

Construction Specification 24—Drainfill

1. Scope

The work consists of furnishing, placing, and compacting drainfill required in the construction of structure drainage systems.

2. Material

Method 1—Drainfill material shall conform to the requirements of Material Specification 521, Aggregates for Drainfill and Filters. A minimum of 30 days before delivery of materials to the site, the contractor shall inform the engineer in writing of the source(s) from which drainfill material will be obtained. The contractor shall provide the engineer free access to the source(s) for the purpose of obtaining samples for testing.

Method 2—Drainfill material shall be sand, gravel, or crushed stone, or mixtures thereof, obtained from the specified sources. The material shall be selected as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles, or other substances that would interfere with their free-draining properties.

3. Base preparation

Foundation surface and trenches shall be clean and free of organic matter, loose soil, foreign substance, and standing water when the drainfill is placed. Earth surfaces upon or against which drainfill will be placed shall not be scarified.

4. Placement

Drainfill shall not be placed until the subgrade has been inspected and approved by the engineer. Drainfill shall not be placed over or around pipe or drain tile until the installation of the pipe or tile has been inspected and approved.

Drainfill shall be placed uniformly in layers not to exceed 12 inches thick before compaction. When compaction is accomplished by manually controlled equipment, the layers shall not exceed 8 inches thick. The material shall be placed to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign material shall be allowed to become intermixed with or otherwise contaminate the drainfill.

Traffic shall not be permitted to cross over drains at random. Equipment cross-overs shall be maintained, and the number and location of such crossovers shall be established and approved before the beginning of drainfill placement. Each crossover shall be cleaned of all contaminating material and shall be inspected and approved by the engineer before the placement of additional drainfill material.

Any damage to the foundation surface or the trench sides or bottom occurring during placement of drainfill shall be repaired before drainfill placement is continued.

The upper surface of drainfill constructed concurrently with adjacent zones of earthfill shall be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.

Drainfill over and/or around pipe or drain tile shall be placed to avoid any displacement in line or grade of the pipe or tile.

Drainfill shall not be placed adjacent to structures until the concrete has attained the strength specified in section 9 of this specification. The strength shall be determined by compression testing of concrete

test cylinders cast and field cured at the project site in accordance with ASTM Method C 31 for determining when a structure may be placed into service.

When the required strength of the concrete is not specified as described above, placement of drainfill adjacent to concrete structures shall not be commenced until the following item intervals have elapsed following placement of the concrete:

Structure type	Time interval (days)
Vertical or near-vertical wall with earth loading on one side only (retaining walls and counterforts)	14
Walls backfilled on both sides simultaneously	7
Conduits and galleries, cast-in-place (with inside forms in place)	7
(inside forms removed)	14
Conduits, precast, cradled	2
Conduits, precast, bedded	1
Cantilever outlet bents backfilled on both sides simultaneously	3

5. Control of moisture

The moisture content of drainfill material shall be controlled as specified in section 9 of this specification. When additional water is required, it shall be applied in a manner to avoid excessive wetting to adjacent earthfill. Except as specified in section 9 of this specification, control of moisture content will not be required.

6. Compaction

Drainfill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction—For drainfill materials with more than 70 percent passing the 3/4 inch sieve, each layer of drainfill shall be compacted to a minimum dry density of not less than the density specified in section 9 of this specification as determined by ASTM D 698. For drainfill materials with 70 percent or less passing the 3/4 inch sieve, each layer of drainfill shall be compacted to a relative density of not less than 70 percent as determined by ASTM D 4254.

Class I compaction—Each layer of drainfill shall be compacted by a minimum of two passes over the entire surface with a steel-drum vibrating roller weighing at least 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at a minimum frequency of 1,200 times per minute, or by an approved equivalent method.

Class II compaction—Each layer of drainfill shall be compacted by one of the following methods or by an approved equivalent method. (A pass is defined as at least one complete coverage of the roller wheel, tire, or drum over the entire surface for each layer.)

- a. A minimum of two passes over the entire surface with a pneumatic-tired roller exerting a minimum pressure of 75 pounds per square inch.
- b. A minimum of four passes over the entire surface with the track of a crawler-type tractor weighing at least 20 tons.
- c. Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded hauling equipment.

Class III compaction—No compaction will be required beyond that resulting from the placing and spreading operations.

When compaction other than Class III compaction is specified, material placed in trenches or other locations inaccessible to heavy equipment shall be compacted by manually controlled pneumatic or vibrating tampers as specified in section 9 of this specification.

Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from cranes, hoists, or similar equipment will not be permitted.

7. Testing

The contractor shall conduct such tests as necessary to verify that the drainfill material and the in-place drainfill meets the specification requirements.

The engineer shall be granted access to perform such tests as are required to verify that the drainfill materials and the drainfill in place meets the requirements of the specifications. These tests are not intended to provide the contractor with information needed to assure that the materials and workmanship meet the specification requirements. These verification tests will not relieve the contractor of the responsibility of performing required tests for that purpose.

8. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, the volume of drainfill within the neat lines shown on the drawings are measured and computed to the nearest cubic yard. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the volume of such drainfill is included. The volume included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation in the determination of the engineer.

Payment for drainfill is made at the contract unit price for each type of drainfill, complete in place. Except as otherwise specified in section 9 of this specification, such payment will constitute full compensation for all labor, equipment, material, and all other items necessary and incidental to the performance of the work.

Method 2—For items of work for which specific unit prices are established in the contract, the quantity of drainfill placed within the specified limits is computed to the nearest 0.1 ton by actual weight. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the weight of such drainfill is included. The weight included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation in the determination of the engineer.

Payment for drainfill is made at the contract unit price for each type of drainfill, complete in place. Except as otherwise specified in section 9 of this specification, such payment will constitute full compensation for all labor, equipment, material, and all other items necessary and incidental to the performance of the work.

Compensation for any item of work described in the contract, but not included in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 9 of this specification.

9. Items of work and construction details