Appendix 3. Compost Material Properties

This specification shall apply for all applications where compost is used as or within a construction or post-construction stormwater best management practice. Particle size specifications vary depending on use, as noted in Table 3.1.

Table 3.1: Compost Material Properties

Parameter	Range	Testing Method
Particle Size	For Amendments: 100% pass through a ½" screen For Compost Logs: 99% pass through a 2" screen; max. 40% pass through a 3/8" screen	TMECC 2.02-B
pH	6.0-8.0	TMECC 4.11
Manufactured Inert Material	<1% dry weight basis	TMECC 3.08-A
Organic Matter	35-95% dry weight basis	TMECC 5.07-A
Soluble Salt Concentration	≤ 6.0 mmhos/cm	TMECC 4.10-A
Carbon to Nitrogen Ratio (C:N)	≤ 25:1	
Stability (Carbon Dioxide evolution rate)	≤ 4 C / unit VS / day	TMECC 5.08-B
Maturity (seed emergence and seedling vigor)	>80% relative to positive control	TMECC 5.05-A
Trace Metals	Arsenic < 11 mg/kg[2] Cadmium < 4 mg/kg Chromium < 35 mg/kg[3] Copper < 310 mg/kg Lead < 400 mg/kg Mercury < 10 mg/kg Molybdenum < 2 mg/kg Nickel < 160 mg/kg Selenium < 26 mg/kg Zinc < 2.300 mg/kg	EPA SW-846
Dry Bulk Density	30-45 lb/cu.ft.	
Moisture content	35-55%	

Compost Specifications

Compost used to fulfill regulatory requirements shall meet the criteria set forth in this specification. In addition, it must be provided by an active member of the U.S. Composting Seal of Testing Assurance (STA) program.

The compost shall be the result of the biological degradation and transformation of plant-derived materials under conditions that promote anaerobic decomposition. No manure or biosolids shall be included. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have a moisture content that has no visible free water or dust produced when handling the material. It shall meet the following criteria, as reported by the U.S. Composting Council STA Program Compost Technical Data Sheet (See Table 14.3).

Soluble salt refers to the amount of soluble ions in a solution of compost and water. The concentration of soluble ions is typically estimated by determining the solution's ability to carry an electrical current, i.e., electrical conductivity. The units of measure for soluble salts are either mmhos/cm or dS/m (they are 1:1 equivalent). Plant essential nutrients are actually supplied to plants in a salt form. While some specific soluble salts, (e.g., sodium, chloride), may be more detrimental to plants, most composts do not contain sufficient levels of these salts to be a concern in landscape applications. Plant species have a salinity tolerance rating and maximum tolerable quantities are known. Excess soluble salts can cause phytotoxicity to plants. Compost may contribute to, or dilute, the cumulative soluble salts content of a growing media or soil. Reduction in soluble salts content can be achieved through thorough watering at the time of planting. Most composts have a soluble salt conductivity of 1.0 to 10.0 mmhos/cm, whereas typical conductivity values in soil range from 0 to 1.5 in most areas of the country. 6 mmhos/cm is moderately saline and will inhibit the growth of some plants. The final selection of plants should be made after a soil test identifies the limiting characteristics of the soil mix.

The ***Carbon to Nitrogen Ratio*** is the first step in evaluating the maturity and stability of a compost sample. A Carbon to Nitrogen (C:N) ratio of less than or equal to 25 is acceptable prior to the additional tests of maturity and stability. Currently there are a number of tests available to determine compost stability and maturity. Some have been published in Test Methods for the Examination of Composting and Compost (TMECC) by the U.S. Composting Council (USCC), while commercial laboratories have developed others.

Stability refers to a specific stage or state of organic matter decomposition during composting, which is related to the type of organic compounds remaining and the resultant biological activity in the material. The stability of a given compost is important in determining the potential impact of the material on nitrogen availability, volume, and porosity in soil or growth media. Compost as a soil amendment requires a stable to very stable product that will prevent nutrient tie up and maintain or enhance oxygen availability in soil or growth media.

Maturity is the degree or level of completeness of composting. Maturity is not described by a single property and therefore maturity is best assessed by measuring two or more compost characteristics. Some immature composts may contain high amounts of free ammonia, certain

organic acids or other water-soluble compounds which can limit seed germination and root development, or cause odor. All uses of compost require a mature product free of these potentially phytotoxic components. The bioassay used in the STA Program uses a seed germination and growth test to measure the percent of seed emergence and relative seedling vigor.

Trace metals are elements whose concentrations are regulated due to the potential for toxicity to humans, animals, or plants. Regulations governing the heavy metal content of composts, fertilizers, and certain other horticultural and agricultural products have been promulgated on both the State and Federal levels. Specific trace elements, often referred to as heavy metals include arsenic, cadmium, chromium, copper, lead, mercury, molybdenum nickel, selenium, and zinc. The quantity of these elements are measured on a dry weight basis and expressed as mg/kg (milligram per kilogram) or ppm (parts per million). Many of these elements are actually needed by plants for normal growth, although in limited quantities. Therefore, measuring the concentration of these elements, as well as other plant nutrients, can provide valuable management data relevant to the fertilizer requirements of plants and subsequent fertilizer application rates. All composts that contain regulated feedstocks must meet national and/or state safety standards for metals in order to be marketed.

Moisture content (percent) is the measure of the quantity of water present in a compost product; expressed as a percentage of total weight. The moisture content of compost affects its ***bulk density*** (weight per unit volume) and, therefore, affects handling and transportation. Overly dry compost (35% moisture, or below) can be dusty and irritating to work with, while very wet compost (55 to 60%) can become heavy and clumpy, making its application more difficult and delivery more expensive. A preferred moisture percent for finished compost is 35-55%.

Pathogens, such as bacteria and other infectious microorganisms, should be limited in compost derived from plant-based material, versus bio-solids, but may be present due to animal feces and other sources. Pathogen removal of the compost shall be in compliance with Title 40 of the Code of Federal Regulations Part 503 (or 40 CFR 503),