

# TACKIFIERS

What they are and how they work



# What is a Tackifier

- Tackifiers are used in various industries.
- In each industry tackifiers have differing roles.
- However the common thread is a Tackifier has T-A-C-K. Tack is the ability to enable things to stick or adhere to various surfaces.



# Stick to What??

- Misconception #1 – tackifiers do not glue anything to the ground.
- Misconception #2 – any polymer can polymer can be a tackifier.
- Misconception #3 – tackifiers prevent erosion.
- Misconception #4 – tackifiers “glue” the hydromulch together.

# Polymers In General

- The word Polymer is derived from Greek meaning many parts.
- There are literally thousands of different types of polymers.
- In hydromulch we concern ourselves with only a very few.





# THESE POLYMERS ARE

- **Natural Gums & Polymers**

- Guar Gum
- Xanthan Gum
- Psyllium (Really a Cellulose Fiber)
- Starch (Pregelatinized)

- **Semisynthetic**
  - Derivatized Starches
  - Methyl Cellulose
  - Carboxymethyl Cellulose
  - Hydroxyethyl Cellulose
- **Synthetic**
  - Polyacrylamide
  - Polyacrylate



# General Classification

- **Generally Hydromulch Polymers Fall into two groups.**

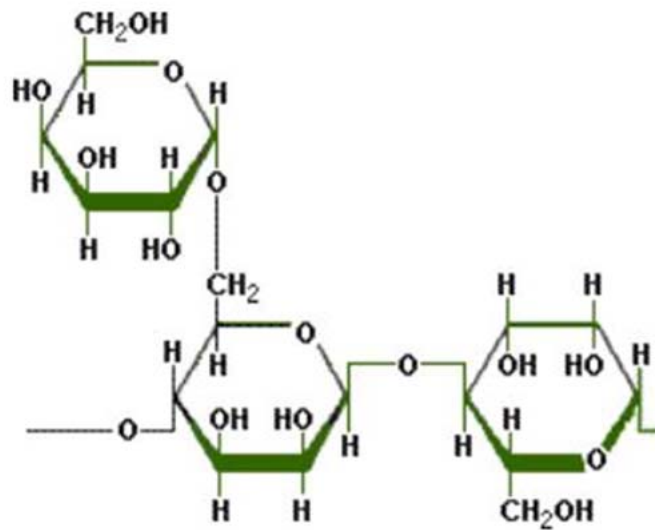
- 1. Polysaccharides**

- Starches
- Cellulosics
- Guars
- Semisynthetics

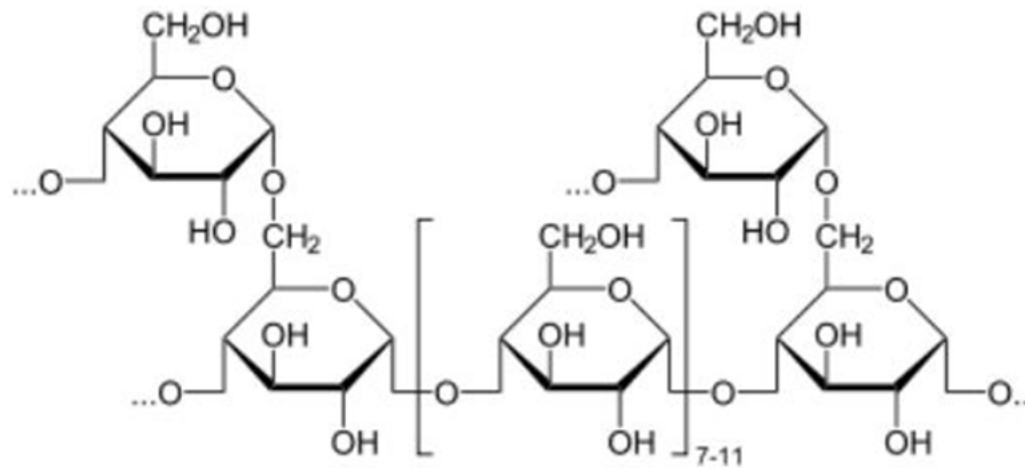
- 2. Acrylamides**

# General Structure Of Polymers

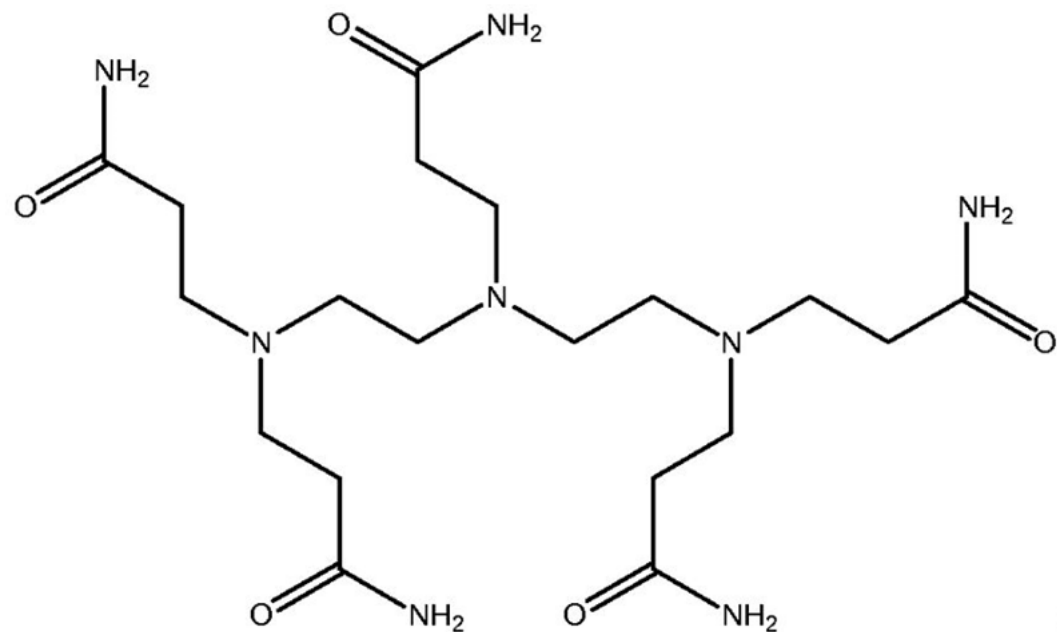
Guar Gum:



Starch:



Polyacrylamide:





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# Polymer Functions

- Providing for Viscosity and Suspension
- Uniformity by making slurry smooth
- Moisture retention of the mulch
- Lubricity
- Friction Reducer allowing better application
