

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

MULCHING

(acre)
CODE 484

DEFINITION

Applying plant residues or other suitable materials not produced on the site to the soil surface.

PURPOSE

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

CONDITIONS WHERE PRACTICE APPLIES

On soils subject to erosion on which low-residue-producing crops are grown; on critical areas; and on soils that have a low infiltration rate.

CRITERIA

General Criteria Applicable to All Purposes Named Above

Mulches applied should be free from weed seeds, plant pathogens, visible mold or fungus, and toxic materials. Mulches shall be evenly distributed over the areas of consideration immediately after seeding unless otherwise specified. Commercial mulch products shall be applied and anchored in accordance with manufacturer's specification.

The following mulching methods are acceptable:

1. Hay or small grain straw:

Perennial native or introduced grass. At least 50 percent of the herbage by weight must be ten (10) inches or longer before being applied to the site. Seed hay may be used if the same species as to be used in the seeding, otherwise hay should be free of seed.

Leguminous plants will not exceed 25 percent of the dry weight of the mulch.

Small grain shall consist of wheat, oats, flax, barley, or rye straw from which grain has been removed. At least fifty (50) percent of the stems by weight shall exceed six (6) inches in length before being applied to the site if anchored by asphalt or netting. When anchored mechanically, fifty (50) percent of the stems by weight shall exceed ten (10) inches.

When spread by hand, the bales of hay must be torn apart and spread uniformly over the area. For uniform application of hand-spread mulch, divide the area into approximately 1,000 square foot sections and place the required mulch in each section for distribution. Mulch shall not be applied when wind velocities exceed fifteen (15) miles per hour.

Hay or straw mulches will be anchored using one of the following methods:

Peg and Twine – Drive 8 to 10 inch wooden pegs or stakes within 2 or 3 inches of the soil surface every four (4) feet in all directions. Secure mulch to soil surface by stretching twine between pegs in a crossing pattern and secure twine to pegs.

Mulch netting – Staple paper, cotton or plastic netting to the soil surface according to the manufacturer's recommendations.

Hand anchorage – With a square pointed spade, punch mulch into the soil surface in contour rows twelve (12) inches apart.

Mechanical anchorage:

Tools – Use a heavy, straight, coulter-type implement. The coulters should be ¼ inch thick. A farm disk set straight may be used if

weight is added to provide for proper penetration depth, and providing it tucks the material without cutting. Travel speeds may need to be reduced to prevent excessive burial of seed and mulch material. A rotary hoe may be used if soil is not too compacted. A fairly high rate of speed may be required to prevent the frame from dragging the mulch material. The edges should be dull so as not to cut the mulch during the anchoring operation. The edges may be serrated or smooth. If serrated, the scallops should not be more than three (3) inches in length and $\frac{3}{4}$ inches in depth. The rows of furrows made by the mulch tiller shall be spaced 6 to 12 inches apart. Penetration depth should be 2 to 3 inches. The mulch should not be covered with excessive amounts of soil. Limit the number of passes to no more than two (2).

Site preparation – When using a mulch-anchoring tool, the seedbed must be loosened to a minimum depth of three (3) inches prior to placing and anchoring mulch material. This is necessary for the 2 to 3 inch penetration required for mulch anchorage.

Asphalt emulsion mulch tack – Asphalt emulsion shall consist of liquid emulsions of water and natural bituminals of asphalt grade SS-1 or equivalent. The SS-1 will be continuously applied with an emulsion spray system equipped with a mechanical mulch hay blower. Application temperature shall be 50° F or greater. The asphalt shall be applied with a mechanical mulch blower equipped with an emulsion spray system having a heating unit.

Resin emulsion mulch tack – Shall consist of liquid emulsion of water and natural petroleum resins of a type and grade similar to Petroset SB, Aerospray 70, or Curosol AH. The resin shall be applied with a mechanical mulch blower equipped with an emulsion spray system having a heating unit.

2. Barnyard Manure

Apply 15 – 20 tons per acre on the soil surface without subsequent tillage.

Apply 30 – 40 tons per acre on the soil surface if application is to be followed by disk implement for anchorage.

