

ILLINOIS URBAN MANUAL PRACTICE STANDARD

Polyacrylamide (PAM) for Temporary Soil Stabilization

Code 893



Definition

The land application of a water soluble anionic or nonionic Polyacrylamide (PAM) as a temporary agent to bind soil particles and reduce erosion.

Purpose

The purpose of this practice is to temporarily stabilize disturbed soils and reduce erosion from wind and water during construction activities.

Conditions Where Practice Applies

This practice applies where timely establishment of vegetation or other temporary or permanent stabilization practices may not be feasible or practical, or to enhance or augment other stabilization practices. PAM application may be beneficial to or during:

- Rough grading
- Cut/fill areas
- Temporary stockpiles
- Temporary or permanent seeding
- Staging areas
- Any disturbed soils

Criteria

Only anionic or nonionic PAM shall be used for stormwater treatment. No Cationic PAM formulations shall be used for stormwater treatment due to high toxicity to aquatic life.

Polyacrylamide use for erosion control shall be used in areas of sheet flow only. Polyacrylamide is not designed for use as an erosion control best management practice in concentrated flow.

Slope steepness and length shall be taken into consideration when using PAM or discussed with manufacturer to ensure appropriate application and stabilization is achieved. Polyacrylamide shall not be applied on slopes steeper than 3:1 without additional erosion control measures such as an erosion control blanket or turf reinforcement matting or applied as an additive in a hydraulically applied Bonded Fiber Matrix.

PAM shall not be applied to soils that are frozen or soils that have ice present at the surface.

When handling and mixing PAM Manufacturers' recommendations and criteria shall be followed. The method of PAM application chosen shall ensure a uniform coverage of active polymer over the areas to be stabilized. Polyacrylamide must be applied in solution.

Polyacrylamide application for soil stabilization shall be used for temporary purposes only (less than 4 months).

Application rates will vary based on manufacturer, but actual amount of polymer applied shall not exceed Material Safety Data Sheet (MSDS) or manufacturer's recommendations.

The PAM chosen to be used on site shall be tested with soils from the site where it is to be used prior to installation, to ensure successful application.

Polyacrylamides used for erosion control and shall have a charge density of 8-35% by weight and have a molecular weight of 6 to 24 mg/mole.

The acrylamide used in the PAM shall also meet active monomer limits of $\leq 0.05\%$.

Considerations

The following are recommendations that may enhance the use of, or avoid problems with, the application of the practice:

- Polyacrylamide application is intended for, and most effective in, soils containing significant amounts of fine silts, clays, and colloidal particles.
- Polyacrylamide performance is significantly enhanced by the application of seed and mulch, and the duration of polymer effectiveness is significantly increased with the application of mulch.
- Over use or over application of PAM beyond manufacturer's recommendation may lead to soil clogging which reduces infiltration and can lead to increased erosion.
- If an approved PAM is impregnated into a carrier to act as a tracer and controlled release delivery system, it can be applied without the use of mulch providing that sufficient seed germination data and erosion control performance is adequate.
- Appropriate protection for personnel and equipment should be used during PAM application.
- Follow manufacturer's specifications and recommendations for selection and application of Anionic or Nonionic PAM.

The following are recommendations for application of PAM in solution:

- See manufacturers' instructions to determine the appropriate amount of PAM to ensure that the equipment does not clog.
- Dry PAM mixed or PAM in an emulsified solution may be used.
- Dry PAM should be applied to water slowly and not vice versa; proper agitation is recommended.
- Emulsified PAM or PAM in solution should be applied slowly in the tank of the equipment used for application in order to allow for adequate mixing of the PAM and water.

Plans and Specifications

Plans and specifications for installing PAM for sediment control and turbidity reduction shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. As a minimum include the following:

1. Purpose and goals of using PAM should be identified on the plan
2. Location where the practice is to be applied
3. Application rates and directions for PAM application
4. The manufacturer and specific PAM product to be used on-site based on soil and water testing for site specific soils
5. Material Safety Data Sheets (MSDS) for the specific PAM product to be used
6. Acute and chronic toxicity testing for aquatic organisms for the PAM product to be used meeting USEPA Test Method EPA 600/R- 92-080 or EPA 600/R-92-081

Operation and Maintenance

Degradation of PAM occurs as a result of mechanical, chemical, and biological hydrolysis. The effectiveness of PAM for soil stabilization will decrease over the course of time and the areas where PAM is used for soil stabilization should be inspected regularly for signs of erosion.

Polyacrylamide treated areas shall be monitored after each rain event to identify areas that may require re-application.

Areas treated with PAM that are re-disturbed shall be re-treated with PAM, as recommended by the manufacturer, or another equivalent soil stabilization practice.

All equipment used to apply PAM shall be thoroughly rinsed and kept clean to ensure effective application rates and prevent clogging, damage to equipment or mixing of inappropriate PAM formulations due to residual PAM.

Adjust PAM types used on-site as needed to ensure effective stabilization. No excess amounts of PAM should be disposed of directly to storm sewers or receiving waters.

References

- Erosion and Sediment Control Technical Bulletin #2, *Application of Anionic Polyacrylamide for Soil Stabilization and Storm Water Management*, Virginia Department of Conservation and Recreation, July 2002
- Georgia Soil and Water Conservation Commission. 2000. *Polyacrylamide (PAM)*. Manual for Erosion and Sediment Control in Georgia, 5th Edition. pp. 6-67 – 6-68.
- Soil Facts, Using Polyacrylamides (PAM) to Control Turbidity, Richard A. McLaughlin, North Carolina Cooperative Extension Service Fact Sheet AGW- 439-59
- University of Central Florida – Stormwater Management Academy, *Polymer Enhanced Best Management Practice Guide*,
- U.S. Environmental Protection Agency. 2002. *Construction Site Storm Water Runoff Control – Chemical Stabilization*. Stormwater Phase II Menu of BMPs & Model Permits. EPA Office of Wastewater Management webpage.
- U.S. Environmental Protection Agency. 1994. *Chemical Summary for Acrylamide*. Office of Pollution Prevention and Toxics. EPA-749-F-94-005a.

