

Special Specification 4075

Wick Drains



1. DESCRIPTION

Furnish labor, materials, and equipment necessary to furnish and place prefabricated wick drains at the locations shown on the plans and at locations, designated by the Engineer, in accordance with the requirements of these specifications. Install the prefabricated wick drains in the specified triangular grid pattern with the limits shown on the plans.

The abbreviation ASTM used in this specification refers to American Society for Testing and Materials. Reference to specifications of ASTM means the latest standard or tentative standard in effect on the date of the proposal.

2. MATERIALS

All materials must conform to the requirements of this item, the plans, and the following items:

- Item 423, "Retaining Walls"
- Item 556, "Pipe Underdrains"
- DMS-6200, "Filter Fabric"

2.1. **General.** Provide new and unused materials for this project unless otherwise stated in the plans or proposal.

2.2. **Wick Drain.** Provide a 2-part prefabricated geocomposite wick drain consisting of a formed polypropylene core covered with a non-woven polypropylene filter fabric. Provide the drainage wicks with the properties from Table 1a through 1c.

Table 1a
Fabric Properties

| Properties | Requirements | Specification |
|-----------------------|--------------|---------------|
| Grab Tensile Strength | 130 lbs | ASTM D4632 |
| Grab Elongation | 60% | ASTM D4632 |
| Trapezoidal Tear | 60 lbs | ASTM D4533 |
| Puncture Strength | 50 lbs | ASTM D4833 |
| Mullen Burst Strength | 140 psi | ASTM D3786 |
| Flow Rate | 75 gpm/sf | ASTM D4491 |
| Permittivity | 0.5 sec-1 | ASTM D4491 |

**Table1b
Core Properties**

| Properties | Requirements | Specification |
|------------------|--------------|---------------|
| Tensile Strength | 180 lbs. | ASTM D4632 |

**Table1c
Wick Drain Properties**

| Properties | Requirements | Specification |
|--|--------------|---------------|
| Discharge Capacity (@ 70 psi and unit gradient) | 1.4 gpm | ASTM D4716 |

- 2.3. **Fabric and Core.** Provide a fabric and core that is inert to corrosive chemicals, hydrocarbons; and resistant to mildew, rot, insects, rodents, and ultraviolet light.
- 2.4. **Submittals.** A minimum of 2 weeks before installing the wick drains, submit for approval:
- Manufacturer's literature and written material specifications
 - Samples of the wick drain that are stamped or labelled by the manufacturer as being representative of the wick drain having the specified trade name
- Approval of the sample materials by the Engineer is required before delivery of the materials. Provide a manufacturer material certification for the wick drain materials delivered to the project.
- 2.5. **Shipment and Storage.** During shipment and storage, wrap the wick drain material in a heavy-duty protective covering. Provide storage area for the wick drain material that is protected from mud, dirt, dust, debris, and detrimental substances.
- Stockpile and store wick drain material in a manner that will protect the material from damage. Provide drains that are free of defects, rips, holes, or flaws. Replace damaged materials at no expense to the Department. Do not expose the wick drain material to the direct sunlight for more than 2 weeks during storage and installation.
- 2.6. **Granular Drainage Blanket.** Provide a 2-ft thick granular drainage blanket over the wick drain areas that meets the requirements for Type AS Select Backfill in Table 2, Item 423. Provide Type 1 filter fabric wrapping the drainage blanket that meets the requirements of Type 1 filter fabric in accordance with DMS-6200, "Filter Fabric."
- 2.7. **Pipe Underdrains.** Provide Type 8 perforated pipe.

3. CONSTRUCTION

- 3.1. **General.** Install the wick drains with equipment that will cause a minimum of disturbance of the subsoil during the installation. Install the wick drains with a sleeve or mandrel that is advanced to the required elevation using constant load, or constant rate of advancement methods. Do not use falling weight impact hammers, vibratory techniques, or jetting for installing the wick drains. Ensure the mandrel protects the wick drain material from tears, cuts, and abrasions during installation and withdraw after installing the drain. Provide the drain with an "anchor" plate or rod at the bottom to anchor the bottom of the drain at the required depth at the time of mandrel removal. The maximum allowable cross sectional area of the mandrel and anchor combination is 10 sq. in.

There may be areas of the project where dense sand or stiff clays exist at or near the existing ground surfaces. If these soils cannot be penetrated with reasonable effort, pre-auger the wick drains locations.

The maximum allowable diameter of the auger is 8 in. and the auger is to be advanced no more than 2 ft. into the underlying compressible material. The pre-auger holes are subsidiary to this item.

- 3.2 **Shop Drawings.** Provide the Engineer with shop drawings for review and approval that show the field layout of the wick drain installation at least 2 weeks before installing the wick drains. Include in the shop drawings details of the sequence and method of installation of the wick drains, installation of the drainage blanket, and as a minimum the following specific information:

- Size, type, weight, maximum pushing force and configuration of the installation rig
- Dimensions and length of mandrel
- Details of wick drain anchorage
- Detailed description of proposed installation procedures
- Proposed method(s) for overcoming obstructions
- Proposed method(s) for splicing wick drains
- Proposed means of making a linear determination of the length of wick drain material installed at each wick location

Approval by the Engineer of the submittal does not relieve the Contractor of the responsibility to install wick drains in accordance with the plans and specifications. If, at any time, the Engineer determines that the method of installation does not produce a satisfactory wick drain, alter the method and equipment as necessary to comply with the plans and specifications.

- 3.3 **Drainage Blanket.** Place a 2-ft. thick granular drainage blanket over the wick drain areas. Observe precautions necessary for protection of any instrumentation devices. After installing instruction devices, replace at no cost to the Department any equipment that is damaged or becomes unreliable as a result of these operations. Install the drainage blanket in accordance with Item 423 for Select Backfill.

- 3.4 **Wick Drains.** Before installing wick drains within the designated areas, demonstrate that the equipment, method, and materials produce a satisfactory installation in accordance with these specifications. For this purpose, install trial wick drains at locations designated by the Engineer. Payment for satisfactory trial wick drains will be at the bid price per foot for the wick drains. Payment will not be made for installing unsatisfactory trial wick.

Approval by the Engineer of the method or equipment used to install the trial wick drains will not constitute acceptance of the method for the remainder of the project. If, at any time, the Engineer determines that the method of installation does not produce a satisfactory wick drain, alter the method and equipment as necessary to comply with these specifications.

4. MEASUREMENT

This Item will be measured by the foot for the full length of acceptable wick drains measured from the top of the working surface, plus the 4 in. to 8 in. length of wick drain material protruding above the working surface, complete and in place.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured under "Measurement" will be paid for at the unit price bid for "Wick Drains". This price is full compensation for furnishing and installing wick drains, for furnishing and installing granular drainage blankets, for pre-augering, and for labor, tools, equipment, and incidentals necessary.