



How Alum Works

Alum is the name used for aluminum sulfate, chemical formula $Al_2(SO_4)_3$. It is also known as soda alum, filter alum, concentrated alum, pearl alum, pickle alum, cake alum, papermaker's alum and patent alum. Alum's main function is to clarify or floc the pool water.

When alum is broadcast into the water (not added to the skimmer of a sand filter as a filter aid) with a pH near 7.0, it forms a gel-like precipitate that bridges or sticks together. The precipitate is aluminium hydroxide, chemical formula $Al(OH)_3$. The alum precipitate then forms small bundles (called flocs) that trap suspended particles as they fall through the water.

This bridging process is known as flocculation. It creates a large amount of sediment on the bottom of the pool made up of both the dirt (suspended particles) and the gel-like alum precipitate. The sediment is then usually vacuumed to waste rather than filtered out because the amount of sediment is more than most filters can handle. The secret to using alum as a floc is to adjust the pH of the water to near 7.0. For alum to work properly, the pH must be adjusted to 7.0.

When alum is used as a sand filter aid, the alum initially plugs up some of the "holes" between the sand particles in the filter. If the pH has been adjusted to near 7.0, the alum then begins to form that same gel-like material that can trap dirt particles on their way through the filter. This effectively makes the filter remove smaller particles than it normally is capable of removing.

The big question is whether to use alum or not. This is not an easy question. Liquid, organic polymer water clarifiers are far better, faster and a lot less of a hassle to use than alum. If the purpose is to clarify cloudy or hazy water, it is better to recommend using a water clarifier than alum. If the water is really dirty -- like if you can only see down into the water an inch or two -- then a one-time dose of alum may be better than multiple doses of a water clarifier. If the purpose is to make a sand filter more efficient, then alum may be a better choice. The last reason is that alum has been around for a very long time and some customers like using alum instead of the "new-fangled" polymers.

Using Alum as a Water Clarifier or as a Flocculant

For alum to work properly as a water clarifier (not a sand filter aid), the pH of the water needs to be near 7.0. At a pH near 8.0, the floc is unstable and begins to come apart. If the pH is below 6.5, the alum can dissolve in the water making it worthless. The pH should be adjusted to near 7.0 - 7.2 before adding the alum.

Estimates vary on how much alum to use for water clarification. The reason is that the amount needed is dependent upon how much dirt and suspended particles are in the water. A consensus is between 4 and 8 pounds per 10,000 gallons of water.

The amount can then be mixed up in a bucket of water, made into a slurry and added around the perimeter of the pool or dry alum can be broadcast directly into the water. After the pool water has circulated for 4 hours or when the pressure gauge on the filter reaches the manufacturers maximum, turn the circulation equipment off. The settling out of the floc will occur during the next 6 to 12 hours. Once the floc has settled to the bottom, it should be vacuumed to waste. Be careful not to stir up or disturb the alum floc on the pool bottom. The pool water lost due to vacuuming should be replaced and the Total Alkalinity and pH should be readjusted to their proper levels.

Using Alum as a Sand Filter Aid

When alum is used as a sand filter aid, the pH of the pool water should be adjusted to 7.0 to 7.2. Then, with the circulation system on, 1 pound of alum for each square foot of filter area should be added through the skimmer. The dosage may be added dry or as a slurry. The square footage of the filter is usually inscribed on the filter manufacturer's label on the filter. The filter pressure gauge should be watched closely. If the pressure exceeds the manufacturer's recommended maximum, the filter should be backwashed. Extremely dirty water and high doses of alum create large amounts of floc and sediment. It may be necessary to backwash the filter a few times to remove all the material. It may also be necessary to vacuum the pool to get some of the smaller floc that may have passed through the filter. The Total Alkalinity and pH should be readjusted to their proper levels.

Sales Tips and Additional Information

If one of your customers who owns a sand filter is continuously buying alum or clarifiers, you may want to suggest he replace the sand filter with a cartridge filter or a D.E. (diatomaceous earth) filter. As a point of reference, a sand filter will filter a particle as small as 30 microns; a cartridge filter will remove particles that are larger than 8-10 microns; and a D.E. filter can filter particles as small as 1 micron. If the water is not clear enough for your customer's taste, maybe he needs a better filter; He could also need to run his filter for more hours per day; He could need to shock treat or superchlorinate more often; He could need new grids, cartridges or sand; and he could need to just balance his water.