Standard Practice for

Compost for Erosion/Sediment Control (Compost Blankets)

AASHTO Designation: R 52-10[1]

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1. SCOPE

1.1. This specification covers compost produced from various organic by-products for use as a surface mulch for erosion/sediment control on sloped areas. This technique may be used for both temporary and permanent erosion/sediment control applications.

1.2. This technique is appropriate for slopes up to a 2:1 grade (horizontal distance:vertical distance) and should only be used in areas that have sheet flow drainage patterns (not areas that receive concentrated flows). This technique may also be used on up to 1:1 slopes with proper consideration to length of slope and compost application rates (depth).

2. REFERENCED DOCUMENTS

2.1. *ASTM Standard*:

- D 2977, Standard Test Method for Particle Size Range of Peat Materials for Horticultural Purposes

2.2. *U.S. EPA Test Method*:

- U.S. EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition

2.3. *TMECC Sampling and Test Method*:

- *Test Methods for the Examination of Composting and Compost* (TMECC), jointly published by the USDA and USCC (2002 publishing as a part of the USDA National Resource Conservation Technical Bulletin Series)

2.4. *Other Standards*:

- U.S. Composting Council Seal of Testing Assurance Program documents
- *Development of Landscape Architecture Specifications for Compost Utilization*, The U.S. Composting Council and the Clean Washington Center, 1997

3. GENERAL DESCRIPTION

3.1. Compost is the product resulting from the controlled biological decomposition of organic material, occurring under aerobic conditions, which has been sanitized through the generation of heat and stabilized to the point that it is appropriate for its particular application. Active composting is typically characterized by a high-temperature phase that sanitizes the product and allows a high rate of decomposition, followed by a lower temperature phase that allows the product to stabilize while still decomposing at a slower rate. Compost should possess no objectionable odors or

substances toxic to plants and shall not resemble the raw material from which it was derived. Compost contains plant nutrients but is typically not characterized as a fertilizer.

3.2. Compost may be derived from a variety of feedstocks, including agricultural, forestry, food, or industrial residuals; biosolids (treated sewage sludge); leaf and yard trimmings; manure; tree wood; or source-separated or mixed solid waste.

3.3. Proper thermophilic composting, meeting the U.S. Environmental Protection Agency's definition for a "process to further reduce pathogens" (PFRP), will effectively reduce populations of human and plant pathogens, as well as destroy noxious weed seeds and propagules.

3.4. Compost is typically characterized as a finely screened and stabilized product that is used as a soil amendment. However, most composts also contain a wood-based fraction (e.g., bark, ground brush and tree wood, wood chips, etc.) that is typically removed before use as a soil amendment. This coarser, woody fraction of compost plays an important role when compost is used in erosion and sediment control. It is even possible to add fresh, ground bark or composted, properly sized wood-based material to a compost product, as necessary, to improve its efficacy in this application.

3.5. Compost products acceptable for this application must meet the chemical, physical, and biological parameters outlined in Section 4.

4. CHEMICAL, PHYSICAL, AND BIOLOGICAL PARAMETERS

4.1. Compost products specified for use in this application are described in Table 1. The products' parameters will vary based on whether vegetation will be established on the treated slope.

4.2. Only compost products that meet all applicable state and federal regulations pertaining to its production and distribution may be used in this application. Approved compost products must meet related state and federal chemical contaminant (e.g., heavy metals, pesticides, etc.) and pathogen limit standards pertaining to the feedstocks (source materials) in which they were derived.

Table 1—Compost Blanket Parameters

Parameters[a,b]	Reported as (Units of Measure)	Surface Mulch to Be Vegetated	Surface Mulch to Be Left Unvegetated
pH[c]	pH units	5.0–8.5	N/A
Soluble Salt Concentration[c] (electrical conductivity)	dS/m (mmhos/cm)	Max 5	Max 5
Moisture Content	%, wet weight basis	30–60	30–60
Organic Matter Content	%, dry weight basis	25–65	25–100
Particle Size	% passing a selected mesh size, dry weight basis	3 in. (75 mm), 100% passing 1 in. (25 mm), 90% to 100% passing $^3/_4$ in. (19 mm), 65% to 100% passing $^1/_4$ in. (6.4 mm), 0% to 75% passing Max particle length of 6 in. (152 mm)	3 in. (75 mm), 100% passing 1 in. (25 mm), 90% to 100% passing $^3/_4$ in. (19 mm), 65% to 100% passing $^1/_4$ in. (6.4 mm), 0% to 75% passing Max particle length of 6 in. (152 mm)
Stability/Maturity[d]			
Carbon Dioxide Evolution Rate	mg CO_2-C per g OM per day	<8	N/A
Physical Contaminants (man-made inerts)	%, dry weight basis	<1	< 1

[a] Recommended test methodologies are provided in *Test Methods for the Examination of Composting and Compost* (TMECC, The U.S. Composting Council).

