



## All Weather Sports Field Infill



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All Weather Sport Fields that utilize crumb rubber and silica sand started to be used since 1996. Today there are thousands of Fields across the United States. Since 1996 players and owners have had growing concerns with the infill systems that are on the market today. The concerns weather true or not range from; high surface temperatures, crumb rubber containing chemicals, bacteria, MRSA, pungent odor's, abrasiveness of the surface, Prop65 use of Silica Sand and players inhaling dust from silica sand, Some artificial grass infill options that are being used today to get away from the traditional infill are Organic's, Envirofill, Durafill, Copper slag, TPE, TPV, Flexsand, Recycled Infill Materials. However owners have found these products to be very expensive to the project and some of them require a major amount of maintenance and water overtime.

**Solution:** A product named ZeoFill® born in the 1940's for storm water management and hazardous spill clean-ups made out of a natural organic resource from the earth. Now Zeofill is being used as a natural solution to all weather turf problems. It is different than any other infill because ZeoFill® is a negatively charged honey-combed molecular structure which absorbs the water like a magnet and holds it for slow release to cool the surface temperatures. You can use your existing irrigation to water the field before practice and not have the humidity raise dramatically as it does today on older fields.



One of the many health benefits that ZeoFill® provides is the Infill will pull any gases towards itself and hold it until sodium ion ( $\text{Na}^+$ ) in rain water releases the magnetivity and the force of heavy rainfall will flush out the bacteria, forcing it through the turf into the ground making your turf virtually new again. The sodium forces the calcium ions out and recharges the ZeoFill® when dry. This also can be achieved by treating the field with a very low cost solution called Field Clenz when mother nature does not cooperate.

The nicest part of ZeoFill® when pertaining to sport field application is that you are not reinventing the wheel so to speak. The only difference in using ZeoFill® over silica sand is you gain the benefits of a cooler surface, less pungent VOC of the rubber smell, no silica sand for dusting and increase chances of silicosis collection of bacteria from the surface. Your project budget is not being taxed, your maintenance is not changing, your watering is not increasing everything you do today or plan on doing when building a new field all remains the same.

Compared to other zeolite products found in the USA, ZeoFill has the purest clinoptilolite zeolite to avoid possible issues with drainage or even damage to the turf fibers. Harmful elements of the environment in other zeolites contain metals that could contain volcanic glass, lead or even crystalline free silica. Our competitors have 0.01% crystalline free silica and claim to be 97% pure. I don't think so. ZeoFill stands for quality and is the safest zeolite for artificial grass infill.

## DURABILITY IN FIELD APPLICATION

Purity is not the only benefit of ZeoFill. Performance testing has been done in Belgium for durability in field applications. We have established an 8 (eight) year warranty for degeneration on ZeoFill due to the correct Mohs hardness of ZeoFill. Other similar products don't compare and could dissipate sooner. ZeoFill is an angular infill but not sharp enough to tear turf fibers.

The logo for ZeoFill features the word "Zeo" in a white, bold, sans-serif font, with a registered trademark symbol (®) to its upper right. Below "Zeo" is the word "Fill" in a green, cursive script font. A green swoosh arches over the text from the top left to the top right.

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## PROPOSITION 65 SAFE

Proposition 65 Warning labels are not needed when using ZeoFill Infill.

We are Prop 65 Safe. We do not have any trace of crystalline free silica like our competitors.

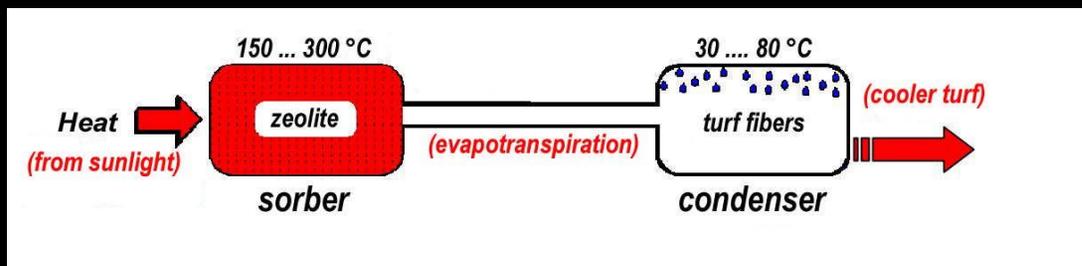
## DRAINAGE

ZeoFill is a molecular structure which allows liquid to drain through itself slowly after saturation. We don't have the harmful angular elements of the environment restricting water from flowing through ZeoFill like other zeolites.



## COOLER FIBERS

Zeofill holds 81% of its volume space with water. This allows the field to either capture water natural or thru watering and keep the field cooler longer.



# Zeolites for Cooling Synthetic Turf

## Zeolite Cooling Properties

Zeolite cooling properties are similar to Transpiration which is water within a plant and the subsequent loss of water as vapor through stomata in its leaves. The natural mineral zeolite (e.g. porous aluminosilicate) has the property to naturally attract (adsorb) water vapor for long periods of time and to incorporate it in its internal crystal lattice while releasing heat at the same time:

## Cooling System

A zeolite cooling system requires cycling between adsorption and desorption.

While heat is released in the zeolite, and cooling is seen at the evaporation level. If absorption proceeds in an evacuated environment the attraction of water by the zeolite is so forceful that the internal pressure drops dramatically. The remaining water in an attached vessel evaporates, cools down turf fibers immediately due to the effect of evapotranspiration resulting in cooler synthetic turf fibers.

