

zeo plus / GARNET

Superior filtration and clarity



Zeoplus



Garnet

Superior Filtration plus Ammonium Reduction

Waterco has devised a filter bed of Zeoplus and Garnet able to achieve effective filtration down to 5 microns with the added benefit of Ammonium adsorption. Garnet (0.2 - 0.6mm) is the means to very fine filtration. However, a filter bed entirely made up of Garnet (specific gravity 4.0) would result in increased head loss, backwash flow rates and a decreased service run. Therefore a lighter (specific gravity 2.4) and coarser (1 - 2.2mm) upper layer of Zeoplus is implemented to lower head loss, backwash flow rates and extend the service run.

Waterco conducted the following tests on Zeoplus/ Garnet's filtration and ammonium adsorption capabilities:

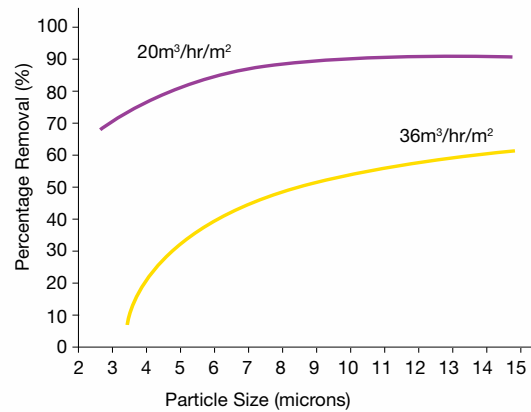
1. Filtration Effectiveness below 5 microns

The combination of Zeoplus and Garnet produces a filter bed capable of filtering particles between 5 and 10 microns.

Zeoplus/Garnet Percentage Removal at:

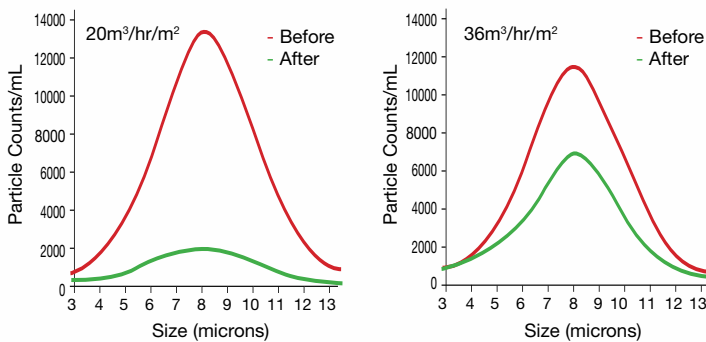
20m³/hr/m² - recommended filtration velocity for residential and commercial water conditioning.

36m³/hr/m² - recommended filtration velocity for commercial pool and spa filtration.



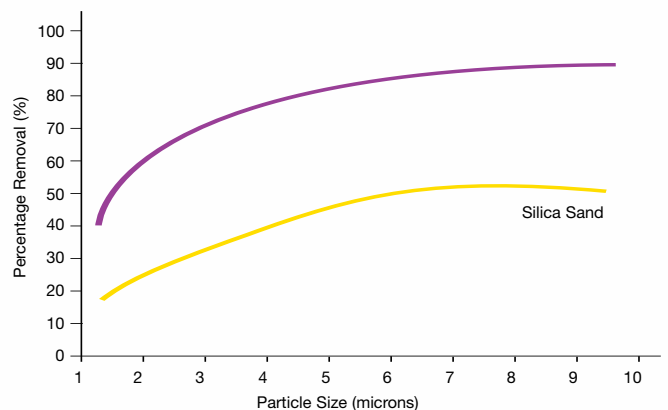
The above graph displays the percentage of sized particles removed at the velocity of 20m³/hr/m² & 36m³/hr/m²

Change in particle concentration at 36m³/hr/m² and 20m³/hr/m²



The above graph reveals the particle concentration of sized particles before filtration and after filtration at the velocity of 20m³/hr/m² and 36m³/hr/m²

Filtration efficiency of Zeoplus/Garnet Vs Silica Sand (0.6 - 1.2mm) Percentage Removal at 20m³/hr/m²

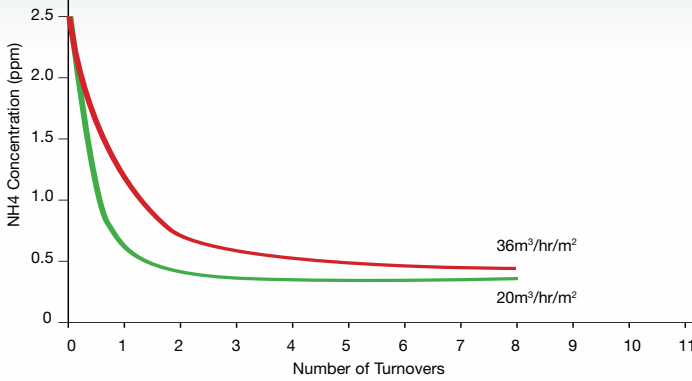


The above graph displays the difference in the percentage removal of sized particles, between Zeoplus/ Garnet and Silica sand at the velocity of 20m³/hr/m²

2. Ammonium Adsorption

Zeoplus is able to absorb ammonia and this decreases the level of chloramine in the swimming pool leading to: *Reduced chlorine demand, *Reduced skin eye irritations, *Reduced "Chlorine" odour.

