

## SECTION 805—MULCHING

**805.1 DESCRIPTION**—This work is the furnishing, placing, anchoring, and maintaining of mulch of the type indicated.

### 805.2 MATERIAL—

**(a) Mulches.** Free from foreign material, coarse stems, mold, substances toxic to plant growth, and mature seed bearing stalks or roots of prohibited and noxious weeds, as defined by law.

**1. Seeded Areas.** Either one or a combination of the following, as specified:

**1.a Hay.** Timothy hay, mixed clover and timothy hay, or other acceptable native or forage grasses, well-cured to less than 20% moisture content, by mass (weight).

**1.b Straw.** Either wheat or oat straw, reasonably free of viable seed, well cured to less than 20% moisture content, by mass (weight).

**1.c Wood Fiber.** Specially prepared, biodegradable, air-dried wood fibers manufactured from 100% wood chips or bark from lumber mill processing operations, tinted with nontoxic, green dye and containing an organic tackifier approved for use with wood fibers; manufactured to be applied with hydraulic seeding equipment; and conforming to the following requirements:

- |   |              |
|---|--------------|
| • Moisture content  | 15% maximum  |
| • Organic matter<br>(Oven-dried basis)                              | 95% minimum  |
| • Water holding capacity<br>(Grams of water per 100 grams of fiber) | 1000 minimum |
| • Tackifier content<br>(By mass (weight))                           | 2.5% to 3.5% |

Submit a certified physical analysis of the product for approval before application.

**1.d Pellet Mulch.** A biodegradable, water-absorbing, paper-based pellet that when wetted loses its pellet shape, breaks down and adheres to other pellets, forming a thin, protective mulch mat, and meeting the following requirements:

- |                        |  |
|------------------------|--|
| • Paper content        | 85%  |
| • Fertilizer           | 5%   |
| • Polyacrylater        | 2% to 5%   |
| • Moisture content     | 5% to 8%   |
| • Dimensions           | 3 mm (1/8-inch) diameter,<br>6 mm to 19 mm (1/4 inch to 3/4 inch) length |
| • Absorption potential | minimum, 3 times dry weight  |

**1.e Bonded Fiber Matrix (BFM).** Specially prepared, water soluble, biodegradable, hydraulically applied system of long strand wood fibers held together by a bonding agent, which adheres to the soil surface and upon drying forms a continuous, insoluble, three dimensional, non-dispersible protective crust-like soil covering.

**1.e.1 Polymer or Hydrocolloid Binder Matrix.**

**1.e.1.a Wood Fiber.** Specially prepared, long strand (min. 25% 10 mm (3/8-inch) length), air-dried wood fibers (88% to 92% by mass (weight)) manufactured from wood chips, bark, or clean wood waste products, and conforming to the following requirements:

Moisture content	15% maximum
Water holding capacity	1000 minimum (Grams of water per 100 grams of fiber)

**1.e.1.b Bonding Agent.** High-strength tackifier of powdered polysaccharide guar gum, blended hydrocolloid-based binder, hydrophylic, or co-polymer material 5 to 12% by mass (weight).

**1.e.1.c Synthetic Fiber.** System may contain up to 5% by mass (weight) of crimped, polyester fibers or other synthetic fibers with wetting and dispersion agents manufactured for use in mulching applications.

**1.e.1.d Dye.** System may contain a nontoxic, water soluble, colored dye to aid in the visual application coverage of the matrix.

**1.e.1.e Activator.** System may contain up to 1% by mass (weight) of organic and mineral fertilizers.

**1.e.2 Gypsum Binder Matrix.**

**1.e.2.a Wood Fiber.** Specially prepared, long strand (min. 25% 10 mm (3/8-inch) length), air-dried wood fibers manufactured from wood chips, bark, or clean wood waste products, and conforming to the following requirements:

Moisture content	15% maximum
Water holding capacity	1000 minimum (Grams of water per 100 grams of fiber)

**1.e.2.b Bonding Agent.** Naturally occurring, high purity, processed hemi-hydrate gypsum with manufacturer's system additives, which when combined with water will form a cementitious binder that will produce a crust-like soil covering within 4 to 8 hours after application. Material that has become partially air set, lumpy, or caked before use is not acceptable for use.

**1.e.2.c Synthetic Fiber.** Synthetic fibers manufactured for use in mulching applications, coated with wetting and dispersion agents.

**1.e.2.d Dye.** System may contain a nontoxic, water soluble, colored dye to aid in the visual application coverage of the matrix.

