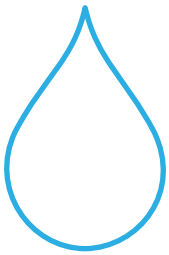
ZEOLITE
CLINOPTILOLITE
APPLICATION FOR



WATER TREATMENT
POOL & SPA

UTILIZATION OF CHLORINE IN POOLS AND THE FORMATION OF CHLORAMINE

Bad odors, skin irritations, eye inflammations and red eyes are frequently encountered situations in cases of pools that have not been good take care of. The root of those problems is chloramine, which is formed with the combining of free-floating chlorine with ammonia that has sweat, body grease and urine in the pool as its source. In order to address and solve this problem, it is necessary to increase the amount of free-floating chlorine in water and to decrease the amount of free-floating ammonia in water.

Zeolite absorbs ammonia that mix into the water from sweat, body grease and urine at a rate of 95%. It prevents the free-floating chlorine in water from getting saturated with ammonia and from becoming ineffective against microbes. By increasing the effectiveness of chlorine use, zeolite decreases the need to apply chlorine to the water. It decreases the cost of using chlorine.

CRUCIAL PROBLEMS THAT CAN BE OVERCOME BY USING ZEOLITE

Problem Encountered	Source of the Problem
Brown/Green, Blurred Water	Algae and Moss
Brown/Green, Clear Water	Fe or Co Ions
Green Colour on Hair and Nails	Co Ions
Water in Black/Dark Colour	Mg Ions
Stains on Pool Floor and Walls	Fe or Co Ions
Grey Clear Water	High Hardness
Grey Blurred Water	Dissolved Solid Particles
Chlorine Smell and Eye Inflammation	High Amounts of Chloramine

NATURAL ZEOLITE - CLINOPTILOLITE: 1 PRODUCT, 2 DIFFERENT FILTRATION

Zeolite carries out two different filtration methods at the same time to filter your water:

Chemical Filtration

It is about filtration of the ammonia in water with chemical methods. The most suitable ingredient for this filtration is zeolite which has a high capacity of exchanging ions. Ammonia, heavy metals and harmful compounds are absorbed by zeolite through ion exchange. On the other hand, sand is an inert material and it has no ability to absorb any ion that is dissolved in water.

Physical Filtration

Zeolite applies physical filtration to solid particles in water. While sand filters are able to filter particles that are 30-40 microns and bigger in size, zeolite can do filtration for particles that are as small as 4 microns and bigger in size. Moreover, zeolite decreases the number of necessary backwashings.

Zeolite filters are replacing sand filters in the USA, Europe and Australia everyday.

COMPARISON OF ZEOLITE AND SAND

	ZEOLITE	SAND
Filtration	>4 micron	>35 micron
Porosity	+++++	++
Surface Area	+++++	+++
Absorption of Ammonia	Yes	No
Absorption of Heavy Metals	Yes	No
Removal of Bad Odors	Yes	No
Bulk Density*	~0,8 kg/lt	~1,2 kg/lt

** Zeolite is an ingredient that is 15% lighter in weight than sand. You can fill your filter with ≈ 85 kg of zeolite instead of 100 kg of sand.*

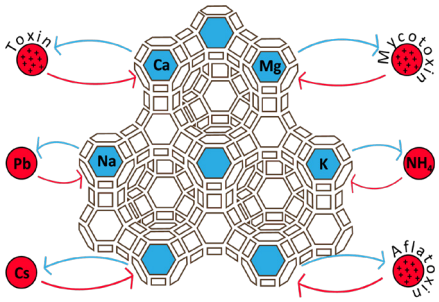
- Ordinary sand is an inert material and it is chemically completely passive. Zeolite, thanks to its high capacity of exchanging ions, removes from water the ammonia resulting from dissolved sweat and urine (at a rate of 100%) and the metal ions.
- Zeolite is more advantageous than sand due to its cage-like structure and high porosity.
- Zeolite greatly decreases your number of backwash and chemical costs.

STARKE AQUACARE TECHNOLOGIES

ZEOLITE
CLINOPTILOLITE

WATER TREATMENT
POOL & SPA

CONTENT
Zeolite is a crystalline, hydrated aluminosilicate that has an infinite three dimensional structure. Zeolite contains extremely pure Clinoptilolite (**92% by mass on average**), which is one of the most effective Heulandite type of zeolite. Its highly porous structure (with a porosity reaching 50%) provides an extremely large surface area on which chemical reactions and cation exchanges can take place at a very high degree. It can absorb incredible amounts of water/liquid into its pores. Clinoptilolite has a natural negative ion charge which furnishes it with a tremendously high cation exchange capacity (CEC). Thanks to CEC, it adsorbs and binds ammonium, toxins, mycotoxins and heavy metals like Ni, Pb, Hg and Cd, very efficiently and effectively.

CATION EXCHANGE CAPACITY


Cation exchange capacity (CEC) is a measure of the amount of cations (positively-charged ions) that a clay can catch. As mycotoxins, toxins, heavy metals and ammonium are all positively charged, they are all easily trapped by cation exchangers. Clinoptilolite from Rota Mining's Gördes / Manisa reservoir possesses by far one of the highest CEC rates (**as high as 170 $cmol^{+}kg^{-1}$**) among all reservoirs in the world. Purity and CEC are the two vital parameters that define the quality of zeolite mineral.

APPLICATION
Fill half of the filter tank with water. Add Zeolite to half the tank and close the lid. Backwash and rinse until all fines are removed. Fill the rest of filter tank with Zeolite to the normal sand level. Backwash and rinse again until all fine particles and dust are removed. Before switching to the filter cycle, do a backwash water clarity check.

Please be reminded that Zeolite is a very porous material. Its pores are filled with fine zeolite particles which may blur the water at first usage if not removed by backwash.

Renew or regenerate your zeolite when it is fully saturated.

SUITABLE SIZES
0,7 - 1,6 mm

1,6 - 3 mm

3 - 5 mm

ENVIRONMENT-FRIENDLY
100% natural and safe product; produced under the strict quality control system and surveillance of FamiQs.

STARKE AQUACARE TECHNOLOGIES