



Odour Control Systems ZEOLITE

Zeolite uses

- Environmental Cleanup
- Soil Amendments
- Fertilizer
- Water Filtration
- Odour Control
- Animal Nutrition
- Waste Water Filtration
- Air Filtration
- Pesticide/Herbicide Carrier
- Pellet Binders
- Desiccants
- Catalysts
- Building Materials
- Flow Agents
- Aquaculture, Ponds, Tanks
- Pozzolan for Cement
- Floor Clean
- Kitty Litter
- No Skid
- Animal Bedding
- Household Uses

“Zeolite” refers to a group of minerals that are basically hydrated calcium potassium sodium aluminosilicates in which the water is held in cavities in the lattice. The lattices are negatively charged and they loosely hold cations such as calcium, sodium, ammonium, and potassium and also water. Their ability to exchange one cation for another is known as their “cation-exchange capacity” or “CEC.” Cation-exchange capacity is a measure of the number of cations per unit weight available for exchange, usually expressed as milliequivalents per 100 grams of material. The zeolites are also referred to as “molecular sieves”, because the channel ways within the crystalline structure are extremely small and they can be used to separate large molecules from smaller molecules.

Benefits

- OCS ZEOLITE is almost pure clinoptilolite with a general formula of $(\text{Na}, \text{K}, \text{Ca})_2\text{-}3\text{Al}_3(\text{Al}, \text{Si})_2\text{Si}_{13}\text{O}_{12}\text{H}_2\text{O}$
The balance is primarily opaline or non-crystalline silica
- It contains approximately 3.5% potassium which is a plant nutrient
- It contains approximately 1.6% calcium which is a pH buffer for soils and plant nutrient
- It contains less than 0.5% sodium, which is toxic to plants
None of the sodium is water soluble
- When loaded with ammonium cations, it becomes a fertilizer
- No significant concentrations of toxic trace elements exist
No trace metal elements are soluble
- When dry, it is light green. When wet the colour is darker green
- It holds up to 55% off its weight in water
- It has a high cation exchange capacity (“CEC”) of 160 to 180 meq/100 grams
- The high CEC allows it to be loaded with 1.8 to 2.1% nitrogen as ammonium
- A low clay content makes it non-clouding in water and also low dust
- It has a very large surface area that is approximately 24.9 square meters per gram
- It is hard and resistant to attrition
- Has good oil adsorption qualities
- It is hydrophilic

Environmental Cleanup

The cation exchange capability of OCS ZEOLITE makes it an excellent candidate for the clean up of oil, diesel, and gasoline; PCBs; soluble heavy metals such as mercury, chromium, lead, zinc, arsenic, molybdenum, nickel, cobalt, antimony, silver, and uranium from water; feed lots; leaching of nitrogen fertilizers into the groundwater; organically polluted water; acid mine drainage; smelter slags; metal contaminated blast sand; metal plating sludge; contaminated soils, solidification and stabilization of hazardous waste; oil refinery and oil field sludge; leach residues; batteries, possibly MTBE and various other organic toxins, and radioactive nuclides such as Sr90, Cs137.

Soil Amendment

Its to hold ammonium and its high potash content, low sodium content, and ability to hold water make it an excellent soil amendment for golf courses, sports fields, parks, common areas, lawns, gardens, all sandy soils, and agricultural applications.

Fertilizer

The ability to load with 1.8 to 2.1% nitrogen in the form of ammonium in its crystal structure makes it excellent for fertilizer applications. The nitrogen is not water-soluble, but it is plant accessible. The zeolite holds the nitrogen in the root zone of the plant. In typical nitrogen fertilizer applications, as much as 35% of the nitrogen leaches out of the growth zone and reports to the aquifer to create nitrite and nitrate contamination. Consequently, the zeolite reduces the amount of nitrogen needed. It contains approximately 3.47% potassium, which is an important nutrient in fertilizers. The zeolite holds at least 55% of its weight in water that protects the plant against drought. Zeolites have been successfully used for golf courses, sports fields, parks and common areas, and high value crops.

Water Filtration and Waste Water Treatment

Zeolites are used as a filter media for particulate removal. Additionally, they are used to remove nitrogen, certain organic hydrocarbons, and toxic cations such as silver, mercury, nickel, chrome, cobalt, antimony, arsenic, etc. Typical applications would include swimming pools, municipal water systems, and waste water treatment plants.