[b] Landscape Architects and Project (Field) Engineers may modify the allowable compost specification ranges based on specific field conditions and plant requirements.

[c] Each specific plant species requires a specific pH range. Each plant also has a salinity tolerance rating, and maximum tolerable quantities are known. When specifying the establishment of any plant or turf species, it is important to understand their pH and soluble salt requirements, and how they relate to the compost in use.

[d] Stability/Maturity rating is an area of compost science that is still evolving, and as such, other various test methods could be considered. Also, never base compost quality conclusions on the result of a single stability/maturity test.

4.3. Very coarse compost should be avoided if the slope is to be landscaped or seeded as it will make planting and crop establishment more difficult.

4.4. In regions subject to higher rates of precipitation and/or rainfall intensity, higher compost application rates should be used. In these particular regions, as well as regions subject to wind erosion, coarser compost products are preferred.

Note 1—Specifying the use of compost products that are certified by the U.S. Composting Council's Seal of Testing Assurance (STA) Program (www.compostingcouncil.org) will allow for the acquisition of products that are analyzed on a routine basis, using the specified test methods. STA participants are also required to provide a standard product label to all customers, allowing easy comparison to other products.

Where water quality is an issue, or in areas in proximity to sensitive water bodies, the appropriate compost product should be used and vegetating the compost blanket should be considered.

5. FIELD APPLICATIONS

5.1. The following steps shall be taken for the proper installation of compost as a soil blanket for erosion/sediment control on sloped areas.

5.1.1. Slightly roughen (scarify) slopes and remove large clods, rocks, stumps, roots larger than two in. in diameter, and debris on slopes where vegetation is to be established. This soil preparation step may be eliminated where approved by the Project Engineer or Landscape Architect/Designer, or

where seeding or planting is not planned. Where practical, track (compact) perpendicular to contours on the slope using a bulldozer before applying compost as a soil blanket.

5.1.2. Apply compost at the rates specified in Table 2.

Table 2—Compost Blanket Application Rates

Annual Rainfall/Flow Rate	Total Precipitation and Rainfall Erosivity Index	Application Rate for Vegetated Compost Surface Mulch[a]	Application Rate for Unvegetated Compost Surface Mulch
Low	1–25 in., 20–90	1/2–3/4 in. (12.5–19 mm)	1–1 1/2 in. (25–37.5 mm)
Average	26–50 in., 91–200	3/4–1 in. (19–25 mm)	1 1/2–2 in. (37.5–50 mm)
High	51 in. and above, 201 and above	1–2 in. (25–50 mm)	2–4 in. (50–100 mm)

[a] These lower application rates should only be used in conjunction with seeding and for compost blankets applied during the prescribed planting season for the particular region.

5.1.2.1. Compost blanket application rates should be modified based on specific site (e.g., soil characteristics and existing vegetation) and climatic conditions as well as particular project-related requirements. The severity of slope grade, as well as slope length, will also influence compost application rates.

5.1.2.2. In regions subject to higher rates of precipitation and/or rainfall intensity, higher compost application rates should be used. In these regions, as well as those with spring snow melt and on sites possessing severe grades or long slope lengths, the compost blanket may be used in conjunction with a compost filter berm. The filter berm may be 1–2 ft (30 cm–60 cm) high by 2–4 ft (60 cm–120 cm) wide, and may be placed at the top or base (or both) of the slope. In these particular regions, as well as regions subject to wind erosion, coarser compost products may be preferred.

5.1.2.3. In regions subject to lower rates of precipitation or rainfall intensity, or both, lower compost application rates may be used.

Note 2—Specific regions may receive higher rainfall rates, but this rainfall is received through low-intensity rainfall events (e.g., the Northwestern United States). These regions may use lower compost application rates.

5.1.3. Compost shall be uniformly applied using an approved spreader unit, such as a bulldozer, side discharge manure spreader, etc. Alternatively, apply compost using a pneumatic (blower) unit, or other unit that propels the product directly at the soil surface, thereby preventing water from moving between the soil-compost interface. Thorough watering may be used to improve settling of the compost. Apply compost layer approximately 3 ft (90 cm) over the top of the slope, or overlap it into existing vegetation.