- Tackifier





# Viscosifiers

- ✓ The polymers that function as viscosifiers are not tackifiers.
- ✓ These polymers are principally Guar Gum, Xanthan Gum and Polyacrylamide.
- ✓ To achieve the necessary viscosity the polymer concentration is not sufficient to provide the required tack for the Hydraulically Applied Erosion Control Product.



## **Viscosifiers Continued:**

- ✓ Viscosifier performance is measured using a viscometer. The units of measure are called centipoise.
- ✓ There may be more than one polymer to aid in building viscosity.
- ✓ Viscosifiers do not make good tackifiers for two reasons:
  - Not in solution at high enough concentration
  - Molecular weight is much higher than typical tackifiers.

# **CAN A VISCOSIFIER BE A TACKIFIER?**

**THE SIMPLE ANSWER IS - - “NO”**

**TO FUNCTION AS A “GOOD” TACKIFIER THE VISCOSIFIER HAS TO AT SUCH A HIGH LOADING THAT THE SLURRY COULDN’T BE MIXED OR PUMPED.**

**WHAT SORT OF LOADING?**

**GREATER THAN 2%**



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# What is the Function of a Tackifier?

It is not only to glue the hydraulically applied mulch together

## **Primary Functions:**

- ✓ Assist in adhering the mulch to the ground.
- ✓ To help form a uniform seal or barrier from the elements.
- ✓ To rewet during a rain event(s) and hold the applied mulch together
- ✓ To aid in maintaining a small quantity of moisture for seed germination.

# HOW TO MEASURE A TACKIFIER?

This is an interesting question.

Why?

Because the industry has not adopted any standards that allow for measuring the performance of a tackifier. ASTM D18.25.11

Why?

Because there is no consensus on how to measure the performance of Tack.