3. Excelsior Erosion Blankets

Upon completion of seedbed preparation, fertilization and drilling of seed, excelsior blankets will be installed

Material specifications will be as follows:

The blanket shall consist of a machine-produced mat of curled wood excelsior of 80 percent 6 inch or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The topside of each blanket shall be covered with 2" x 1" biodegradable mesh. The blanket shall be smolder resistant.

The area to be covered shall be properly prepared, fertilized and seeded before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. In channels, the blankets shall be applied in the direction of the flow of water. On slopes, the blankets shall be butted snugly and stapled.

The blanket will be secured to the ground with wire staples of 0.091-inch diameter or greater. Staples will be "U" shaped with legs at least 6 inches in length and a 1 inch crown. The staples will be driven vertically into the ground, spaced approximately two (2) lineal yards apart, on each side of the blanket, and one row in the center alternately spaced between each side. Use a common row of staples on adjoining blankets.

4. Wood Cellulose Fiber Mulch

Wood cellulose fiber mulch shall consist of wood cellulose fiber pulp, which shall contain no germination or growth inhibiting factors. It shall be dyed an appropriate color to allow for visual confirmation of application rate, and shall have the property of becoming dispersed and suspended when agitated in water.

Weight specifications from suppliers, and for all applications, shall refer only to air-dry weight

of the fiber, a standard equivalent to ten-percent moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air-dry content. Sampling and testing for moisture content will be in accordance with ASTM D 2016 Oven Drying Method.

Wood cellulose fiber mulch shall be applied with hydraulic spray equipment at the rate of 1,500 pounds per acre. The fiber shall be added to the water slurry in a hydraulic seeder along with the proportionate quantities of seed, fertilizer, and other approved materials. All ingredients shall be mixed to form homogenous slurry.

Where there is high probability of wind or water erosion, a non-toxic, organic soil stabilizer may be included or added to the wood cellulose fiber.

Because of the broadcast nature of this method, the mulched area will be kept moist, by sprinkler or other means, for a period of thirty (30) days.

5. Asphalt, Asphalt Emulsion, and Resin Emulsion

Asphalt shall be liquid or cut-back asphalt or grade RCA-1 or equivalent and shall contain no water.

Asphalt emulsion shall consist of liquid emulsions of water and natural bituminals of asphalt grade SS-1 or equivalent.

Resin emulsion shall consist of liquid emulsion of water and natural petroleum or acrylic resins prepared specifically for soil stabilization. These materials include such products as Phillips Petroleum, Petroset SB, Aero-spray 70 and Curosol AH.

Resin emulsion, asphalt emulsion and cutback asphalt shall be applied with an emulsion spray system having a heating unit.

Additional Criteria to Conserve Moisture and Control Weeds

The minimum width of the fabric mulch is 6 feet for continuous roll fabrics. The minimum

width of fabric material on renovation projects, hand-planted jobs or sites where continuous roll installation is not used, is 3-foot fabric mat squares.

Fabric thickness is a minimum of 14 mil.

Fabric must be black and/or capable of preventing underlying plant growth.

Site preparation width shall be a minimum of the larger of 8 feet or 2 feet wider than the fabric mulch.

On sandy sites with warm season grasses present, fabric mulch can be installed over existing vegetation. The existing vegetation will be mowed prior to fabric mulch installation.

Fabric mulch installation shall occur no later than thirty (30) days after trees are planted to insure adequate weed control and water conservation. For best results the fabric should be installed immediately after the trees/shrubs are planted.

Fabric mulch will be centered over planted trees. During installation, an 'X'-shaped cut is made in the fabric and the tree is pulled into an upright position through the fabric mulch. The seeding should be pulled out from under the fabric as soon as possible to avoid heat damage to the seedlings. The cut should be kept as short as possible, and no longer than twelve (12) inches.

When planting trees after mulch anchoring, make an 'X'-shaped cut in the center of the barrier for access to the soil. Keep the cut as short as possible, and no longer than twelve (12) inches.

For renovation sites, 2 three-foot widths of continuous roll fabric mulch may be used. Cut and lay the material around the base of the trees/shrubs. Fabric mulch will overlapped six inches in the center, and anchored using the manufacturer's staples. Staples should be placed within 6 (six) to 12 (twelve) inches of the base of the tree/shrub.

