1. GEOMEMBRANE (revised 2-2-2022)

Description. This work is furnishing labor, equipment and materials to construct an impervious geomembrane layer as shown in the MSE Wall plans or as directed in writing by the Project Manager.

Materials. Furnish impervious geomembrane consisting of textured (roughened) surface sheets of High Density Polyethylene (HDPE), Linear Low Density Polyethylene (LLDPE), or Polyvinyl Chloride (PVC) material.

The geomembrane must meet the requirements of the Build America Buy America (BABA) special provision.

Furnish material that is puncture free and flexible, with both sides textured with a rough finish and a minimum thickness of 30 mils +/- 1.5 mils in accordance with ASTM D 5994 for Textured Geomembranes. Identify, handle, and store geomembrane in accordance with ASTM D 4873 and manufacturer’s recommendations. Provide manufacturer certifications ensuring that the geomembrane has been tested by lot and meets the minimum specification property requirements for 30 mil material as specified by the industry standards in the table below:

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| --- | --- | --- |
| **Material Type** | **Organization** | **Testing Standard(s)** |
| HDPE | Geosynthetic Research Institute (GRI) | GRI Test Method GM13: Standard Specification for “Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes” |
| LLDPE | Geosynthetic Research Institute (GRI) | GRI Test Method GM17: Standard Specification for “Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes” |
| PVC | American Society of Testing and Materials (ASTM) | ASTM D 7176: Standard Specification for Non-Reinforced Polyvinyl Chloride (PVC) Geomembranes Used in Buried Applications and ASTM D 7408: Standard Specification for Non-Reinforced Polyvinyl Chloride (PVC) Geomembrane Seams. |

In addition to the industry standard specification requirements shown above, the following minimum properties are required regardless of geomembrane type:

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| **PROPERTY** | **TEST METHOD** | **UNITS** | **REQUIRED VALUE** |
| Minimum Thickness | ASTM D 5994 for Textured Geomembranes | Mils | 30 (+/- 1.5) |
| Minimum Tear (Die C) | ASTM D 1004 | lbs | 10 |
| Minimum Puncture Resistance | ASTM D 4833 | lbs | 32 |

Construction.

Install geomembrane at the top of the reinforced soil zone as shown in the MSE Wall plans. For concrete panels, bond the geomembrane to the inside face of the wall panels and extend the geomembrane perpendicularly from the wall face into the fill.

Slope the geomembrane away from the wall face at the grade indicated on the MSE Wall Plans. Ensure that the impervious geomembrane layer is drained properly to prevent ponding above the geomembrane.

Install the geomembrane in accordance with the MSE Wall plans and manufacturer’s recommendations.

Prior to geomembrane installation, ensure the area to be lined is smooth and free of sharp objects or debris.

Limit geomembrane exposure to ultraviolet (UV) radiation to less than 10 days.

Install geomembrane that is free of holes or tears.

Do not install geomembrane during periods of precipitation or in conditions of excessive moisture, such as fog or dew, and in accordance with manufacturer’s recommendations.

Weld or bond all seams of the geomembrane to ensure a water tight seal is formed to prevent leakage.

Provide a minimum finished seam overlap of 4 inches, or the manufacturer’s recommended overlap, whichever is greater.

Conduct field testing of seams, in accordance with the manufacturer’s recommendations, to verify satisfactory seaming conditions.

Take all precautions necessary during backfilling to prevent damage to the geomembrane.

Do not operate construction equipment directly on the geomembrane under any circumstance.

Repair or replace all damaged geomembrane at the Contractor’s expense. Make repairs following the manufacturer’s recommendations or use a patch of the same material placed over the damaged area, overlapped at least 1 foot from the edge of any part of the damaged area, and weld or bond the patch to the geomembrane to form a water tight seal in accordance with the manufacturers’ recommendation.

Perforations through the geomembrane are not allowed without written approval from the MSE Wall designer and the Project Manager. Where perforations are required, the Contractor will provide a written narrative and details demonstrating the method(s) proposed for sealing the perforations to the Project Manager. The narrative and details must be approved by the MSE Wall designer and the Project Manager.

Method of Measurement: Geomembrane is not measured for payment.

Basis of Payment: Include the cost of the geomembrane, including all materials, labor, and equipment to install the geomembrane in the unit bid price for Mechanically Stabilized Earth (MSE) Retaining Walls.