

THE FLEXIBLE SOIL STABILIZER SYSTEM



GUARDIAN™

GUARDIAN™ is the portable SOIL STABILIZER SYSTEM of the future. This proprietary blend of natural polysaccharides called GUARDIAN™ allows it to be a stand-alone soil stabilizer or used to tackify an infinite combination of native fiber sources. GUARDIAN™ can be used creatively with a wide array of other options that are conducive to the environment and project. For example GUARDIAN™ could be used with the following:

- Cereal grain stalks and straw residue
- Sugar cane topplings
- Agricultural processing waste
- Recycled cardboard and paper waste
- Blends of paper and virgin wood fiber
- Compost

UNIVERSITY TESTED

SAN DIEGO STATE UNIVERISTY, SOIL EROSION RESEARCH LABORATORY

- **100% REDUCTION IN SEDIMENT YIELD**

When compared to the untreated bare soil condition on a 2:1 slope, the data demonstrates that an application of a hydraulic mixture composed of 1,000 lbs of wood fiber mulch, 2,800 gallons of water, 200 lbs of Guardian™ and 80 lbs of XL™ (Rantec Cross Linker) reduced erosion and sediment delivery by 100% when exposed to three consecutive 10-year storm events.

SDSU, May 13, 2004

LOW WATER USE: GUARDIAN™ has the specific advantage of minimal water requirement. If water consumption is limited or cost prohibited due to remote locations, then Guardian™ is your choice. Use less water and save time and money.

EASE OF MIXING: GUARDIAN™ has been specially treated to allow ease of mixing with minimal agitation. Chemical tackifiers require costly liquid suspensions that add to the cost and do not contribute to product performance. GUARDIAN™ can be added directly to water truck applications with a Rantec Eductor. The product can be vacuumed directly from the bag into the tank.

APPLICATION: GUARDIAN™ allows the applicator to vary the tackifier and fiber application rate independently to accommodate a wider range of slope and erosion options. GUARDIAN™ is effective as a stand-alone soil binder for NPDES temporary soil stabilization.

ENDURING ADHESIVE: GUARDIAN™ is a guar based tackifier which has been used for the past 30 years as an acceptable biodegradable alternative to latex emulsions and plastic polymer suspensions. Starch, plantago and polyacrylamide systems will all re-dissolve once they are wetted again and will lose their bond. GUARDIAN™ can be repeatedly soaked and still resist rewetting when used in conjunction with Rantec's XL™ cross linker.

ENVIRONMENTAL COMPATIBILITY: GUARDIAN™ will not form a crust that inhibits plant growth. Over the time necessary to establish permanent revegetation, GUARDIAN™ will biodegrade into harmless components that will provide nutrients for future plant growth.

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VISCOSITY AND ADHESIVE STRENGTH IN ONE PACKAGE: One aspect of tackifier performance often overlooked is the role of viscosity of the slurry:

1. Slurry flow is laminar and droplet size is increased. This creates an easily directed flow and minimizes wind drift so that the GUARDIAN™ goes where it is aimed and stays put once in contact with the ground.
2. GUARDIAN™ viscosity is critical to a uniform application. Runny slurries will drift and slide down the slope once applied, just like paint that is too thin. GUARDIAN™ produces slurry viscosity very quickly and can be applied as soon as the hydroseeder is topped off. No waiting for testing.
3. GUARDIAN™ is a non-linear polymer that exhibits shear thinning. When GUARDIAN solutions are sheared at higher rates during pumping thru fittings and nozzles, they actually exhibit less pressure drop than basic water solutions. They also lubricate the slurry and increase the pumping capacity of the circuit because of that feature.
4. Once the shear rate is decreased and the solution comes to rest, the GUARDIAN slurry will thicken rapidly and thus decrease runoff of tackifier solution into the soil.

INCREASING SLOPE MEANS INCREASING GUARDIAN PER UNIT FIBER:

GUARDIAN™ is very sensitive to concentration. Increasing the concentration of GUARDIAN™ from 40lbs per 1000 gal of water to 60lbs per 1000 gal doubles the viscosity and at the same time produces a 50% increase in adhesive strength. We have incorporated that feature in our application guidelines for steeper and more severe applications. For pumpable slurry, we recommend 400 to 800 cps for centrifugal pumps.

SPECIFIC ADHESIVE STRENGTH vs. CONCENTRATION

SPECIFIC ADHESIVE STRENGTH (SAS) tested with virgin wood fiber with a water ratio of 2 gallons per 1 lb of fiber (example: 2000lbs of fiber requires 4000 gallons of water)

Lb Tack/2000lb fiber	40	60	80	100
Tack/Fiber ratio, %	2	3	4	5
Guardian™ SAS	400	600	750	900
Plantago SAS	150	220	300	380

SAS value measured by producing 4 inch diameter by 1/4 inch test pad from standard virgin wood fiber source. SAS value is amount of force in grams required to produce tensile failure in the pad sample divided by dry pad weight in grams.



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