**2. Planting and Other Areas.** One of the following:

**2.a Tanbark.** Suitable fibrous shredded, ground or chunked, aged tanbark derived as a by-product of the tannin extraction process, free from insect life, not decomposed, and between 6 mm and 50 mm (1/4 inch and 2 inches) in any dimension.

**2.b Shredded Bark.** Suitable shredded, chunked, or ground pieces of predominantly aged, but not decomposed, hardwood or pinewood tree bark produced from lumber mill processing operations, free of excessively fine particles and having a general size range of 6 mm to 50 mm (1/4 inch to 2 inches) in any dimension.

**2.c Washed Gravel.** Uncrushed, washed, No. 57, as specified in [Section 703.2\(a\)2](#).

**2.d Coarse Aggregate.** No. 67, Type C, as specified in [Section 703.2\(a\)1](#).

**2.e Sewage Sludge Compost.** A blend of secondary dewatered sewage sludge and wood chips, aerobically composted at a DEP, Bureau of Waste Management permitted site for at least 21 days and cured for 30 to 60 days to ensure pathogen destruction. Free of foreign material and substances toxic to plant growth, nonburning, weed free, screened, and conforming to the following requirements:

- Minimum of 50% organic matter (oven dry basis)
- Minimum of 100% water holding capacity
- Particle Size—10 mm to 80 mm (3/8 inch to 3 inches)
- pH—6.0 minimum
- Heavy metals and toxic compounds (based on sewage sludge content)

	<b>MAXIMUM PPM</b>
Cadmium	25
Chromium	1000
Copper	1000
Lead	1000
Mercury	10
Nickel	200
Zinc	2500
PCBs	3

Submit a certified laboratory analysis with each shipment.

**2.f Wood Chips.** Suitable chipped or ground wood material produced from predominantly live or non-decayed trees, logs, brush including leaves or post-consumer lumber having a general size range of 15 mm to 50 mm (1/2 inch to 2 inches) in any dimension and free of excessively fine or stringy particles. Chips produced and stockpiled during clearing and grubbing operations or aged chips, at least 6 months old, from lumber mill operations of the desired size and free from foreign debris will also be accepted.

**2.g Spent Mushroom Soil Compost.** Organic substrate used in mushroom production that has been steam sterilized, then composted for a minimum of 90 days in well-managed windrows, and on a properly surfaced and protected composting pad and blended with ground brush (yard waste), recycled wood, and/or composted bark. Conforms to the requirements specified in [Section 808.2\(g\)4](#) except as follows:

- Minimum Organic Matter (Oven Dry Basis)—40%
- Moisture Content—60% maximum
- Particle Size—10 mm to 80 mm (3/8 inch to 3 inches)
- Soluble Salt Concentration—20 dS maximum

**(b) Mulch Binders.** Other acceptable binder materials manufactured for this purpose or the following.

**1. Recycled Cellulose Fiber.** Specifically prepared, biodegradable, shredded paper particles, comprised of recycled newsprint or other recycled wood cellulose fiber, containing a surfactant and nontoxic, green dye; manufactured to be applied with hydraulic seeding equipment; and conforming to the following requirements:

- Moisture content 17% maximum
- Organic matter 80% minimum  
(Oven-dried basis)
- Water holding capacity 900 minimum  
(Grams of water per 100 grams of fiber)

**2. Wood Fiber.** [Section 805.2\(a\)1.c](#)

**3. Nonasphaltic Emulsion.** Either water soluble natural vegetable gum blended with gelling and hardening agents or a water soluble blend of hydrophylic polymers, viscosifiers, sticking aids, and gums.

**4. Polyvinyl Acetate.** Emulsion resin, containing 60% ± 1% total solids by mass (weight).

**5. Recycled Cellulose Fiber/Wood Fiber Mixture.** Specially prepared mixture of biodegradable, air-dried wood fiber, manufactured from wood chips or bark, and shredded paper particles, comprised of recycled newsprint or other recycled cellulose fiber combined with a surfactant and a nontoxic, green dye; manufactured to be applied with hydraulic seeding equipment; and conforming to the following requirements:

- Wood fiber 45% to 55%
- Recycled cellulose fiber 45% to 55%
- Moisture content 21% maximum
- Organic matter 97% minimum  
(Oven-dried basis)
- Water holding capacity 900 minimum  
(Grams of water per 100 grams of fiber)

**(c) Mulch Control Netting.** One of the following:

**1. Plastic.** A uniformly extruded, rectangular, plastic mesh conforming to the following requirements:

- Mass (weight) 7.8 g/m<sup>2</sup> (0.23 ounce per square yard), minimum
- Mesh opening Nominal 19 mm x 19 mm (3/4-inch by 3/4-inch)

