the reverse electrostatic force due to repulsion between particles of similar charge. On the other side of the membrane there is a corresponding build-up of positive ions.

The build up of negative F ions on the inside of the membrane is compensated for by Cl ions in the internal reference solution becoming neutralised by combining with the Ag/AgCl wire, and electrons are thus forced through the external wire to the voltage measuring device (ion meter or computer interface). The other terminal of the voltmeter is connected to the Ag/AgCl wire of the external reference electrode. Here, the influx of electrons causes Ag ions in the filling solution to accept electrons and deposit on the silver wire and, consequently, Cl ions to flow out into the sample solution.

**Application of Equipment:** Measuring of pH//ISE/Conductivity/DO

**Instruction for Use:** *FLUORIDE ESTIMATION IN WATER/URINE*

Fill the electrode up to below filling hole

By filling solution to activate the electrode



\* Prepare fluoride standard:-

1. To prepare 10.0 ppm:- Add 9ml Distilled Water +1 ml Fluoride standard 100 ppm  $\text{F}^-$  in a plastic beaker, mix well
2. To prepare 1.0 ppm:- Add 9ml Distilled Water +1ml prepared 10 ppm solution in a plastic beaker, mix well
3. To prepare 0.1 ppm:- Add 9ml Distilled Water + 1ml prepared 1ppm solution in a plastic beaker, mix well and discard 1 ml
4. Add 1 ml TISAB III in each of the standard



Measure each standard of fluoride from lower to higher concentration i.e. 0.1 ppm, 1 ppm and than 10 ppm & set the standard in the Ion meter  
(Rinse the electrode with Distilled Water after each reading of Standard solution)



Record the resulting slope value.  
The slope should be between -54 to -60Mv.



Take 9ml water/urine which is to be tested in a plastic beaker of 50 ml  
& add 1ml TISAB III Buffer



Mix well and dip the electrode in solution



Take the reading and record the fluoride content  
(Rinse the electrode with Distilled Water after each sample)

\*Note: The dilution from the stock standard should be done in such a way that the value of unknown sample lies between two standards.

**Fees for Use:** (Please put tentative fees for use we may have to approach ICMR for approval): **Approx. Cost - 200 per Test**

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