

CSIR-NEERI OxiMax Electrolytic Defluoridation System

Designed & Developed
by



Manufactured & Marketed
by



HES

OxiMax
WATER QUALITY SOLUTIONS

NEERI - HES Water Engineers India

NEERI, India's premier research institute on Environmental Science and Engineering, and HES Water Engineers India Pvt. Ltd., one of India's fastest growing companies in the field of water quality solutions have come together to deal with the menace of fluoride in the country's groundwater. Since its inception in 2005, HES Water Engineers India Pvt. Ltd. has been at the forefront of introducing effective, sustainable, and economical technologies to treat potable water. With similar vision to make available clean drinking water to the people of India the two organizations have joined hands, wherein NEERI transferred its technology for defluoridation to HES Water Engineers India Pvt. Ltd. for manufacturing and marketing of the same.

What is Electrolytic Defluoridation (EDF)? How does it Work?

Electrolytic defluoridation process is a water purification system suitable for fluoride affected area with water containing excess fluoride. In areas having a power crisis, a system running on solar energy can be incorporated. The process is effective to remove excess fluoride and also bring down the bacterial load of the raw water. The defluoridation process is based on the principle of electrolysis, using aluminium plate electrodes placed in the raw water containing excess fluoride. During the electrolysis, anode gets ionized and fluoride is removed by complex formation, adsorption, precipitation, coagulation and settling.

An electrolytic defluoridation unit basically consists of electrolytic reactors having aluminium anode and cathode. When a DC source is applied across the electrodes, the anode dissolves and hydrogen gas is released at the cathode. During the dissolution of anode various aqueous metallic species are produced, which depend on the solution chemistry. These metallic species act as a coagulant by combining with the fluoride ions present in the water to form large size flocs which can be removed by sedimentation or filtration.

Installation of Electrolytic Defluoridation Plant



Dongargaon, Chandrapur Distt,
(Maharashtra)



CSIR-NEERI OxiMax
Electrolytic Defluoridation System



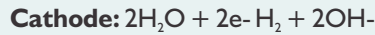
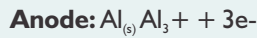
Usarwara village in Durg Distt.
(C.G.)



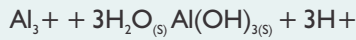
Chhindwara
(M.P.)

Effective, Economical & Simple Fluoride Removal Technology for the Masses

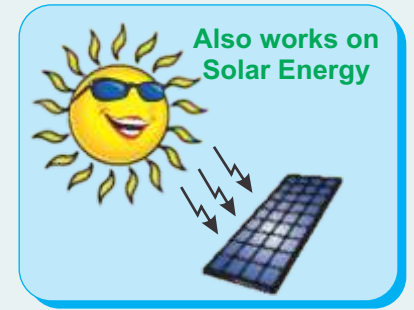
The chemical reaction taking place during electrolytic defluoridation is as following:



The Al_3^+ ions further react to form $Al(OH)_3$ flocs which adsorb the fluoride ions present in the water resulting in the formation of the sludge.



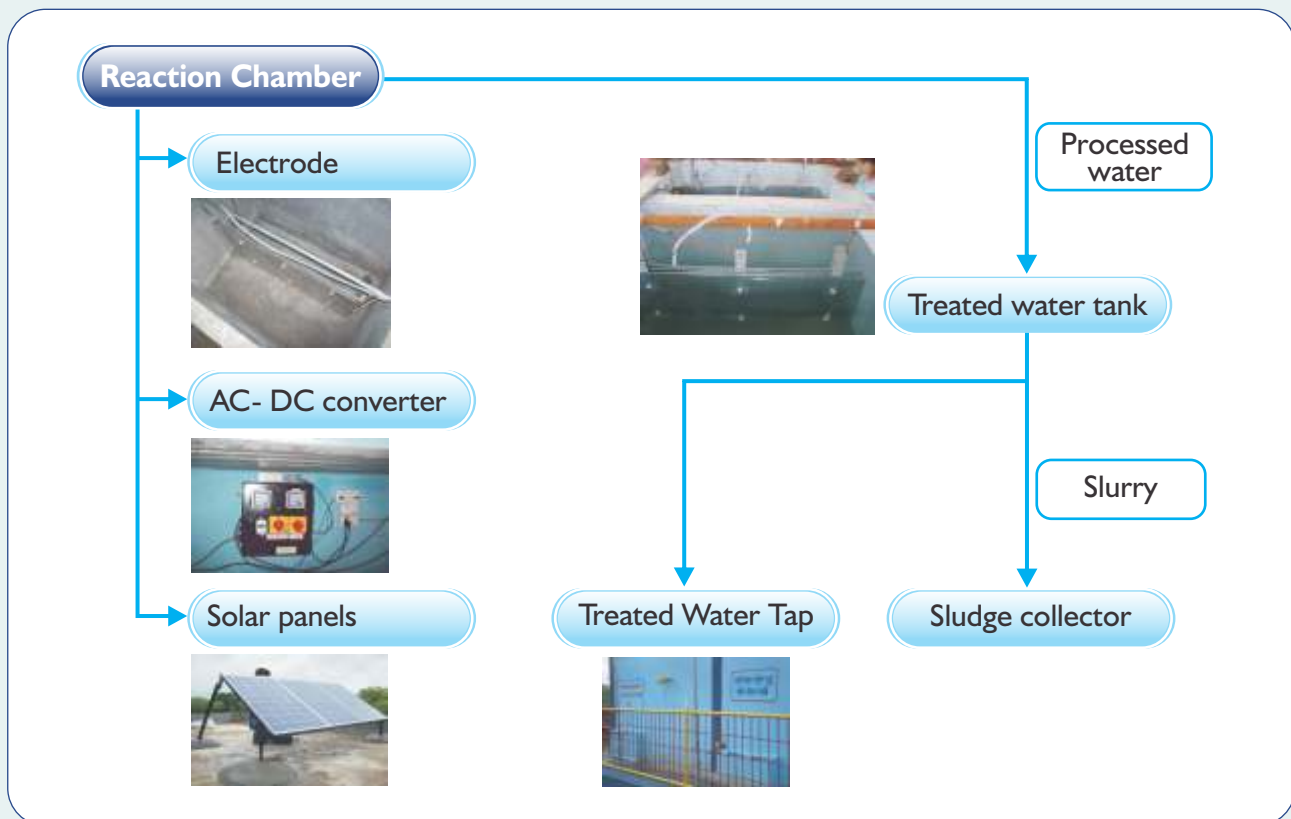
Direct Current (20-30 amp) required for electrolytic process is generated either by conversion of AC electric supply by DC conversion unit of required capacity or by solar photovoltaic system consisting of solar panel, charge controller and battery.



Sludge Disposal

No leaching of fluoride back to water from sludge generated in the electrolytic defluoridation process was observed in the studies carried out. Small sand sludge drying bed can be constructed outside the plant on which sludge slurry can be put to drain the water in the sludge and allowing sludge to dry. Dried sludge can be disposed in the land filling or may be used in brick making.

Flow Diagram for CSIR-NEERI OxiMax Electrolytic Defluoridation Plant



Advantages

- Developed by NEERI, India's premier research institute
- Reduces the fluoride concentration to < 1.0 mg/L
- Useful for safe water supply in fluoride affected area
- Easy to operate even by unskilled persons
- Minimum maintenance
- Produce potable water with palatable taste
- Quantity of sludge produced is much less (60-70%) as compared to conventional treatment methods
- Simultaneous reduction in bacterial contamination in treated water.



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