

(c) **Temporary Silt Fences, Geotextile Fabric Silt Barriers, and Filter Barriers:**

1. **Geotextile fabric** shall conform to the requirements of Section 245.
2. **Posts for temporary silt fences** shall be a nominal 2 1/2 by 2 1/2 inch or a 3 inch diameter No. 2 Southern pine, a nominal 2 by 2 inch oak, or steel having a weight of at least 1.25 pounds per linear foot and a length of at least 5 feet.
3. **Wire fence reinforcement for temporary silt fences** using standard strength geotextile fabric shall be at least 36 inches in height, at least 14 1/2 gage, and shall have a mesh spacing of more than 6 inches.
4. **Burlap fabric for temporary filter barriers** shall conform to the requirements of AASHTO M182, Class 3, and shall provide at least 3 months of expected usable construction life.
5. **Supports for temporary filter barriers** shall be a nominal 1 by 2 inch or 1 1/2 inch diameter No. 2 Southern pine or oak, or steel having a weight of at least 1.00 pound per linear foot.

SECTION 243—EPOXY-RESIN SYSTEMS

243.01—Description.

These specifications cover epoxy-resin systems to be used for all applications requiring bonding of various materials or as patching or overlay of concrete slabs.

243.02—Detail Requirements.

Epoxy-resin materials shall conform to the applicable requirements of Tables II-19, and II-21. The infrared spectrum for each component shall essentially match that of

TABLE II-19
Requirements: Component A

Type Property	EP-3B Max.	EP-3T Max.	EP-4 Max.	EP-5 Max.	EP-6 Max.
Epoxy equivalent	245	220	225	270	245

TABLE II-21
Requirements: Mixed Epoxy Systems

Property	EP-3B Red		EP-3T Gray		EP-4 Straw		EP-5 ¹ Straw		EP-6 Lt. Straw		CTE Black	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Pot life at 75°F	40	65	40	65	35	55	35	35	20	30	20	40
Tensile strength (psi) at 75°F	—	—	—	—	3,000	—	2,000	—	1,500	—	400	—
Tensile elongation (%) at 75°F	—	—	—	—	1	3	5	15	5	15	30	—
Water absorption (Max. %)	—	0.8	—	0.8	—	0.8	—	0.8	—	0.8	—	0.8
2 in Cubes compressive (psi, 24 hr, dry) (min.)	—	—	—	—	6,000	—	—	—	—	—	—	—
Strength (psi, 48 hr, wet) (min.)	—	—	—	—	7,000	—	4,000	—	4,000	—	—	—
Bond strength: (7 day) Hardened concrete to hardened concrete or fresh concrete (psi min.)	3,000	—	3,000	—	3,000	—	—	—	3,000	—	2,500	—
Ash content (%)	20	30	10	20	—	0.5	—	0.5	5	15	—	5.0
Viscosity												
Poises	40	100	40	150	20	40	10	25	—	—	—	—
Spindle No.	4	—	4	—	3	—	3	—	—	—	Gel	—
Speed	10 or 20	—	10 or 20	—	20	—	20	—	—	—	—	—
Volatile content (max. %)	—	—	6.0	—	3.0	—	3.0	—	3.0	—	20.0	—

¹Epoxy system EP-5LY shall have the same requirements as epoxy system EP-5 except that the viscosity shall be less than 9.0 poises.

the standard infrared spectrum for the particular component as specified in AASHTO T237, Sections 4 and 5.

(a) **Epoxy Systems:**

1. **Types EP-3B and EP-3T** shall be 100 percent reactive high build coatings designed as a two coat (minimum) system for protection of concrete exposed to splash zones and tidal water. Type EP-3B shall be the prime or base coat, and Type EP-3T shall be the finish or topcoat.
2. **Types EP-4, EP-5, and EP-6** shall be moisture insensitive systems designed for structural bonding, sealing, and grouting of dry, damp, or wet structural material free from standing water. Mortar shall be prepared by mixing 3 1/4 parts by volume of loose oven-dried sand to 1 part of premixed Type EP-4 or EP-5 epoxy; however, Type EP-6 shall be mixed on a 1:1 ratio.

Mortars shall be mixed to a uniform consistency.

Type EP-4 shall be a high modulus, rigid, general purpose adhesive with a tensile elongation of 1 to 3 percent. Type EP-4, low viscosity, shall be used to seal rigid cracks.

Type EP-5 shall be a low modulus patching, sealing, and overlay adhesive with an elongation of at least 10 percent. When used as a penetrating sealer and to repair nonrigid cracks, Type EP-5 shall be of a low viscosity.

Type EP-6 shall be a low modulus, nonsagging, flexible adhesive with an elongation of at least 5 percent. Type EP-6 shall be used for bonding or repairing damp and underwater surfaces where a nonsagging, low modulus material is required.

- (b) **Classes:** Epoxy resin shall be formulated for use at specific temperatures. Three classes of systems are defined according to the range of temperatures for which they are suited. The controlling temperature shall be that of the surface of the hardened concrete to which the bonding system is applied.