Additional Criteria to Reduce Sheet and Rill Erosion

Acceptable mulch materials may include small grain straw, native grass hay, strawy manure, wood fiber, other chipped, chopped or shredded plant material, gravel, asphalt emulsion, other organic resins, fiber netting, and erosion blanket materials. The amount of mulch applied to the soil surface shall be determined by the amount and orientation that must be present, in combination with other practices to achieve the planned reduction in average annual sheet and rill erosion. These criteria shall be established using currently approved sheet and rill erosion prediction technology.

The mulch shall be applied mechanically or by hand such that it is evenly distributed over the soil surface of the target area prior to, and for the duration of, the targeted erosion period. The mulch shall be anchored by a packer, crimper, disk, spade, or with and anchoring agent such as netting, asphalt emulsion or other tackifier, if the potential for movement is anticipated. For sheet and rill erosion control, all mulching operations will be completed on the contour.

Additional Criteria to Reduce Soil Erosion From Wind

Acceptable mulch materials may include small grain straw, native grass hay, strawy manure, wood fiber, other chipped, chopped or shredded plant material, gravel, asphalt emulsion, other organic resins, fiber netting, and erosion blanket materials. The amount of mulch applied to the soil surface shall be determined by the amount and orientation that must be present, in combination with other practices to achieve the planned reduction in average annual sheet and rill erosion. These criteria shall be established using currently approved wind erosion prediction technology.

The mulch shall be applied mechanically or by hand such that it is evenly distributed over the soil surface of the target area prior to, and for the duration of, the targeted erosion period. The mulch shall be anchored by a packer,

crimper, disk, spade, or with and anchoring agent such as netting, asphalt emulsion or other tackifier, if the potential for movement is anticipated.

CONSIDERATIONS

Mulching will effect the water budget by potentially decreasing the volumes and rates of runoff, increasing infiltration, decreasing evaporation, decreasing transpiration, increasing plant growth, and increasing soil water volume.

If a drip system is installed, place on top of the fabric mulch for ease of maintenance.

Good site preparation before mulch is installed, is essential to store moisture in the soil.

Fabric mulch may repel water for 3-4 weeks due to chemical surfactants applied to the fabric during manufacturing. Consider installing fabric mulch so that water will gravitate towards the trees/shrubs.

PLANS AND SPECIFICATIONS

Plans and specifications will prepared for the practice site. The State standard will specify practice requirements for site specifications. Specifications will include, but are not limited to, recommended material, rates and dates, establishment methods, and other information. Specifications can be recorded in narrative format, on job sheets, or forms designed to provide specific requirements for the practice.

See the Specification Guide for this practice for requirements.

OPERATION AND MAINTENANCE

Mulch materials will remain as placed throughout the target period by avoiding tillage or other soil surface disturbances.

Mulch will be redistributed or replaced in specified quantities if movement occurs during the target period.

Table 1 – Material Rates

Mulch Material	Rate	Asphalt
Resin Emulsions		
Petroset	200 gallons/acre	N/A
Aerospray	200 gallons/acre	N/A
Curosol AH	50 gallons/acre	N/A
Asphalt Emulsions		
SS-1	1,200 gallons/acre	N/A
Cutback Asphalt	1,200 gallons/acre	N/A
Natural Materials With No Asphalt		
Native Grass Hay w/ Viable seed	4,000 lbs./ac	N/A
Legume Hay	4,000 lbs./ac	N/A
Straw	4,000 lbs./ac	N/A
Wood Chips	8-12 tons/ac	N/A
Corn Cobs	10 tons/ac	N/A
Natural Materials With Asphalt		
Native Grass Hay w/ Viable Seed	2,000 lbs./ac	150 gallons
Legume Hay	2,000 lbs./ac	150 gallons
Straw	2,000 lbs./ac	150 gallons
Wood Chips	6 tons/ac	150 gallons
Corn Cobs	5 tons/ac	150 gallons
Commercial Mulches		
Jute Netting	1 layer on soil surface	N/A
Soil Retention Mat	1 layer on soil surface	N/A
Spun Glass Fibers	1,000 lbs./ac	N/A
Wood Cellulose	1,500 lbs./ac	N/A
Excelsior Blanket	1 layer on soil surface	N/A
Curlex Blanket	1 layer on soil surface	N/A
Hydro Mulch Fiber	2,000 lbs./ac	N/A
Synthetic Resin	100 gallons/ac	N/A