



Iowa Department of Transportation

SPECIAL PROVISIONS FOR EXPANDED POLYSTYRENE FILL

Mills County
NHSX-534-1(84)--3H-65

Effective Date
July 19, 2011

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090140.01 DESCRIPTION.

The Work consists of furnishing all labor, material, and equipment for placement of expanded polystyrene (EPS) fill, complete, as specified in the contract documents.

090140.02 MATERIALS.

A. General.

EPS shall not be classified as a specific Density or Type. EPS blocks shall conform to the specified type category in ASTM D6817 and have the following physical properties:

1. Physical Properties: In accordance with accepted values of ASTM Test Procedures.
2. Type: NOT CLASSIFIED.
3. Density as per ASTM D1622, NOT CLASSIFIED.
4. Compressive Resistance as per ASTM D1621, 5.3 psi minimum yield at 1% deformation.
5. Flexural Strength as per ASTM C203, 30 psi minimum.
6. EPS shall be fabricated using virgin feedstock manufactured into blocks having no more than five percent regrind content. Blocks shall have a height of at least 32 inches or 16 inches for a half block, a width of at least 48 inches, and a length of at least 96 inches. All blocks shall be shop-trimmed as necessary so that all surfaces are smooth and flat, and are within tolerances of 0.5% of respective height, width and length dimensions. Additional field and/or shop-trimming and cutting will be required as necessitated by the geometry of the fill being constructed.

7. The EPS shall contain a flame retardant additive and shall have UL Certification of Classification as to External Fire Exposure and Surface Burning Characteristics. EPS should be considered combustible and should not be exposed to open flame or any source of ignition.

090140.03 CONSTRUCTION.

B. Submittals.

1. Product Data: Signed by manufacturer of EPS certifying that products furnished comply or exceed the acceptance criteria of ASTM D6817 for EPS.
2. Testing Compliance: Signed by testing agency certifying that product delivered to the project site meets and/or exceeds criteria of specification found within these project documents.

C. Quality Assurance.

1. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designations only.
 - a. American Society for Testing and Materials (ASTM).
 - b. Project Required Testing.
2. The following are testing procedures required by the Contractor for project specific requirements.
 - a. ASTM D1622 – Standard Test Method for Density
 - b. ASTM D1621 – Standard Test Method for Compressive Resistance
3. The following are testing procedures required by EPS molder/Contractor for Industry specific requirements.
 - a. ASTM C203 – Standard Test Method for Flexural Strength
 - b. ASTM D1623 – Standard Test Method for Tensile Strength
 - c. ASTM C272 – Standard Test Method for Water Absorption
4. Manufacturer Qualifications: A firm experienced in manufacturing Expanded Polystyrene similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce the required quantity shall manufacture the EPS product for this project.
5. Installation Qualifications: A firm experienced in the installation and handling of Expanded Polystyrene with a minimum of three projects of similar size within a five year period shall install the EPS portion of this project.
6. Complete quality assurance testing and sampling, to monitor the conformance of the EPS fill with the specification requirements, as directed by the Engineer. Conduct density and geometry (dimensional tolerance) testing using full-sized blocks. Use blocks in conformance with contract requirements to make required fills.
7. Testing to monitor the quality of the EPS shall be done at the direction of the Engineer. The Engineer has the right to randomly sample the manufacturing plant. If any block does not conform to the physical requirements or if it is damaged in any way, it may be rejected by the Engineer.

8. Test and evaluate one set of ten samples prior to shipment of the first EPS delivery to project site. Test a minimum of 1 set of 10 samples per 500 cubic yards of material delivered to the project site. Testing may be performed with either a 2 inch by 2 inch by 2 inch cube or a 12 inch by 12 inch by 12 inch cube.
9. ASTM D1621 shall be the standard test method for evaluating product stability. Take ten samples from every delivery for the first 15 trucks. If there are no out of specification tests, then the testing frequency can be reduced to one set of samples every 500 cubic yards delivered to the project site.

D. Delivery, Storage, Handling

1. Prevent damage to the EPS during delivery, storage, and construction. Prior to delivery of EPS fill to the project site, review the manufacturer's care and handling recommendations. Cover any EPS fill to be exposed to sun light for more than 90 days with opaque material which will prevent ultraviolet light degradation. Any damage to the EPS resulting from the contractor's vehicles, equipment, or operations, shall be replaced.
2. Placement of embankment requires special procedures and careful selection of appropriate construction equipment to prevent damage to the EPS fill. Do not allow heavy construction equipment or vehicles directly on the EPS. Protect EPS from petroleum based solvents such as gasoline and diesel fuel.
3. Correct damage to EPS as follows:
 - a. Slight damage (<0.12 cubic feet with no linear dimension >1 foot) may be left in place as is.
 - b. Moderate damage (<0.35 cubic feet with no linear dimension >3.3 feet) shall be removed or left in place at the discretion of the Engineer.
 - c. Replace EPS blocks with excessive damage (i.e., exceeding the "moderate" category) with EPS blocks which meet the damage criteria. EPS blocks not meeting the damage criteria may be cut to eliminate the excessive damage and the remaining undamaged portion of the block may be used within the fill, provided the undamaged portion of the block meets all other requirements.

E. Execution.

1. Set, maintain, and reset all alignment stakes, slope stakes, and grade stakes necessary for the construction of the EPS fill. This includes, but is not limited to subgrade preparation, and all appurtenances within the limits of the EPS fill.
2. Trim EPS fill in the field and place to the lines and grades shown in the plans and as directed by the Engineer. Construct the surface of a layer of EPS blocks to receive additional EPS blocks with a variation in surface tolerance of no more than 0.5 inch in any 10 foot interval. Accurately fit all blocks relative to adjacent blocks. No gaps greater than 2.0 inches will be allowed on vertical joints. Construct the finished surface of the EPS fill beneath the top layer of topsoil backfill to within the tolerance of zero to minus 2.5 inches of the indicated grade.
3. Place the bottom layer of EPS blocks on a thin layer of sand backfill that has been screeded level to provide a uniform bearing surface.
4. Offset blocks placed in a row in a particular layer a minimum of 2.0 feet relative to blocks placed in adjacent rows of the same layer. In order to avoid continuous joints, rotate each subsequent layer of blocks on the horizontal plane 90 degrees from the direction of

placement of the previous layer placed. Connector plates are not necessary or recommended for this project. Cut blocks using a hot wire.

5. Because of the light unit weight of the EPS material, provide temporary weighting and/or guying as necessary until all the blocks are built into a homogeneous mass and the topsoil backfill is in place.

090140.04 METHOD OF MEASUREMENT.

Measurement for EPS fill will be by the cubic yard in place within the limits indicated in the plans.

090140.05 BASIS OF PAYMENT.

Payment for EPS Fill will be the contract unit price per cubic yard. Payment shall be full compensation for furnishing, trimming and placing the EPS fill, providing construction survey for EPS fill, testing EPS material, and all labor, equipment and incidentals needed to complete the work.