**2. Coconut Coir.** Undyed, biodegradable, coconut coir yarn woven into a mesh conforming to the following requirements:

- Mass (weight) 200 g/m<sup>2</sup> (6 ounces per square yard), minimum
- Mesh opening Nominal 50 mm x 50 mm (2-inch by 2-inch), maximum

**(d) Weed Barrier and Weed Control Mats.**

**1. Weed Barrier Mat.** Stable, evenly distributed, permeable, network of polymeric woven, non-woven or a woven/non-woven combination of polypropylene or polyester filaments or yarns manufactured for weed

barrier/soil separator use, inert to commonly encountered construction chemicals or substances and conforming to the following physical requirements:

Type	MARV*	Property
Woven or combination Non-woven fabric	0.03 sec-1 1.3 sec-1	Permittivity flow rate <a href="#">ASTM D 4491</a>
Woven or combination Non-woven fabric	0.004 cm/sec 488 L/min/m <sup>2</sup> (12 gal/min/sq. ft.)	Permeability coefficient Permeability flux <a href="#">ASTM D 4491</a> Falling head test
All fabric	175 N (40 lbs.)	Puncture strength (5/16-inch flat head rod) <a href="#">ASTM D 4833</a>
All fabric	70% after 150 hours	Ultraviolet resistance Strength retention <a href="#">ASTM D 4355</a>

\* Minimum Average Roll Value (+95% of the fabric in a lot will meet or exceed the minimum requirements).

Certify as specified in [Section 106.03\(b\)](#).

**2. Weed Control Mat.** Stable, permeable network of spunbonded, long chain synthetic polyolefins (minimum 95% by mass (weight)) filaments or yarns with nodules of trifluralin, carbon black and polyethylene compounded together utilizing time-release characteristics permanently attached to the fabric on 38 mm (1 1/2-inch) centers and conforming to the following requirements.

Physical Property	MARV*
Trifluralin (Nodule)	20%
Puncture strength (5/16-inch flat head rod) <a href="#">ASTM D 4833</a>	175 N (39 lbs.)
Permittivity <a href="#">ASTM D 4491</a>	0.7 sec-1
Ultraviolet resistance Strength retention <a href="#">ASTM D 4355</a>	70% after 500 hours

\* Minimum Average Roll Value (+95% of the fabric in a lot will meet or exceed the minimum requirement).

Certify as specified in [Section 106.03\(b\)](#).

(e) **Staples.** [Section 806.2\(e\)1](#)

(f) **Wood Stakes.** [Section 806.2\(e\)3](#).

**805.3 CONSTRUCTION—**

**(a) Mulching Seeded Areas.** Place mulch, of the type indicated, immediately after seeding or within 48 hours after seeding is completed. Unless otherwise indicated, place only straw or wood fiber over topsoiled areas. Use hay, straw, or wood fiber in other areas, as indicated or specified.

Place hay or straw uniformly, in a continuous blanket, at a minimum rate of 650 kg/1000 m<sup>2</sup> (1,200 pounds per 1,000 square yards) or as otherwise indicated. If directed, increase the rate of application, depending upon the material used, season, soil conditions, or method of application. An acceptable mechanical blower may be used to apply mulch. Do not use machines that cut mulch into short pieces. Anchor mulch with specified mulch binders applied at the following rates:

- Recycled cellulose fiber—90 kg/1000 m<sup>2</sup> (160 pounds per 1,000 square yards)
- Wood fiber—90 kg/1000 m<sup>2</sup> (160 pounds per 1,000 square yards)
- Nonasphaltic emulsion—At manufacturer's recommended rate
- Polyvinyl acetate—At manufacturer's recommended rate
- Recycled cellulose fiber/wood fiber mixture—90 kg/1000 m<sup>2</sup> (160 pounds per 1,000 square yards)

The mulch binder application is incidental to the application of straw and hay mulch.

Apply wood fiber mulch hydraulically according to the manufacturer's tank-mixing instructions. It may be incorporated as an integral part of the slurry after the seed and soil supplements have been thoroughly mixed. Apply uniformly at the rate of 175 kg/1000 m<sup>2</sup> (320 pounds per 1,000 square yards) unless otherwise indicated.

Mulch temporary seeded areas with hay.

**1. Median Areas.** On slopes 1:6 (6:1) or flatter, place pellet mulch by hand or using a mechanical spreader immediately after seeding. Apply uniformly at application rate of 293 kg/1000 m<sup>2</sup> (540 pounds per 1,000 square yards). Thoroughly wet pellet mulch with water without dislodging mulch.