Where unusual curing rates are desired and upon the approval of the Engineer, a class of bonding agent may be used at a temperature other than that for which it is normally intended. The class and gel temperature shall be as follows:

1. **Class A:** for use below 40 degrees F
2. **Class B:** for use between 40 degrees F and 60 degrees F
3. **Class C:** for use below 60 degrees F

- (c) **Mixing Epoxy:** Epoxy resin shall be furnished in two components for combining in accordance with the manufacturer's instructions immediately prior to use. Component A shall contain a condensation product of epichlorohydrin with bisphenol A and shall conform to the requirements of Table II-19. Component B shall conform to the requirements of Table II-20 and shall contain one or more hardening agents that will cause the system to polymerize and harden, on mixing with Component A in accordance with Table II-21. Thixotropic agents used to control viscosity will be permitted in accordance with the manufacturer's recommendations. If the mixture proportion of component A to component B exceeds 2:1, only complete units as packaged by the manufacturer shall be used.

Contents of the separate packages containing Components A and B shall be thoroughly stirred prior to use. The same paddle shall not be used to stir Component A that is used to stir Component B. The Contractor shall dispose of solvents used for cleaning in accordance with applicable Virginia Department of Waste Management policies and procedures. Components A and B shall be stored between 65 degrees F and 80 degrees F for at least 2 hours before use. Epoxy components may be heated in hot water or by indirect heat prior to mixing to bring them to the required temperature. Solvents and thinners shall not be used except for cleaning equipment.

Mixing of epoxy components shall be in accordance with the manufacturer's instructions.

When mineral fillers are specified, they shall be inert and nonsettling or readily dispersible. Materials showing a permanent increase in viscosity or the settling of pigments that cannot be readily dispersed with a paddle shall be replaced at the Contractor's expense. At least 95 percent of the filler shall pass the No. 300 sieve.

- (d) **Aggregates:** Aggregate for surface application work shall be nonfriable, nonpolishing, clean, and free from surface moisture. Silica sand having a well-rounded particle shape shall be used. Aggregates that will be exposed to traffic shall have a Mohs scale hardness of at least 7. In surface applications, the aggregate shall be applied on the epoxy surface in excess of the amount necessary to cover the surface, shall be sprinkled or dropped vertically in such a manner that the level of epoxy mixture is not disturbed, and shall be applied within 5 minutes after application of the epoxy. At temperatures below 70 degrees F, a maximum of 10 minutes will be allowed. The grading analysis of the fine aggregate (silica sand) shall conform to the requirements of Table II-22.

243.03—Handling and Storing Materials.

The two components of the epoxy resin system shall be furnished in separate containers that are nonreactive with the materials. The size of the containers shall be

TABLE II-22
Fine Aggregate (Silica Sand)

Amounts Finer Than Each Laboratory Sieve (Sieve Opening) (% by Weight)						
Grading	No. 8	No.16	No. 20	No. 30	No. 40	No. 100
D	Min 100	50 ± 10		Max 3		Max 1
E	Min 100	99 ± 1	95 ± 5		Max 10	

Grading D aggregate shall be used in Class I waterproofing and other skid-resistant applications. Grading E aggregate shall be used in epoxy patching mortars and loop detector sealants. Aggregates shall be oven dried.

such that the recommended proportions of the final mixture can be obtained by combining one container of Component A with one container of Component B. The size of the container shall be not more than 10 gallons. When less than one complete unit is used, each component shall be measured within ± 2 percent of the volume required. Batches of less than 6 fluid ounces shall be measured within ± 1 percent.

Containers shall be identified as “Component A—Contains Epoxy Resin” and “Component B—Contains Hardener” and shall show the type, class, and mixing directions. Each container shall be marked with the name of the manufacturer; class, batch, or lot number; date of packaging; date of shelf life expiration; pigmentation, if any; and the quantity contained in pounds and gallons.

243.04—Acceptance.

Shipments of less than 15 gallons may be accepted upon certification. The Contractor shall submit a certification from the manufacturer that Components A and B conform to these specifications. The certification shall consist of a statement by the manufacturer that Components A and B have been sampled and tested. The certification shall be signed by an authorized agent of the manufacturer and contain actual results of tests performed in accordance with the methods specified herein.

For shipments of 15 gallons or more, at least one random test sample of each component from each batch or lot number will be taken by the Department. The quantity of Component A required to react with 1 quart of Component B will be a sufficient sample for the tests specified. Components shall be furnished in as few different batches or lots as possible.

Tests will be performed in accordance with the following methods:

Characteristics	Test Method	Other
Viscosity	ASTM D2393, Model RVF Brook-field visco-meter	Determination to be made at Class A–32°F Class B–50°F Class C–77°F
Epoxide equivalent	ASTM D1652 and VTM-43	
Volatile content	ASTM D1259, Method B, for mixed system	Sample cured 4 days at room temperature and weighed on previously weighed metal foil
Filler content	VTM-43	
Ash content	ASTM D482	
Pot life	AASHTO T237	Determination to be made at Class A–32°F Class B–50°F Class C–75°F
Tensile strength	ASTM D638	
Bond strength	VTM-41	
Compressive strength	VTM-41	
Water absorption	ASTM D570	
Thermal shear	VTM-42	

SECTION 244—ROADSIDE DEVELOPMENT MATERIALS

244.01—Description.

These specifications cover the various materials, such as fertilizers, seeds, plants, sod, and mulch, for use in landscaping and materials used for soil retention to help prevent erosion.

244.02—Detail Requirements.

- (a) **Herbicides:** Herbicides shall be registered with the Virginia Department of Agriculture and Consumer Services in accordance with the Virginia Pesticide Law and shall be supplied in the manufacturer's containers clearly labeled as to the composition, brand, and name and address of the manufacturer.
- Herbicide for control of broad-leaf weeds** shall contain at least 3 pounds of 2,4-D as an oil-soluble, water-emulsifiable amine salt. It