Linear and crosslinked superabsorbent polymers for sediment and erosion control

JRM Chemical, Inc.

LINEAR POLYMERS

BENEFITS:

- Reduces soil erosion with less product than plant based materials
- Improves soil structure, water infiltration and water retention
- Reduces turbidity on discharge water
- Improves site conditions and compliance with regulatory requirements
- Binds all types of mulch to the soil
- Economical and easy to apply

Close-up of hydrated superabsorbent polymer and plant roots.

For the past twenty-six years JRM Chemical has supplied the erosion industry with site specific linear anionic polymers and superabsorbent polymers on a variety of projects and sites. Both types of polymers are widely used but have very specific differences.

Superabsorbent polymers are hydrophilic and absorb water. Water is absorbed by hydrogen bonding and osmotic pressure in the polymer matrix. Our superabsorbent polymers will hold over 200 times their weight in tap water (water rated at 160mg/l of NaCl). They are applied where water management is of concern. Some of the many applications include revegetation projects, mine reclamation, landscaping and for use as a hydroseed amendment. The products increase the amount of water held in the soil and slowly release the stored water back to the plant when there is no longer any capillary water. The polymer reduces transplant shock and increases plant establishment. The polymer will help reduce fertilizer use by absorbing fertilizer leaching in the soil. The polymer is beneficial in remote plantings and in restoration projects where water is scarce or impractical to irrigate. The material is effective in the soil for 3-5 years. Degradation of the polymer is effected by site conditions, amount of organisms in the soil, presence of high salts, minerals and uv exposure.

In hydroseeding applications, the polymer increases the moisture held in the mulch matrix. This makes it more conducive for seed germination and irrigation frequency is reduced. A typical application of 9-16 pounds of polymer per acre will hold in excess of an additional 220 to 385 gallons of water. If hydroseeding with paper only, the expansion and retraction of the polymer during its water cycle can help reduce the "paper-mache" effect. The grade size of the polymer (100-700um) forms a homogenous mix in the hydroseed tank and when applied in the field it assures a rapid uptake of water when it rains or irrigated. For drop/spread seeding our fine grade polymer (<75um) with or without a compounded graphite should be used.

Unlike superabsorbent polymers, water soluble linear polymers also known as PAM, are made from long molecular linear-chain structures. They are not hydrophilic as superabsorbent polymers and are not designed to hold water. Linear polymers increase the viscosity of water and increase the wet tensile strength. The linear polymers flocculate, which is the action of building a bridge between individual particles either in a water solution or soil. Linear polymers are available as either anionic (negative charged ion) or cationic (positive charged ion). For use in erosion and landscape applications, only anionic polymers should be used.

Once the linear polymer is introduced to water, the sodium breaks from the polymer chain (disassociates) and becomes a negative charge. The negative charged polymer will form a bridge with positive charged parts of the suspended soils in the water or soil and make larger soil aggregates. In treating discharge water, the larger soil aggregates settle to the bottom and dramatically reduce the turbidity. When applied on the soil, larger aggregates are formed which increases the porosity, water retention and infiltration of water in the soil. The linear polymer stabilizes soil, increases soil cohesion, improves soil structure and reduces soil erosion.

JRM offers a full line of diverse linear anionic polymers in powders and emulsions that vary in molecular weight and charge density to perform in all types of soil and site conditions. For erosion control they are used on building/ construction sites, highway construction, mine reclamation, reforestation, revegetation projects and hydroseeding. All products comply and are certified with NSF International ANSI/NSF 60, drinking water.

In hydroseeding they are used as a tackifier or as an overspray to increase the bond between the soil and media. With linear polymers less material is needed than plant based erosion products. On a 4:1 slope only six pounds of linear polymer is needed per acre compared to guar which requires sixty pounds or more.

A few of the erosion products include linear and superabsorbent polymers with beneficial bacteria and mycorrhizal fungi. These materials enhance root growth and turf establishment while reducing irrigation frequency or erosion.

Linear tablets are used to reduce soil erosion, remove soluble particles and reduce NTU values in water channel applications. The tablets are ideal on sites where electricity and machinery are not available for metering, pumping or dispensing. An advantage with the tablets is that they do not "gel block" and become ineffective as larger sized logs and blocks do. There is no need to constantly go out in the field and scrape off layers that are gelled with soil particles and other debris. The tablets have more surface area than other products and have the ability to release polymer even in low water flow rates.

Superabsorbent polymer benefits:

- Reduces irrigation frequency
- Increases plant and turf establishment
- Reduces transplant shock
- Cost effective, lasts up to five years in the soil
- Reduces fertilizer leaching while improving moisture uptake in the plant

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Product Selection Guide

Product	Formulation	Application	Benefits	Packaging	Form No.
Superabsorbent Polymers					
Granules **1000-2000 microns** **2000-4000 microns**	Crosslinked potassium polyacrylamide	Soil Amending new plantings	Reduces plant waterings and transplant shock. Increases plant establishment.	3 lb., 8 lb., 40lb. pails, 50 lb. box, 55 lb. bags	144
Hydro **100-700 microns**	Crosslinked potassium polyacrylamide	Hydroseeding	Increases turf establishment with less waterings	3 lb., 8 lb., 40 lb.pails, 50 lb. box, 55 lb. bags	190
Fines **50-500 microns**	Crosslinked potassium polyacrylamide	Bare-root dip	Increases plant establishment	3 lb., 8 lb., 40 lb.pails, 50 lb. box, 55 lb. bags	144
Seed Coat <75um	Crosslinked potassium polymer with and without compounded graphite	Drop/Spread seed coating	Increases turf establishment and seed germination	8 lb. pails, 50 lb. box and 2205 lb. super sacks	195
Soil Moist Disks **1" & 2" diameter**	Crosslinked potassium polymer with 8-9 month timed release 10-10-10 fertilizer	Soil Amending new plantings	Reduces plant waterings and transplant shock. Feeds for 8-9 months.	Bulk packs 100 or 250	200/250
Packs **Polymer in biodegradable paper tea bags**	Crosslinked potassium polymer with and without a 8-9 month timed release 9-3-6 fertilizer	Soil Amending new plantings	Reduces plant waterings and transplant shock. Feeds for 8-9 months. Ideal for high volume plantings.	Bulk packs 200 each	1402
Hydroseed Plus	Crosslinked potassium polyacrylamide with mycorrhiza and biostimulants	Hydroseeding	Increase plant growth and establishment. Reduces waterings.	6 lb. and 42 lb. pails	787
Linear Anionic Polymers					
Hydrobond **FI-1045/FI-1046** **FI-1000**	Linear anionic polymer	Landscape Hydroseeding	Erosion control, reduce turbidity on discharge water. Improve soil structure.	6 lb., 42 lb. pails, 55 lb. bags	701
Hydrobond L **FI-2050L**	Linear anionic emulsion	Landscape Hydroseeding	Erosion control, reduce turbidity on discharge water. Improve soil structure.	5 gallon pails	700
Pam Tablets **FI-3500**	Linear anionic polymer	Discharge Water	Reduce turbidity on discharge water, holding ponds.	30 lb. pail	702
Hydrobond Plus	Linear anionic polymer with biostimulants	Hydroseeding Landscaping	Erosion control, increases plant growth and establishment.	6 lb. and 42 lb. pails	788

The above chart is a guide line only.

Refer to the individual specification sheets for detailed information and application rates.

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