

### Dosing Aluminium Floccing Agents

**Tech Tip #001**

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#### Background.

Sand filtration (or mechanical filtration) will remove most of the solids found in pool water systems. Clarity can be improved by the addition of a floccing agent. The Charged Particles of the floccing agent are attracted to the suspended particles. The particles agglomerate and settle out of solution. The floccing agents generally form a gelatinous mat on the top of the filter media and trap the smaller particulate matter.

#### Common Floccs Used

- PAC (Poly Aluminium Chloride) (Premixed Liquid or Powder)
- Alum (Aluminium Sulphate) (Powder or "Rock" forms)

#### The Process.

##### Alum

- Alum is added to the water
- After a brief time the solution is dissolved
- The resulting solution is slightly acidic
- The acid solution is neutralised by the slightly basic solution of the pool water. (It may require some pH adjustment)
- Most suspended particles in pool water have a negative charge
- The positively charged alum compound are attracted to the negatively charged particles .
- The suspended solids increase in size and then settle out on the filter media
- The filter DP will rise until at the level of Backwash as specified by the manufacturer. (30kpa to 40kpa DP rise)
- The filter will become a more efficient solids trap at higher DP. This is because the gaps between the filter media particles are progressively getting smaller
- After Backwash the floc is renewed

##### PAC

- The process surrounding PAC usage is very similar to that of Alum
- In PAC however the operative coagulant species are already partially formed
- The aluminium is bound in polymer form
- The pH change is less severe
- The process is less pH dependant

#### Adding Floc

##### 1. Alum (Aluminium Sulphate Powder):

Dissolve the required amount of powder into water at the rate of 0.5kg to 1 kg per square meter of filter area. Try to maintain the suspension in solution during dosing. (Stirring by electrical/mechanical stirrer is desirable) If necessary adjust the pH of the pool to between 7.6 and 7.8  
Dose or drip feed the solution into a point well before the filters. (remote corner of wet deck or balance tank)  
This will ensure that the solution is at the correct pH when it gets to the filters.  
This process should take a minimum of 2 hours.

*NB : The addition of Alum without regard to the correct pH will cause the floc to pass through the filters and into the pool.*

## 2. PAC (Poly Aluminium Chloride)

Dilute the required amount of PAC into water.

Dose at the rate of 0.1kg to 0.25 kg per square meter of filter area.

PAC is generally purchased as a pre mixed liquid.

It should be diluted or added in small enough amounts to ensure that the pH is in the correct range prior to the application to the filters.

If necessary adjust the pH of the pool to between 7.6 and 7.8

Dose or drip feed the solution into a point well before the filters. (remote corner of wet deck or balance tank)

This will ensure that the solution is at the correct pH when it gets to the filters.

This process should take a minimum of 2 hours.

*NB : The addition of PAC without regard to the correct pH will cause the floc to pass through the filters and into the pool.*

### General Warnings.

Do not add the alum/PAC :

- too quickly
- too close to the circulation pump
- too close to the filter

Ensure pH of the water is within the 7.6 to 7.8 range, before adding the floc

### General Comments

- The addition of the Floc is generally **post** backwash. The previous floc will have been flushed away during the backwash procedure
- The addition of PAC or Alum **without regard to the correct pH** will cause the floc to pass through the filters and into the pool
- Introduction of alum at **too fast a rate** will result in an acidic solution reaching the filters without a precipitate being formed and will cause the floc to pass through the filters and into the pool
- Introduction of alum **too close to the filter** will result in an acidic solution reaching the filters without a precipitate being formed and will cause the floc to pass through the filters and into the pool
- If the pool water is not slightly basic then the floc will go back into solution. The pH needs to be 7.6 to 7.8.
- Alum in the pool is sticky, and has a silvery cloudy appearance.
- Alum deeply embedded in a filter is seen as an excessively high filter DP (Differential Pressure)(50 to 70 kpa)
- If GAC (*Granulated Activated Carbon*) filters are downstream from the Sand Filters Floc/Alum may also become embedded in these.
- Alum embedded in a GAC filter is also seen as a high DP
- These high DPs may cause a low flow rate
- If the pool is clear at opening and then becomes cloudy immediately after the entry of the first swimmers, it may have alum in the water. The alum settles out overnight and is stirred up by the swimmers. The pool assumes a silvery cloudy sheen when sunlight shines into it.
- Addition of large volumes of make up water may also alter the pH of the floc above the filter. This may allow the floc to dissolve and pass through the filter.
- Addition of neat undiluted chemicals may cause a deep media bed penetration by the floc. This may become hard to remove by normal backwash regimes. Air scouring of the media bed will expand the bed and allow removal of the floc.
- Minimise the addition of acids to the balance tank as this will result in the floc dissolving and passing into the pool.

**Still Need Help ?**

**.....Ring Roejen**

End of Tip