Odour Control

One of the major causes of odour around animals is the generation of ammonia from urea and manure. Essential advantages of using zeolite for odour control of cattle, hog, and poultry feed lots are as follows: it captures ammonium and prevents the formation of ammonia that causes the noxious odour, it removes moisture, it prevents the leaching of the nitrogen to the groundwater, and the ammoniated zeolite then becomes a secondary merchantable product as a fertilizer. Typical applications are for composting cattle, horse, and hog manure; poultry; cats ("Kitty litter"); personal items, room air cleaners, carpet cleaning for pets, diapers; horse stalls, veterinary clinics; and bathrooms.

Air Filtrations

Zeolites have been used for the separation of gasses such as nitrogen, carbon dioxide, sulphur dioxide, and hydrogen sulphide. Typical applications would include: enriched oxygen supplies for steel mills, smelters; re-oxygenation of downstream water from sewage plants, smelters, pulp and paper plants, fishponds and tanks; removal of carbon dioxide, sulphur dioxide, and hydrogen sulphide from sour natural gas; removal of carbon dioxide, sulphur dioxide, and hydrogen sulphide from methane generators such as organic waste, sanitary landfills, municipal sewage systems, animal waste treatment facilities; the removal of sulphur dioxide from stack gasses such as coal generating plants (to limit sulphur dioxide, emissions to 100ppm for EPA standards); coal gasification from underground sources for the removal of nitrogen and sulphur dioxide.

Aquaculture, Tanks, Ponds

Zeolites are used for the removal of ammonium from water fisheries, trucks to transport fish, and aquariums. The addition of zeolite to ponds and tanks often stops or inhibits the growth of algae by removing nitrogen from the water.

Catalysts and Petroleum Refining

Although most of the zeolites used in the petroleum industry are synthetic, more natural zeolites are being used. Typical applications include removing water and carbon dioxide from gaseous hydrocarbons, removing hydrochloric acid from gas streams, assisting in hydrogen or chlorine drying, assisting in chlorinated and fluorinated hydrocarbon purification, catalysis and natural gas separation.

Carriers

Clinoptilolite can be used as a carrier for insecticides, pesticides, and herbicides due to its large porosity. In animal feeds it is used as a carrier for antibiotics, enzymes, and other medicines.

Desiccants

Clinoptilolite has been used as a desiccant for drying natural gas, carbon dioxide, freon gas, and organic chemical streams such as transformer oil and xylene.

SPECIFICATION FOR OCS ZEOLITE

Mineral Components:	85% Clinoptilolite balance opaline silica					
Cation Exchange Capacity:	150 to 180meq/100 gram (as ammonium,-N)					
Maximum Water Retention:	>55 WT%					
Overall Surface Area:	24.9 square meters/gram					
Bulk Density:	Approx. 55-60 pounds per cubic foot					
Hardness:	Moh's no. 4					
Colour:	Pale green					
Chemical Composition						
Cations:	Potassium:		3.47%			
	Calcium:		1.60%			
	Sodium:		<0.5%			
Other Elements	Cu	25ppm	Zr	480ppm	Nd	45ppm
	Zn	35ppm	Y	55ppm	La	55ppm
	Rb	120ppm	Nb	40ppm	Ba	1200ppm
	Fe	1.3%	Sr	560ppm	Ce	130ppm
					Pb	<30ppm
Rock Analytical Data:	SiO2	67.4%	Al2O3	10.6%	FE2O3	1.7%
	MgO	0.45%	CaO	2.23%	Na2O	0.59%
	K2O	4.19%	TiO2	0.27%	P2O5	0.10%
	MnO	<0.01%			LOI@925C	11.4%

Certification:

Canadian Animal Feed Registration No. 990643. Swimming Pools and Spas-ANSI/NSF standard 50 (Zeosand). Drinking Water Treatment-ANSI/NSF standard 60 (ChemSorb® Sorbent Powder). Drinking Water-ANSI/NSF standard 61 (ChemSorb® Filter Granules) GRAS (generally regarded as safe) under 21 CFR Part 182.2729, 40 CFR Part 180.1001

General Physical Attributes

Non dusting, resistant to attrition, non clouding in liquids (due to absence of clays), good permeability, relatively high density, high water retention.

Applications:

Fertilizer and soil amendments; water and other liquid purification and clarification; odour abatement; oxygen production and gas separations; ion exchange; absorption and adsorption; nitrogen (ammonia/ammonium) abatement; hydrocarbon abatement; abatement of certain toxic waste and acid wastes; fillers; desiccants; construction materials; aquaculture water treatment; radioactive waste management; animal feed additive supplements; catalysts substrates; wastewater treatment; oil spill sorbent; biological and animal waste management; and many others.

preserving the environment

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