

DETERIORATION OF CONCRETE IN ALUM TREATED WATER STORAGE TANKS

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One of the major steps in water purification is coagulations. The coagulation process is used to remove dirt and other particles suspended in water. When Alum and other chemicals are added to water it forms tiny sticky particles called "flock" which attracts the dirt particles into it. As the combined weight of the dirt and the alum (flock) is heavy enough to sink to the bottom they sediment during the process.

When alum is introduced in to water in a concrete tank, it can be observed that the inner surface of the tank get dissolved in to water. Hence the strength of the tank gradually decreases and after several years the tank will be useless.

X-ray Fluorescence Spectroscopy (XRF) was used to determine the elements and the compounds present in the concrete sample. Atomic Absorption Spectroscopy (AAS) was used to determine the quantity of Ca^{2+} leaching out of the concrete block and Al^{3+} leached in to the concrete block during the treatment. Further X-ray diffraction analysis (XRD) was carried out to determine the changes in micro crystalline structure of the concrete block.

The investigation resulted that Ca^{2+} leached out from the concrete block and the Al^{3+} leached in to the concrete block. As a result the micro crystalline structure of the concrete block has been changed. This phenomenon has been proven by the XRD analysis. The XRD results specifically show that the sulphate ions play a major role in deterioration of concrete.