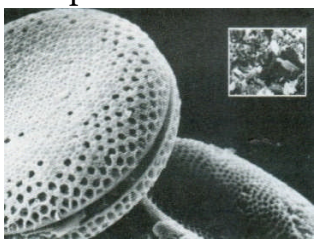
Characteristics of ISOLITE®CG-1 – Porous Ceramic
Trademark Name: Ultra-Safe Infillite™

Isolite's Use as an Infill for Synthetic Turf Athletic Fields

ISOLITE's Specifications:



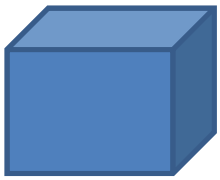
- Porous Ceramic: Main component is diatomaceous earth (sea algae and skeletal remains)
  - A small amount of clay naturally occurs with the diatomaceous earth. This clay binds together the sea algae and skeletal remains during the combustion and extrusion process.

- Extruded & cylindrical, 1 mm and 2 mm

  - This extrusion process guarantees a consistent and uniform particle size. The particle size distribution in the infill will be homogenous and not prone to layering.
  - Because of the cylindrical shape, space between each Isolite particle (interstitial pores) stays consistent and thus provides space for either air or water to be held. This is especially important for the cooling of a field. These interstitial pores will evaporate first during hot days starting the cooling process, and then the water that is held in the internal pores will begin to evaporate, significantly extending the cooling process on the playing surface.

- Bulk Weight is approximately 850 pounds per cubic yard, or 32 pounds per cubic foot
  - The weight of diatomaceous earth is important in comparison to other infill products. The application rates need to be compared on a volume basis. Synthetic turf fields will require much less Isolite than other products such as sand or zeolite.
- Bulk Density: <0.512 g/cc (compared with 1.2 g/cc for fired clay, 1.4 g/cc for soil, and 2.0 g/cc for zeolite)
  - The bulk density of Isolite CG is 0.512 g/cubic centimeter, and the bulk density of zeolite is around 2 g/cc, making it 3.9 times heavier than IsoliteCG.* If the application rate for zeolite is 1.50 pounds/ sq. ft., then on a volume basis, the application rate would be a little more than 0.39 pound/sq. ft. for the Isolite. This means that a field that would normally need 60,000 pounds of zeolite would need 15,000 pounds of Isolite. When evaluating infill products with Isolite, it is critical that products be compared on a volume needed basis and not by the price per pound.

1 pound zeolite

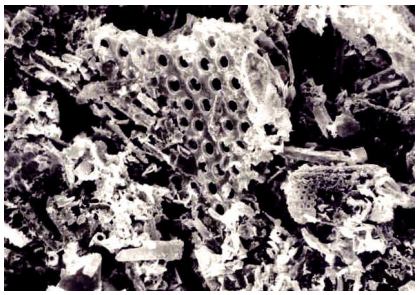


1 pound Isolite

  - *If Zeolite is 2.0 g/cc and Isolite CG is 0.512 g/cc, then 2.0 / 0.512 = 3.9, meaning that Zeolite is 3.9 times heavier than Isolite CG. One cannot determine if it would cost more to use Isolite CG until one determines the cost of Zeolite, the cost of Isolite CG and then determine the application rate. If Isolite's cost is less than 3.9 times the cost of the Zeolite, then Isolite CG is still the cost effective choice.
    Example (hypothetical): Zeolite cost - $ 0.20/pound delivered and Isolite cost - $ 0.78/pound delivered, then after figuring the application rate, the cost for the material is the same. ($0.20 x 3.9 = $0.78)

- Particle Density: 2.27 (compared with 2.56 for sand)

- Specific Surface Area - B.E.T. method - 4.6 m^2/g or 130 m^2/oz
    - The surface area is the amount of surface on which beneficial organisms can attach.
- Porosity: 74% (minimum of 70%)
    - Pore Size Distribution: > 0.5 microns = 6% -- 0.6 to 1 microns = 12% -- 1.1 to 3 microns = 43%-- <3 microns =39%
    - The majority of the pores are between 1 and 3 microns. This is an important attribute of Isolite because this is the pore range that allows the fluctuations of water and air to naturally flow in and out of the pore space.
- Pore Characteristics: Continuous, open ended and interconnecting (no dead-end pore space)



    - The importance of open ended pore space allows for the free flowing in and out of the pore space. Dead-end pore space does not allow water to be pulled out or released and this stagnant water condition can lead to pathogenic environment.
    - Isolite®CG pore space provides the perfect condominium for beneficial organisms to live, making Isolite an ideal product for soil and rubber infill remediation. This means by inoculating the Isolite®CG with specific beneficial, chemical-reducing bacteria and then infilling the inoculated Isolite over existing volatile rubber products, natural remediation can occur.

- Chemical Composition of diatoms
    - SiO_2: 78%
    - Al_2O_3: 12%
    - Fe_2O_3: 5%
    - All these chemicals are bound during the combustion process, thus not allowing these compounds to be reactive.

- Chemical Composition in clay (binder) equal less than 5%:
    - CaO <2.0%,
    - MgO,
    - K_2O,
    - NaO and
    - TiO_2
    - All these chemicals are bound during the combustion process, thus not allowing these compounds to be reactive.

- Cation Exchange Capacity: <2 meq/100g
    - Isolite will hold water that contains nutrients and slowly release it. Isolite itself will not attract and retain nutrients (salts) onto its surface.

- Electrical Conductivity: <0.5 mmhos/cm.
    - EC is the degree to which a specified material conducts electricity, calculated as the ratio of the current density in the material to the electric field that causes the flow of current. Isolite electrical conductivity is extremely low; it is used as an insulating material in other industries.

- Chemically Inert: Has no direct effect on soil chemistry (pH is between 6 and 7)
    - Rubber infill products are chemically active and will react to environmental influences such as heat and physical influences when stamped on.

- ASTM-88 degradation % loss - < 3%

GROWTH MEDIA for green roof construction
Extensive Growth Media that is a mixture of mineral and organic components:

		Isolite® CG 2
1. Air Filled Porosity at Maximum Water Capacity	(ASTM-E2399)	25
2. Maximum Water Capacity	(FLL or ASTM-E2399)	50
3. Density at Maximum Water Capacity	(ASTM-E2399)	67.6
4. Water Permeability - Inches per hour	(ASTM-E2399-05)	9.95
5. Alkalinity, Ca CO_3 equivalents	(MSA)	≤ 1
6. Total Organic Matter, loss on ignition method	(ASTM-F1647)	0.4
7. pH	(RCSTP)	5.9
8. Soluble Salts (DPTA saturated paste extraction)	(RCSTP)	0.1
9. Organic Supplements (compost, peat moss, etc.) (combined respiration rate (TMECC 05.08, B))		
10. Cation exchange capacity	(MSA)	< 2
11. Grain-size distribution of the mineral fraction	(ASTM-D422)	
a. Clay fraction (2 micron)		16.9
b. Pct. Passing US#200 sieve (i.e., silt fraction)		15.7
c. Pct. Passing US#60 sieve		66.4
d. Pct. Passing US#18 sieve		99
e. Pct. Passing 1/8-inch sieve		100
f. Pct. Passing 3/8-inch sieve		100
12. Total Nitrogen, TKN	(MSA)	N/A
13. Phosphorus, P_2O_5	(Mehlich III)	N/A
14. Potassium, K_2O	(Mehlich III)	≤ 1%

15. Other macro- and micro-nutrients shall be incorporated in the formulation in initial proportions suitable for support the specified planting.