POLYMER TESTING AND SCREENING PROCEDURE

A Polyacrylamide Blend for Erosion Control and Water Clarification (Instructions for testing polymer block/logs)

1. BACKGROUND:

The polymer block/log is water and soil specific for each application. No one block/log can work on every soil type. There are many variables that can and will change the performance and application of the polymer block/log. Testing of soils at each site must be done to assure that correct performance will occur when correct application has been done. Failure to perform these tests may result in poor results or no results at all.

There are many different types of polymer blocks/logs. The polymer block/log is produced to reduce and prevent fine particles and colloidal clays from suspension in stormwater. Features and benefits include removal of solubilized soils and clays from the water, prevention of colloidal solutions in water within ditch systems, binding of cationic metals within water, reducing solubilization, reduces pesticides and fertilizer loss during rain events from runoff, increases soil permeability and water penetration to shallow plants in ditches, reduces operational and cleanup costs, and reduces environmental risk and helps meet compliance.

(Note: Polymer block/logs cannot be made into stock solutions and tested as PAMs or polyacrylamides are tested. Polymer block/logs must be tested as described in the procedure below.)

2. DEFINITIONS:

2.1 Flocculation: the process of causing small, suspended materials to stick to each other to form “flocs”. These flocs then become heavier and more readily settle out as compared to the individual particles.

2.2 Polyacrylamide: A white, water-soluble polymer made up of repeating acrylamide units. It may be used as a thickening agent, a flocculent, an absorbent, and to separate macromolecules of different molecular weights. Polyacrylamide is used in food packaging, coatings, secondary oil recovery, water treatment systems, adhesives, paper manufacturing, and to reduce soil erosion.

3. PURPOSE: to test soil/water sample from site for specific polymer block/log that will work on it

4. MATERIALS NEEDED:

5 grams site specific soil or 2 oz. turbid site water
If no site water is available you will need approximately 8 oz of de-ionized water
Two clear/transparent beakers or glassware
Polymer block/log (approximately ½ the size of a pencil eraser)
pH meter or litmus paper
Pipette (15 mL transferring pipette)
Turbidimeter (NTU) meter
Water Quality Test Strips for Total Hardness testing

5. PROCEDURE:

5.1 If water sample:

5.1.1 Shake water sample to make sure the water is uniformly mixed.

5.1.2 Take approximately 2 oz of turbid site sampling water and pour into a clear cup or glassware capable of holding approximately 8 oz liquid.

5.1.3 Use a pipette to test for the initial NTU value. Make sure NTU jar is clear of films and fingerprints by wiping exterior with a clean towel. Record value. (See Step 3 below for EPA Standard Methods turbidity testing.)

5.1.4 Dip litmus paper or a pH probe into the site sampling water to test the pH of the water. Record the value.

5.1.5 Dip a Water Quality Test Strip for total hardness into the 2 ounces of site sampling water to test for Calcium Carbonate (CaCO3). Record the value.

5.1.6 Add approximately ½ of a pencil eraser sized piece of polymer block/log to the soil sample water.

5.1.7 Moderately swirl the container taking care to record the time in seconds that it takes to cause particulate formation (count the seconds).

5.1.8 Take a final NTU reading. Record this as NTUf.

Repeat this entire process for each polymer block/log tested

Time in seconds represents the location of the polymer block/log placement “up pipe or ditch” in regards to the water flow for necessary mixing to produce reaction and settling of particles. (Not at the head wall or discharge point.)

The clarity of water needs be good enough to meet any state or federal water quality requirement for any specific site.

5.2 If soil sample:

5.2.1 Take 5 grams of the soil to be tested and place into a clear cup or glassware capable of holding approximately 8 oz of de-ionized water or preferably water that is taken from the sampling site.

5.2.2 Add 3-4 oz of either de-ionized or sampling site water to the cup and mix until the clay content is in solution.

5.2.3 Allow this mixture to settle for 30-40 seconds.

5.2.4 Carefully separate the turbid water from the “mud” by pouring into a separate beaker and proceed using only the turbid water.

5.2.5 Use a pipette to test for the initial NTU value. Make sure NTU jar is clear of films and fingerprints by wiping exterior with a clean towel. Record value. (See Step 3 below for EPA Standard Methods turbidity testing.)

5.2.6 Dip a pH stick in the mixture or use a pH meter to test the pH of the water. Record the value.

5.2.7 Dip a Water Quality Test Strip for total hardness into the site sample water for 5 seconds to test for Calcium Carbonate (CaCO3). Record the value.

5.2.8 (Optional): Dip a water quality test strip for Phosphate into the site sample water for 5 seconds to test for the amount of phosphate in the water.

5.2.9 Add approximately ½ of a pencil eraser sized piece of the polymer block/log sample to the muddy surface water.

5.2.10 Moderately swirl the container taking care to count or record the time in seconds that it takes to cause particulate formation (count the seconds). Try to imitate what will happen when the storm water runs through a CMP or mixing system.

5.2.11 Take a final NTU reading. Record this as NTU_f.

Repeat this entire process for each Floc Log tested

Time is seconds represents the location of Floc Log placement "up pipe or ditch" in regards to the water flow for mixing to produce reaction and settling of particulate. (Not at the head wall)

The clarity of water needs to be good enough to meet any state or federal water quality requirement.

6. REPORTING RESULTS

Test report should include the following information:

6.1 All details necessary to determine which Floc Log will fit the specific soil or water type (pH, NTUi, NTUf, total hardness, Floc Log type, etc).

6.2 Test results are to be recorded in a similar to format to Table 1.

Table 1- Recommended Data Record Template for soil sample and water samples. Not all information may be needed or used. This is only a basic template used for polymer testing.

Company:_____ Date:_____

Sample Type: Water Soil

pH:_____ Phosphate (PO4):_____

Hardness (CaCO3):_____ NTUi_____

Log	Time	NTUf

Soil Stabilizer: _____

7. CLEAN UP METHODS AND CAUTIONS:

7.1 Polymer Blocks-

7.1.1 Anionic polymer blocks are non-hazardous and non toxic.

7.1.2 Must require an EPA certified aquatic toxicity report.

7.1.3 Use caution when around water. When polymer blocks come in contact with water they become extremely slippery.

7.1.4 Avoid contact with eyes, skin and mouth

7.1.5 Wear gloves when handling polymer blocks.

7.1.6 Anionic polymer blocks should be non-toxic and non-hazardous and can be disposed of in any commercial landfill.