Number of turnovers and ammonium reduction at 36m³/hr/m² & 20m³/hr/m², in a recirculation system



The above graph shows that Zeoplus/Garnet requires approx. 2-3 turnovers to achieve a desirable concentration of ammonium of less than 0.5 ppm. One turnover removes 88% of ammonium at 20m³/hr/m² & 85% at 36m³/hr/m²

Media Specifications

Zeoplus	
Product Form	Red Angular Grit
Hardness	4.5 - 5.0 Mohs
Product Size	1.0mm - 2.2mm
Product Particle Size	Cubic to blocky
ROM ore	Coarse grained, altered vitric, ash-fall tuff
Geological	Carboniferous (cira 300 million years old)
Main Zeoplus Minerals	Mordeniteand and Clinoptilolite
Density	Approx 1100 kg/m ³
Specific Gravity	2.2 / 2.3
Ammonia Exchange Capacity	Around 65-79 meq./100g

Please Note: Zeoplus is less effective in ammonia removal in saltwater pools than in freshwater pools.

Garnet			
Hardness	7.5 - 8 Mohs	Density	Approx. 2400 kg/m ³
Particle size	0.2 - 0.6mm	Specific Gravity	4.1

Micron Deep Bed Filters

Waterco recommends the use of its range of Micron Deep Bed Filters. The unique deep bed design of the filter enhances Zeoplus/Garnet's filtration and ammonium adsorption capabilities.



Regeneration of ZeoPlus

ZeoPlus should be regenerated once it is saturated i.e. full of ammonium. On an average pool this takes around 12 months, although heavily used spas and hydrotherapy pools may require regeneration sooner. ZeoPlus should be regenerated once ammonium level starts to increase. As a rule of thumb, regenerate ZeoPlus when the ammonium concentration of the outlet water is greater than 1 ppm.

Please note: If ZeoPlus is not regenerated, it may lose its ability to adsorb ammonium. However, it will still perform effectively as a mechanical filter with a life span of up to ten years (depending on the frequency of backwash).

Regeneration Procedure:

1. Backwash the filter as usual until the backwash wastewater is clear of particulates.
2. Isolate the filter.
3. Drain completely the water in the filter by opening the bottom drain plug and replace drain plug once finished.
4. Make up 200g/L of brine solution. Refer to example below to determine the required amounts of salt and water.
5. Pour the well dissolved brine solution into the filter until it completely covers the bed by about 40mm.
6. Mix solution into the media by agitating vigorously. Replace lid or MPV.
7. Leave it to soak overnight (for a minimum period of 12 hours). Once regeneration is complete the ZeoPlus bed must be rinsed with fresh water until the outlet water salt level or TDS is similar to the incoming water.
8. Turn the valve(s) to BACKWASH cycle. Run BACKWASH for 3 to 5 mins
9. Run RINSE cycle for 3 minutes then select BACKWASH again, followed by RINSE for another 3 minutes. If the filter does not have a RINSE cycle, run BACKWASH for an extra 20 minutes.
10. Turn valve(s) to FILTER cycle. You are now ready to operate the ZeoPlus filter as before.

Note:

- Always turn off the pump before changing valve position.
- In heavily used spas and hydrotherapy pools, regeneration may be required sooner than 12 months.

How much Brine is required?

To regenerate a Micron SD600 with ZeoPlus;

Filter Model	Tank Diameter (mm)	Overall Height (mm)	Bed Depth (mm)	ZeoPlus (kg)
SD600	624	1135	500	143

- First calculate the volume of Brine required by determining the volume of Zeoplus in the filter (divide the mass of ZeoPlus (kg) by its bulk density of 1.1 kg/L).
 - > 143 kg / 1.1 kg/L = 130 litres of Brine required,
- If allowing extra 10 litres to adequately cover the filter media, 140 litres of Brine Solution is required.
- Now to make Brine solution of concentration 200 g/L, calculate the mass of salt required.
 - > 140L x 200g/L of Salt = 28,000g or 28 kg of salt
- Therefore add 28 kg of salt to 140 litres of water to produce the necessary amount of Brine to regenerate Zeoplus in the SD600 filter. Salt 25kg – Waterco Code 35219232