5.1.4. On highly unstable soils, use compost in conjunction with appropriate structural measures.

5.1.5. Dry or hydraulic seeding may be completed following compost application, as required, or during the compost application itself, where a pneumatic unit is used to apply the compost.

6. TEST METHODS

6.1. The chemical, physical, and biological analysis of the compost shall be determined in accordance with the *Test Methods for the Examination of Composting and Compost* (TMECC), jointly

published by the U.S. Department of Agriculture and the U.S. Composting Council (2002 publishing as a part of the USDA National Resource Conservation Technical Bulletin Series). (See Appendix X1.)

6.2. ASTM D 2977 shall be used to determine compost gradation.

7. SAMPLING, INSPECTION, PACKING, AND MARKING

7.1. The sampling, testing, packing, and marking of compost samples shall be done in accordance with TMECC 02.01-B (Selection of Sampling Locations for Windrows and Piles).

8. KEYWORDS

8.1. Compost; erosion control; sediment control; sheet flow; slope stabilization.

APPENDIXES

(Nonmandatory Information)

X1. METHODS FOR THE SAMPLING AND CHARACTERIZATION OF COMPOST

X1.1. Sampling procedures to be used for purposes of this specification (and the Seal of Testing Assurance program) are as provided in 02.01 Field Sampling of Compost Materials, 02.01-B Selection of Sampling Locations for Windrows and Piles of the *Test Methods for the Examination of Composting and Compost* (TMECC), Chapter 2, Section One, Sample Collection and Laboratory Preparation, jointly published by the USDA and USCC (2002 publishing as a part of the USDA National Resource Conservation Technical Bulletin Series). The sample collection section is available online at http://tmecc.org/tmecc/.

X1.2. Test Methods to be used for purposes of this specification are as provided in the *Test Methods for the Examination of Composting and Compost* (TMECC), jointly published by the USDA and USCC (2002 publishing as a part of the USDA National Resource Conservation Technical Bulletin Series). A list of such methods is provided in the table below and online at http://tmecc.org/tmecc/.

Table X1.1—Test Methods for Compost Characterization

Compost Parameters	Reported as	Test Method	Test Method Name
pH	pH units	TMECC 04.11-A	Electrometric pH Determinations for Compost. 1:5 Slurry Method.
Soluble salts	dS/m (mmhos/cm)	TMECC 04.10-A	Electrical Conductivity for Compost. 1:5 Slurry Method (Mass Basis).
Primary plant nutrients:	%, as-is (wet) and dry weight basis		
Nitrogen	Total N	TMECC 04.02-D	Nitrogen. Total Nitrogen by Combustion.
Phosphorus	P_2O_5	TMECC 04.03-A	Phosphorus. Total Phosphorus.
Potassium	K_2O	TMECC 04.04-A	Potassium. Total Potassium.
Calcium	Ca	TMECC 04.04-Ca	Secondary and Micro-Nutrient Content. Calcium.
Magnesium	Mg	TMECC 04.04-Mg	Secondary and Micro-Nutrient Content. Magnesium.
Moisture content	%, wet weight basis	TMECC 03.09-A	Total Solids and Moisture at 70 ± 5°C.
Organic matter content	%, dry weight basis	TMECC 05.07-A	Matter Method. Loss on Ignition Organic Matter Method.
Particle size	Screen size passing through	TMECC 02.12-B	Laboratory Sample Preparation. Sample Sieving for Aggregate Size Classification.
Stability (respirometry)	mg CO_2-C per g TS per day mg CO_2-C per g OM per day	TMECC 05.08-B	Respirometry. Carbon Dioxide Evolution Rate.
Maturity (Bioassay) Percent Emergence Relative Seedling Vigor	 % (average) % (average)	TMECC 05.05-A	Biological Assays. Seedling Emergence and Relative Growth.

X2. ADDITIONAL INFORMATION—WEBSITES

X2.1. For additional information on regional precipitation rates or rainfall erosivity indexes go online at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/us_12-month_precip.shtml or http://topsoil.nserl.purdue.edu/nserlweb/weppmain.

X2.2. Find U.S. Composting Council Seal of Testing Assurance Program documents at http://tmecc.org/sta/ or www.compostingcouncil/programs/sta.org.

[1] This standard was first published as MP 10 in 2003. Reconfirmed in 2005 and 2007. Published as a full standard in 2010.