

Fertilizer shall be supplied in one of the following forms:

- (1) A dry free-flowing granular fertilizer, suitable for application by agricultural fertilizer spreader.
- (2) A soluble form that will permit complete suspension of insoluble particles in water, suitable for application by power sprayer.
- (3) A homogeneous pellet, suitable for application through a ferti-blast gun.
- (4) A tablet or other form of controlled release with a minimum of a 6 month release period.
- (5) A liquid suitable for application by a power sprayer or hydroseeder.

9-14.4 Mulch and Amendments

All amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis and name. In lieu of containers, amendments may be furnished in bulk. A Manufacturer's Certificate of Compliance shall accompany each delivery. Compost and other organic amendments shall be accompanied with all applicable health certificates and permits.

9-14.4(1) Straw

Straw shall be in an air-dried condition, free of noxious weeds, seeds, and other materials detrimental to plant life. Hay is not acceptable.

All straw material shall be Certified Weed-Free Straw using North American Weed Management Association (NAWMA) standards or the Washington Wilderness Hay and Mulch (WWHAM) program run by the Washington State Noxious Weed Control Board. Information can be found at www.nwcb.wa.gov.

In lieu of Certified Weed-Free Straw, the Contractor shall provide documentation that the material is steam or heat treated to kill seeds, or shall provide U.S., Washington State, or other states' Department of Agriculture laboratory test reports, dated within 90 days prior to the date of application, showing that there are no viable seeds in the straw.

Straw mulch shall be suitable for spreading with mulch blower equipment.

9-14.4(2) Hydraulically Applied Erosion Control Products (HECPs)

All HECPs shall be biodegradable and in a dry condition, free of noxious weeds, seeds, chemical printing ink, germination inhibitors, herbicide residue, chlorine bleach, rock, metal, plastic, and other materials detrimental to plant life. Up to 5 percent by weight may be photodegradable material.

The HECP shall be suitable for spreading with a hydroseeder.

All HECPs shall be furnished premixed by the manufacturer with Organic or Synthetic Tackifier as specified in [Section 9-14.4\(7\)](#). Under no circumstances will field mixing of additives or components be acceptable.

The Contractor shall provide test results, dated within 3 years prior to the date of application, from an independent, accredited laboratory, as approved by the Engineer, showing that the product meets the following table requirements:

Table 1
HECP Requirements

Properties	Test Method	Requirements
Acute Toxicity	EPA-821-R-02-012 Methods for Measuring Acute Toxicity of Effluents. Test leachate from recommended application rate receiving 2 inches of rainfall per hour using static test for No-Observed-Adverse-Effect-Concentration (NOEC).	Four replicates are required with no statistically significant reduction in survival in 100 percent leachate for a Daphnid at 48 hours and Oncorhynchus mykiss (rainbow trout) at 96 hours.
Solvents	EPA 8260B	Benzene – < 0.03 mg/kg Methylene chloride – < 0.02 mg/kg Naphthalene – < 5 mg/kg Tetrachloroethylene – < 0.05 mg/kg Toluene – < 7 mg/kg Trichloroethylene – < 0.03 mg/kg Xylenes – < 9 mg/kg
Heavy Metals	EPA 6020A Total Metals	Antimony – < 4 mg/kg Arsenic – < 6 mg/kg Barium – < 80 mg/kg Boron – < 160 mg/kg Cadmium – < 2 mg/kg Total Chromium – < 4 mg/kg Copper – < 10 mg/kg Lead – < 5 mg/kg Mercury – < 2 mg/kg Nickel – < 2 mg/kg Selenium – < 10 mg/kg Strontium – < 40 mg/kg Zinc – < 30 mg/kg
Water Holding Capacity	ASTM D 7367	800 percent minimum
Organic Matter Content	ASTM D 586	90 percent minimum
Moisture Content	ASTM D 644	15 percent maximum
Seed Germination Enhancement	ASTM D 7322	Long-Term 420 percent minimum Moderate-Term 400 percent minimum Short-Term 200 percent minimum

If the HECP contains cotton or straw, the Contractor shall provide documentation that the material has been steam or heat treated to kill seeds, or shall provide U.S., Washington State, or other states' Department of Agriculture laboratory test reports, dated within 90 days prior to the date of application, showing that there are no viable seeds in the mulch.

The HECP shall be manufactured in such a manner that, when agitated in slurry tanks with water, the fibers will become uniformly suspended, without clumping, to form a homogeneous slurry. When hydraulically applied, the material shall form a strong moisture-holding mat that allows the continuous absorption and infiltration of water.

The HECP shall contain a dye to facilitate placement and inspection of the material. Dye shall be nontoxic to plants, animals, and aquatic life and shall not stain concrete or painted surfaces.

The HECP shall be furnished with a Material Safety Data Sheet (MSDS) that demonstrates that the product is not harmful to plants, animals, and aquatic life.

