NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

ANIONIC POLYACRYLAMIDE (PAM) EROSION CONTROL

(Acre)
Code 450

DEFINITION

Erosion control through application of water-soluble anionic polyacrylamide (PAM).

PURPOSE

To support one or more of the following:

- Minimization or control of irrigation-induced soil erosion.
- Reduction of wind and/or precipitation erosion.

CONDITIONS WHERE PRACTICE APPLIES

- On irrigated lands susceptible to irrigation-induced erosion, excluding peat soils, and where the sodium adsorption ratio (SAR) of irrigation water is less than 15;
- On areas where the timely establishment of vegetation may not be feasible or where vegetative cover is absent or inadequate;
- On areas where plant residues are inadequate to protect the soil surface from wind erosion; and
- On sites where disturbance activities prevent establishment or maintenance of a cover crop.

This standard does not apply to the application of polyacrylamides to flowing, non-irrigation, waters.

CRITERIA

General Criteria Applicable To All Purposes

Make changes in management where increases in soil infiltration rates can be expected as a result of implementing this practice.

The PAM shall:

- be an anionic type meeting acrylamide monomer limits of ≤0.05 percent (%),
- have a charge density of 10 to 55% by weight,
- have a molecular weight of 6 to 24 Mg/mole,
- be mixed and/or applied in accordance with all Occupational Safety and Health Administration (OSHA) Material Safety Data Sheet requirements and the manufacturer's recommendations for the specified use, and;
- conform to all Federal, state, and local laws, rules, and regulations.

Additional Criteria Applicable To Irrigation Induced Soil Erosion

Surface Irrigation. Use PAM during the first irrigation (pre-irrigation is considered irrigation), after any soil disturbance, and during later irrigations if soil movement is observed.

Add mixed concentrations of PAM to irrigation water only during the advance phase of a surface irrigation. The advance phase is considered the time irrigation starts until water has advanced to the end of the field.

Place dry or "patch" treatments of PAM over an area of the first five (5) feet of furrow.

The resulting concentration of PAM in irrigation water shall not exceed 10 ppm of pure form PAM, applied on a total product basis.

Sprinkler Irrigation. The maximum application rate of PAM active ingredient shall not exceed four (4) pounds per acre (lb/ac) per single application event.

Totally mix and liquefy PAM mixtures prior to injection into the irrigation system.

Injection shall occur on the downstream side of all screens and/or filters and conform to all Federal and state chemigation standards.

Additional Criteria Applicable To Reduce Wind and/or Precipitation Erosion

The maximum application of pure form PAM shall not exceed 200 lb/ac per year.

Mix emulsion batches with pure form polyacrylamide not exceeding 200 pounds per batch.

The application method shall ensure uniform coverage to the target area, minimizing drift to non-target areas.

CONSIDERATIONS

The following relates to the application of the polyacrylamide practice that may enhance or avoid problems with the practice, but is not required to ensure its basic conservation function.

General

Adjust PAM application rates as necessary based on soil properties, slope, and type of erosion targeted.

Where reasonably possible, store tailwater or runoff containing PAM for re-use or recycled on other land areas.

Use of polyacrylamide in combination with other conservation and Best Management Practices will improve erosion control.

Irrigation Induced Erosion Considerations

Use other conservation treatments such as land leveling, irrigation water management, reduced tillage, reservoir tillage, crop rotations, etc., in conjunction with this practice to control irrigation-induced erosion.

PAM may result in an increase in surface irrigation infiltration of up to 60%, with 15% being typical on medium textured soils.

To compensate for PAM changes in infiltration, consider adjustments in flow rates, time of set, and tillage practices.

Consider reduction in PAM rates and volumes from maximum allowed so long as no visible erosion occurs.

Secondary applications on undisturbed soil may be needed in surface irrigation when sediment or erosion is noted.

Sprinkler systems will likely need multiple applications to achieve a significant erosion reduction.

Before and after injecting concentrated liquid PAM (30 to 50% active ingredient) into sprinkler irrigation systems, it is a good practice to pump a surfactant (crop oil) through the injection system (pump, tubing, valves, etc.). Surfactants provide a buffer between PAM and water so non-flowing PAM does not contact water and form a gelatinous mass that can plug valves and tubing.

For sprinkler injection systems, start the injection pump after water is flowing in the sprinkler system and stop before the end of the irrigation cycle to allow PAM to travel through the system.

Applications at the end of the season are discouraged, unless the field has been recently tilled.

Wind or Precipitation Erosion Considerations

Adding seed to PAM mixture may provide additional erosion protection beyond the life of the PAM material.

PAM may improve water quality, infiltration, soil fertility, and air quality.

Safety and Health

Use proper personal protective equipment, e.g., gloves, masks, and other health and safety precautions in accordance with the label, industry, and other Federal or state rules and guidelines.

If inhaled in large quantities, PAM dust can cause choking and difficulty in breathing. Persons handling and mixing PAM shall use a dust mask of a type recommended by the manufacturer.

PAM solutions can cause surfaces, tools, etc., to become very slippery when wet.

Clean liquid PAM spills with dry absorbent material (sawdust, soil, cat litter, etc.) and sweep/collect dry PAM material without washing with water.

PLANS AND SPECIFICATIONS

Develop site specific specifications for each field or treatment unit and each application according to the criteria, considerations, and operation and maintenance described in this standard. Record specifications using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. As a minimum, include the following for each field in the plans and specifications:

- Location of area to be treated,
- Sodium adsorption ratios of irrigation water, and;
- Chemical composition of PAM to be used.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance (O&M) plan for use by the landowner or operator responsible for PAM application. Provide specific instructions for PAM applications to ensure it is used properly. O&M plan items may consist of:

- Reapplying PAM to disturbed or tilled areas, including high traffic use areas.
- Monitoring advance phases of the irrigation to assure applications are discontinued when runoff begins.
- Operating and maintaining equipment to provide uniform application rates.
- Maintaining screens and filtering facilities.
- Rinsing all PAM mixing and application equipment thoroughly with water, to avoid formation of PAM residues.
- PAM is a flocculating agent that may cause deposition in downstream watercourses or other locations, when it comes in contact with sediment-laden waters. Downstream deposition from the use of PAM may require periodic cleaning to maintain normal functions.