

Technical Information:

Date: March 2006
Subject: Water Treatment Application Info
Product: Aluminum Sulphate

Aluminum Sulphate

Chemical – Typically 48% Aluminum Sulphate (Aluminum Sulfate)
 Chemical Formula $Al_2(SO_4)_3$

Characteristics –

- pH approx 2.0 – 3.0
- Specific Gravity 1.335
- Vapour pressure 2.3 kPa (17.5 mm Hg) at 20 Celsius
- Melting / freezing point - 16 Celsius
- Boiling Point 101 Celsius

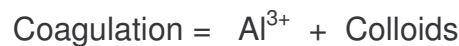
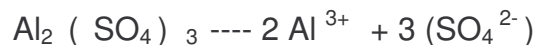
Coagulating agents are used in municipal, Industrial water and wastewater treatment. They are used mainly to treat water for the removal of colloidal particles (turbidity) which helps clarify the water. These colloidal particles typically have a charge associated with them referred to as the Zeta potential. Normally in water treatment this overall charge is negative.

It is important to take out colloidal matter since this can transport / hide bacteria, increase chlorine demand and create precipitation problems in the distribution system.

As a coagulant Alum is used to neutralize colloidal particulate charges (Zeta Potential) and form larger floc's which can be removed in the subsequent sedimentation tank.

The pH of the water has to be monitored as Alum has an effective range of 5.5 to 7.5 and loses efficiency above or below these values.

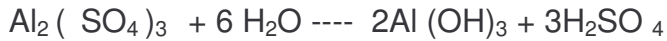
As Alum is added to the water it dissociates to the Aluminum Ion and the Sulphate Ion



Each Aluminum ion has 3 + charges, these will easily attract the negative charges of the colloidal particulate and reduce the overall charge.

A secondary reaction also occurs.

Alum + Water ----- Aluminum Hydroxide + Sulphuric Acid



The Acid formed will at first consume the water's alkalinity, then reduce the pH of the solution.



If the Alum is overfed or no pH monitoring / control is done, the pH of the water can go below Alum's effective range and ineffective coagulation will take place. Proper pH monitoring and control will maintain the effectiveness of this process.

With the colloidal charge reduced and the size of the "colloids" increased they will more readily bind together – especially with presence of the Aluminum Hydroxide which has a sticky characteristic.

These large Floccs then can be removed from the water by gravity / sedimentation.

To determine how much Alum to use, a jar test is initially done to find the ideal pH and Alum PPM addition for best flocculation.

Alum dosage typically in the 10 – 60 PPM range depending on the results of the Jar test,

Flow and turbidity measurement can be used to adjust dosage of the Alum.

For pump selection, it is compatible with EPDM, Viton, and all the liquid end materials. It is not normally necessary to use springs on the valves.