**(b) Mulch Control Netting.**

**1. Plastic.** Install netting over designated mulch surface. Staple upslope ends, edges, bottom, and overlaps at 600 mm (24-inch) intervals. Overlap adjacent fabric to outside edges. Secure remaining fabric areas by putting in approximately 1 staple per 1.0 m<sup>2</sup> (1 staple per 1 square yard) of area.

**2. Coconut Coir.** Install netting over designated mulch surface. Stretch fabric tightly and anchor with wood stakes along all edges at 2.2 m (7-foot) maximum interval. Overlap adjacent fabric widths by not less than 200 mm (8 inches).

**(c) Mulching Planted Areas.**

**1. Individual Plant Pits.** Uniformly apply a designated mulch specified in [Section 805.2\(a\)2](#) to the entire plant pit to a loose depth of 75 mm (3 inches) and as shown on the [Standard Drawing](#). Apply mulch within 48 hours after completion of the planting operation.

**2. Planting Beds.** Cover designated shrub beds with mulch or mulch and weed barrier mat or mulch and weed control mat as indicated. Cut mat around the plant stem to ensure mat will not extend above the mulch. Secure mat to the soil surface with staples or other approved anchoring devices at a maximum interval spacing of 1.0 m (3 feet) and along all edges and overlaps. Overlap mat edge with 50 mm (2-inch) minimum.

Uniformly apply a designated mulch specified in [Section 805.2\(a\)2](#) over the entire bed area to a loose depth of 75 mm (3 inches). Redistribute excessive mulch depth. Taper mulch depth at plant pit as shown on the [Standard Drawing](#). Apply mat and mulch within 48 hours after completion of the planting operation.

**(d) Maintenance.** Properly maintain mulched areas until the entire project has been completed. Promptly reapply mulch materials, which become dislodged or lost due to wind, rain, or other causes, at initial or modified rates, as directed.

After mulching work on a slope has been satisfactorily completed, if a slope failure occurs, one that requires redressing, excavation, or the establishment of a new slope, replace the mulch, as directed.

**(e) Bonded Fiber Matrix.**

**1. General.** Prepare surfaces as specified in [Section 804.3\(b\)](#). Scarify all slopes greater than 1:3 (3:1) to ensure a rough texture for lodging of seed and BFM. Apply seed at twice the rate specified in [Section 804.2\(b\)2 Table A](#). Apply soil supplements as specified in [Section 804.3\(c\)](#).

**2. Application.** Apply bonded fiber matrix components hydraulically with hydromulching (hydroseed) equipment manufactured for this purpose. Follow manufacturer's mixing and application instructions.

The bonded fiber matrix components may be incorporated as an integral part of the seeding and soil supplement application if seeding and soil supplements are applied hydraulically.

Apply polymer binder or hydrocolloid binder matrixes at an application rate of 337.5 kg/1000 m<sup>2</sup> (3,000 pounds per acre) or as indicated to provide a uniform soil surface coverage thickness of 4 mm (0.16 inch) maximum after drying. Test application procedures to ensure a uniform application rate. Do not apply within 24 hours of anticipated rainfall.

Mix gypsum binder matrix components in a homogenous slurry in the following proportions for each 379 L (100 gallons) of water: gypsum binder—69 kg (150 pounds); wood fiber—18 kg (40 pounds); and synthetic fiber—0.3 kg (0.6 pounds). Apply gypsum binder matrix at an application rate of 675 kg/1000 m<sup>2</sup> (6,000 pounds per acre) or as indicated so that the soil surface is covered uniformly. Do not apply within 12 hours of anticipated rainfall.

Place BFM material at least 450 mm (18 inches) beyond the toe and top of all slopes. Apply material in at least two different directions to provide as much uniform coverage with no gaps or spaces greater than 1 mm (0.04 inch).

**805.4 MEASUREMENT AND PAYMENT—**

**(a) Seeded Areas.** Tonne (Ton)

For the type indicated. Measured by the number of tonnes (tons) of mulch actually incorporated into the work, at the specified rates.

**(b) Planted Areas.** Square Meter (Square Yard)

For the type indicated.

**(c) Mulch Replacement.** The Department will pay for replacing mulch on failed slope areas, as specified in [Section 805.3\(c\)](#), at the contract unit price, in addition to the original accepted mulch application.

**(d) Mulching and Weed Barrier Mat.** Square Meter (Square Yard)

For the type indicated.

**(e) Mulching and Weed Control Mat.** Square Meter (Square Yard)

For the type indicated.

**(f) Mulching - Bonded Fiber Matrix.** Square Meter (Square Yard)

**(g) Mulch Control Netting.** Square Meter (Square Yard)