



Meaningful, Valuable, Effective™

ADVANCED SOIL TECHNOLOGY™ (AST™)

The Technology

ENCAP LLC has developed and patented *The Next Generation in Mulch Technology™*. The patented product and process are designed to improve the physical characteristics of the soil with our highly researched Advanced Soil Technology™, also referred to as AST™.

Where other technologies require a significant amount of inert matter to be used as a cover (i.e. straw or paper), ENCAP's AST™ technology engages the soil to do the work.

The Benefits

AST™ is a proven technology designed to provide the following benefits due to soil aggregate management and better soil structure. The benefits include:

- ✓ Larger root system in the plants
- ✓ Reduce soil erosion
- ✓ Prevent the formation of soil crust in the soil
- ✓ Increase water retention
- ✓ Increase the exchange of gases in the soil
- ✓ Maintain soil aggregate structure
- ✓ Reduce runoff due to the increase in filtration
- ✓ Avoid clogging of soil macro pore by the migration of clays into the pore space
- ✓ Increase resistance to scouring by flow
- ✓ Increase water retention and prevent water/fertilizer loss in sandy soils
- ✓ Improve water quality by preventing sediment in suspension
- ✓ Improve survival of shrubs and tree transplants
- ✓ Control dust and related soil loss
- ✓ Improve the effectiveness of the organic matter
- ✓ Improve resistance of grass cover to draught
- ✓ Reduce soil loss during and after construction

The Science

AST™ is a composition of various anionic (negatively charged), water-soluble, linear co-polymers called polyacrylamides. To achieve our desired properties, this special formulation uses a variety of charge densities and molecular weights to maximize performance in all soil types.

AST™ forms a fine net of fibrous molecules (strands) around soil particles and soil aggregates (Exhibit 1). In reality, one molecule of AST™ is bound to many particles of soil in such a way that the particles of soil form flocks, aggregates, or agglomerates of soil that are more stable.

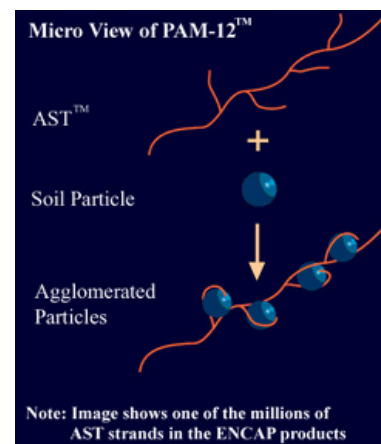


Exhibit 1

The Science (continued)

ASTTM maintains the formation of agglomerated particles between the charged, fine particles in the soil through both electrochemical (Exhibit 2) and physical bonds in the form of “bonding bridges” (Exhibit 3). These agglomerates create pore/free space in the soil, while at the same time stabilizing the soil aggregates. The result of ASTTM is increased soil water penetration and better erosion control.

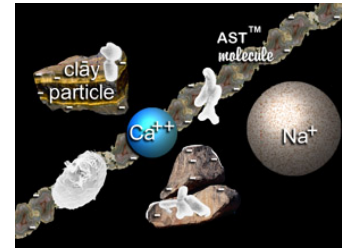
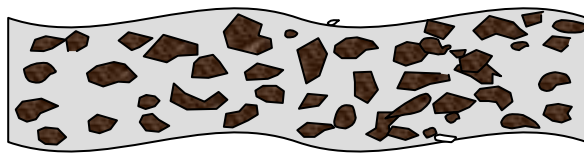
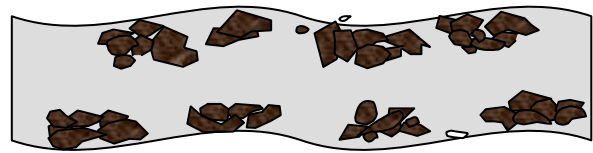


Exhibit 2

Soil crusting is a major problem caused by small particles separation and filling in free/pore space within the soil. ASTTM helps to prevent the formation of soil crusting at the surface of the soil by formation of the aforementioned agglomerates. By controlling the soil crust, one can control the future water intake by the soil, also positively affecting seed germination and soil moisture content.



Untreated Soil



Treated Soil

Exhibit 3

ASTTM molecules are specially designed to attach themselves to many fine silt and clay particles at the same time (Washington DOT, 2000), increasing product versatility.

Once ASTTM is bound to the soil particles and soil aggregates, it is insoluble into water in the soil. The stable soil particles and soil aggregates ensure the intake of water by the soil will maintain or increase the penetration of water and air increases, and the movement of excess water increases. The most important result with the application of ASTTM is the reduction of particle detachment or soil loss (Exhibit 4). This single feature results in the prevention of the crust formation, increased water infiltration, increased permeability, and improvement in the soil physical characteristics.



Rilling & Erosion
Without ASTTM

No Rilling & Erosion
With ASTTM

Exhibit 4

The Research

The polymers used in ENCAP's ASTTM technology have been used in agriculture for over 30 years to supply the same benefits described above. ENCAP's Chief Soil and Water Engineer, Dr. Aicardo Roa, has been developing and formulating polymers for over 20 years. His impressive research in agriculture, erosion control, dust abatement, and water clarification throughout the world ensures ENCAP has the best AND industry leading technology.

The Environment

ASTTM has been applied to over one million acres in the US alone. ASTTM has been found to be non-toxic and environmentally safe. It is regulated by the Food and Drug Administration and is used in numerous process from final-stage drinking-water purification to food additives.