# What Does SYNERMULCH Test?

- **SYNERMULCH tests the relative hardness of the tackifier.**
- **We use an instrument called a DUROMETER.**



This instrument measures the relative hardness

The lab makes fiber pucks using different polymers

# What Do We Test

SYNERMULCH makes fiber pucks using a the polymer of interest sheared into water and then blended with a fine mesh wood fiber and allowed to cure for 48 hours at 100 Deg F. After which they stand at room temperature for 24 hours.

The pucks are then tested with the Durometer for hardness.



# What We Test

Pucks Made From Guar:



# What We Test

Pucks Made From Polyacrylamide:



# What We Test

Pucks made from Water Soluble Starches:





# General Procedures

- Polymer Concentration is a percentage based on weight of water.
- Fiber concentration is 20% by weight of water used.
- Exception is TurFlow. The wood fiber is 20% of the water added, but the TurFlow is 5% by weight of the amount of wood fiber added.





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# General Observations

- We find the measure of the hardness of the puck is a good indication of the effectiveness of the tackifier.
- The Guar Polymer and the Polyacrylamide both indicated a moderate degree of hardness. However to achieve these readings the polymer loading was such that it would not have been possible to mix the slurry in the hydromulch applicator's tank.
- The two starches had the best hardness readings and the slurries could have been easily sprayed.
- The TurFlow at 5% of the weight of the fiber gave good results. The normal application for TurFlow is 10% of the weight of the mulch.



# Rainfall Simulator

- ASTM D6459 – tilting bed rainfall simulator to measure sediment runoff during 100 year rain
- Establish a cover factor  $C$  for determining effectiveness of hydraulic system



Figure 1. Rainfall Testing Facility  
(set up for a control run)



Figure 2. Typical Sampling

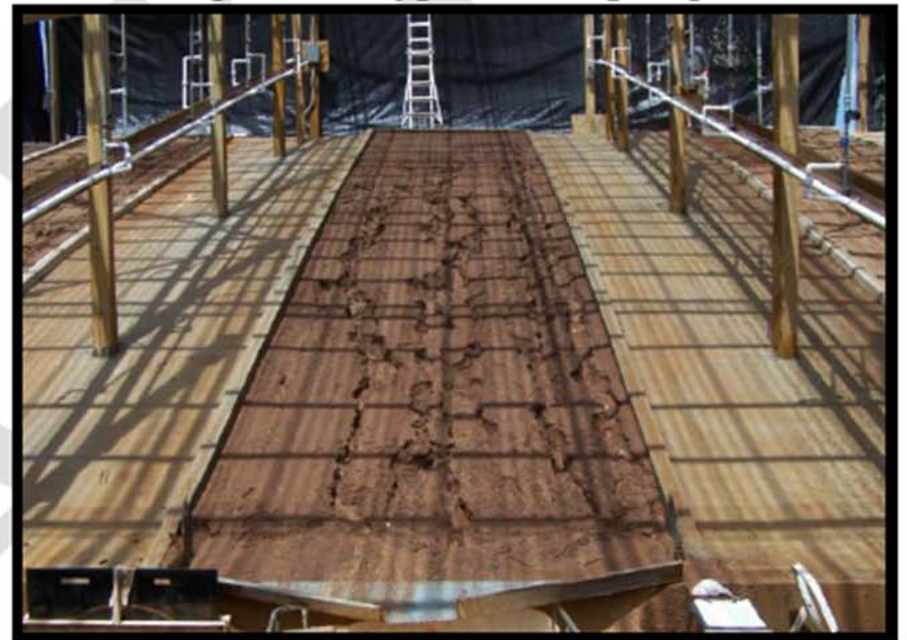


Figure 3. Typical Control Result

# Applications of Tackifiers

- Alternative uses for tackifiers include:
- soil stabilization
- aerial applications
- dust control

# Soil Stabilization

- Do not provide the protection that mulch/tack combination will do. Mechanical barrier is more hearty
- Tackifiers were never developed to specifically treat bare soil
- Accelerated biodegradation of natural polymers
- Can be washed away easier, require more

# Other applications

- Aerial viscosifier
- Dust Control – better products that will last longer





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