9-14.4(2)A Long-Term Mulch

Long-Term Mulch shall demonstrate the ability to adhere to the soil and create a blanket-like mass and shall bond with the soil surface to create a continuous, porous, absorbent, and flexible erosion-resistant blanket that allows for seed germination and plant growth and conforms to the requirements in [Table 2](#), Long-Term Mulch Test Requirements.

The Contractor shall provide test results documenting that the mulch meets the requirements in [Table 2](#), Long-Term Mulch Test Requirements.

Effective January 1, 2012, the Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP).

Table 2
Long-Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion	ASTM D 6459. Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle.	C Factor = 0.01 maximum using Revised Universal Soil Loss Equation (RUSLE)

9-14.4(2)B Moderate-Term Mulch

Within 48 hours of application, the Moderate-Term Mulch shall bond with the soil surface to create a continuous, absorbent, flexible, erosion-resistant blanket that allows for seed germination and plant growth and conforms to the requirements in [Table 3](#), Moderate-Term Mulch Test Requirements.

The Contractor shall provide test results documenting that the mulch meets the requirements in [Table 3](#), Moderate-Term Mulch Test Requirements.

Effective January 1, 2012, the Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP).

Table 3
Moderate-Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion	ASTM D 6459. Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle.	C Factor = 0.05 maximum using Revised Universal Soil Loss Equation (RUSLE)

9-14.4(2)C Short-Term Mulch

The Contractor shall provide test results documenting that the mulch meets the requirements in [Table 4](#), Short-Term Mulch Test Requirements.

Effective January 1, 2012, the Contractor shall supply independent test results from the National Transportation Product Evaluation Program (NTPEP).

Table 4
Short-Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion	ASTM D 6459. Test in one soil type. Soil tested shall be sandy loam as defined by the National Resources Conservation Service (NRCS) Soil Texture Triangle.	C Factor = 0.15 maximum using Revised Universal Soil Loss Equation (RUSLE)

9-14.4(3) Bark or Wood Chips

Bark or wood chip mulch shall be derived from Douglas fir, pine, or hemlock species. It shall not contain resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust shall not be used as mulch.

Bark or wood chips when tested shall be according to WSDOT Test Method T 123 prior to placement and shall meet the following loose volume gradation:

Sieve Size	Percent Passing	
	Minimum	Maximum
2"	95	100
No. 4	0	30

9-14.4(4) Wood Strand Mulch

Wood strand mulch shall be a blend of angular, loose, long, thin wood pieces that are frayed, with a high length-to-width ratio, and it shall be derived from native conifer or deciduous trees. A minimum of 95 percent of the wood strand shall have lengths between 2 and 10 inches. At least 50 percent of the length of each strand shall have a width and thickness between $\frac{1}{16}$ and $\frac{1}{2}$ inch. No single strand shall have a width or thickness greater than $\frac{1}{2}$ inch.

The mulch shall not contain salt, preservatives, glue, resin, tannin, or other compounds in quantities that would be detrimental to plant life. Sawdust or wood chips or shavings will not be acceptable.

The Contractor shall provide Material Safety Data Sheet (MSDS) that demonstrates that the product is not harmful to plant life and a test report performed in accordance with WSDOT Test Method 125 demonstrating compliance to this specification prior to acceptance.

9-14.4(5) Lime

Agriculture lime shall be of standard manufacture, flour grade or in pelletized form, meeting the requirements of ASTM C 602.

9-14.4(6) Gypsum

Gypsum shall consist of Calcium Sulfate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) in a pelletized or granular form. 100 percent shall pass through a No. 8 sieve.

9-14.4(7) Tackifier

Tackifiers are used as a tie-down for soil, compost, seed, and/or mulch. Tackifiers shall contain no growth or germination-inhibiting materials and shall not reduce infiltration rates. Tackifiers shall hydrate in water and readily blend with other slurry materials, and shall conform to the requirements in Table 5, Tackifier Test Requirements.

The Contractor shall provide test results documenting the tackifier meets the requirements in Table 5, Tackifier Test Requirements.

Table 5
Tackifier Test Requirements

Properties	Test Method	Requirements
Heavy Metals Solvents Acute Toxicity	See Table 1 in Section 9-14.4(2) . Test at manufacturer's recommended application rate.	See Table 1 in Section 9-14.4(2)
Viscosity	ASTM D 2364. Testing shall be performed by an accredited, independent laboratory.	4000 cPs minimum

9-14.4(7)A Organic Tackifier

Organic tackifiers shall be derived from natural plant sources and shall have an MSDS that demonstrates to the satisfaction of the Engineer that the product is not harmful to plants, animals, and aquatic life.

9-14.4(7)B Synthetic Tackifier

Synthetic tackifiers shall have an MSDS that demonstrates to the satisfaction of the Engineer that the product is not harmful to plants, animals, and aquatic life.