Evapotranspiration (ET) is the sum of evaporation and transpiration from the Earth's land surface to atmosphere which is an important part of the water cycle. Evaporation accounts for the movement of water to the air from the zeolite granule.

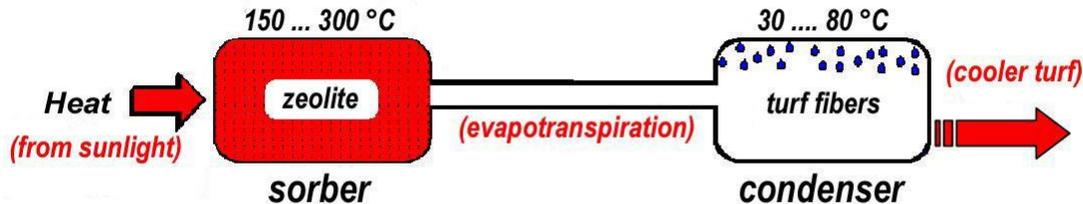


Figure 5: Desorption phase of a Zeolite system

Figure 5 shows the desorption phase. For a comparison to the absorption and transpiration of heat, the left container (sorber) in takes on the role of a single zeolite granule saturated with water under sunlight, and the right container is the (condenser) after evapotranspiration effect. When the zeolite is saturated with water either by soaking using any water source or condensation, desorption is initiated by heat from sunlight at high temperatures. The adsorbed water molecules are forced to evaporate (desorption), and condensation takes place in the condenser. The sequence of adsorption/desorption processes is completely reversible.

## Advantages and Disadvantages

The adsorption of zeolites is very strong, thereby providing the family of materials with unique adsorption properties and permitting extremely high efficiencies for adsorption with artificial turf. Another advantage of zeolite systems is that they allow heating and cooling at the same time. One disadvantage of zeolite systems is that to provide continuous cooling, systems need to cycle between multiple sorption modules. Meaning; when the zeolite granules are dry, no evaporation occur resulting in comparable temperatures to standard silica sand infills. High humidity areas will benefit more than areas with low humidity.

## Materials

Currently the zeolite mines produces more than 1.4 million tons of zeolite annually and it can be expected that the worldwide demand and consequently the production will further increase for a multiple of uses. Only 97% + pure zeolite is adequate for use as an infill for any synthetic turf application as lower purity can destroy turf fibers and/or cause drainage issues due to the negative elements it holds.

*Hydrous Sodium Aluminosilicate  
Natural Clinoptilolite  
Zeolite Granules and Powders*

**TYPICAL PROPERTIES**

<b>General Chemical Formula</b>	<b><math>Na_6[Al_6Si_{30}O_{72}]24H_2O</math></b>
<b>Clinoptilolite Content</b>	<b>97%+</b>
<b>Cation Exchange Capacity (CEC)</b>	<b>1.6 – 2.0 meq/g</b>
<b>Form</b>	<b>Granules and powders</b>
<b>Shape</b>	<b>Angular</b>
<b>Color</b>	<b>Gray – green</b>
<b>Pore Diameter</b>	<b>4.0 – 7.0 angstroms</b>
<b>Specific Gravity</b>	<b>1.89</b>
<b>Specific Surface Area</b>	<b>40m<sup>2</sup>/g</b>
<b>Bulk Density</b>	<b>50 - 65 lbs/ft<sup>3</sup></b>
<b>pH (natural)</b>	<b>7.0</b>
<b>Alkali Stability</b>	<b>pH of 7 - 10</b>
<b>Acid Stability</b>	<b>pH of 3 - 7</b>
<b>Hardness</b>	<b>4.0 - 5.0 Mohs</b>
<b>Swelling Index</b>	<b>Nil</b>

**TYPICAL CHEMICAL ANALYSIS**

<i>SiO<sub>2</sub></i>	<i>Al<sub>2</sub>O<sub>3</sub></i>	<i>Fe<sub>2</sub>O<sub>3</sub></i>	<i>CaO</i>	<i>MgO</i>	<i>Na<sub>2</sub>O</i>	<i>K<sub>2</sub>O</i>	<i>MnO</i>	<i>TiO<sub>2</sub></i>
<b>66.7</b>	<b>11.48</b>	<b>0.9</b>	<b>1.33</b>	<b>0.27</b>	<b>3.96</b>	<b>3.42</b>	<b>0.025</b>	<b>0.13</b>

*This product contains no detectable crystalline silica*

**MAJOR EXCHANGEABLE CATIONS**

<i>Rb<sup>+</sup></i>	<i>Na<sup>+</sup></i>	<i>Ba<sup>2+</sup></i>	<i>Mg<sup>2+</sup></i>	<i>Li<sup>+</sup></i>	<i>Ag<sup>+</sup></i>	<i>Sr<sup>2+</sup></i>	<i>Fe<sup>3+</sup></i>	<i>K<sup>+</sup></i>	<i>Cd<sup>2+</sup></i>
<i>Cu<sup>2+</sup></i>	<i>Co<sup>3+</sup></i>	<i>Cs<sup>+</sup></i>	<i>Pb<sup>2+</sup></i>	<i>Ca<sup>2+</sup></i>	<i>Al<sup>3+</sup></i>	<i>NH<sup>4+</sup></i>	<i>Zn<sup>2+</sup></i>	<i>Hg<sup>2+</sup></i>	<i>Cr<sup>3+</sup></i>