

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENTAL SPECIFICATION 861
GEOGRID FOR SUBGRADE STABILIZATION**

July 17, 2009

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861.01 Description. This work consists of furnishing and installing biaxial geogrid at the locations and dimensions shown in the Contract Documents, or as directed by the Engineer, for the purpose of stabilizing the subgrade.

861.02 Materials. Geogrid is a geosynthetic material formed by a regular network of integrally connected elements with apertures of sufficient size to allow interlocking with surrounding soil, stone, or other geotechnical material to function primarily as reinforcement.

Furnish geogrid which is dimensionally stable and able to retain its geometry under construction stresses. Furnish geogrid that is resistant to damage during construction, ultraviolet degradation, and all forms of chemical and biological degradation encountered in the soil on which it is placed. Furnish geogrid that conforms to the properties presented in Table 861.02-1. With each geogrid shipment, provide certified test data from an independent testing laboratory for the properties presented in the table. The Department will accept test data from the National Transportation Product Evaluation Program (NTPEP) as certified test data from an independent laboratory.

TABLE 861.02-1 REQUIRED GEOGRID PROPERTIES

Property	Test Method	Required Value^[1]	
Reinforcement Properties			
Strength at 2% Strain	ASTM D 6637	400 lb/ft	5.8 kN/m
Minimum Opening Size	Direct Measure	0.75 in ^[2]	19 mm
Maximum Opening Size	Direct Measure	3.0 in ^[3]	76 mm
Survivability Index Values			
Ultimate Tensile Strength	ASTM D 6637	1230 lb/ft	18 kN/m
Junction Strength	GRI ^[4] GG2	25 lb	110 N
Ultraviolet Stability	ASTM D 4355	70 % at 500 hrs	

[1] Values, except ultraviolet stability, are minimum average roll values, MARV (average value minus two standard deviations.) Strength values are the minimum value in either the machine or cross-machine direction.

[2] Minimum opening size must be $\geq D_{50}$ of aggregate above geogrid to provide interlock.

[3] Maximum opening size must be $\leq 2 \times D_{85}$ to prevent aggregate from penetrating into the subgrade.

[4] GRI – Geosynthetic Research Institute

861.03 Shipment and Storage. Follow ASTM D 4873 for geogrid labeling, shipment, and storage. Product labels shall clearly show the manufacturer’s or supplier’s name, product type, lot number, roll number, manufactured date, and roll dimension. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer’s certificate.

During shipment and storage, protect the geogrid from direct sunlight, ultraviolet rays, temperatures greater than 160 °F (71 °C), flames including welding sparks, mud, dirt, dust, and debris. Keep the geogrid dry during storage and do not store directly on the ground.

The geogrid will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacturing, transportation, or storage. The Engineer may allow the Contractor to repair torn or punctured sections by placing a patch over the damaged area which extends at least 3.0 feet (0.9 m) beyond the damaged area in all directions.

861.04 Construction

A. Surface Preparation. Excavate the subgrade at the locations and to the dimensions and depths specified in the Contract Documents, according to Item 204. If specified in the Contract Documents, place geotextile fabric on the bottom of the excavation. The Contractor may attach the geogrid to the geotextile fabric if placing both at the bottom of the excavation.

B. Installation. Have a representative from the geogrid manufacturer provide on-site technical assistance at the start of the work and when required by the Engineer or Contractor.

Place the geogrid in accordance with the manufacturer’s recommendations and remove excess geogrid. The Contractor may turn the excess portion of the geogrid into the fill as an

alternative to removal, if this results in an acceptable installation. Maintain the vertical position of the geogrid at the specified depth.

Roll out the geogrid longitudinally along the roadway, in line with the placement of the granular fill. Do not drag the geogrid across the subgrade. Place the geogrid smooth and free of wrinkles. Fold or cut the geogrid to conform to curves. Hold the geogrid in place with pins, staples, sandbags or piles of granular material.

Overlap geogrid a minimum of 2.0 feet (0.6 m) at the ends and sides. Overlap geogrid 3.0 feet (0.9 m) in all directions if foot traffic causes movement of the subgrade. Place the beginning of each new roll beneath the previous roll to prevent the advancing fill from lifting the geogrid. Stagger end overlaps at least 10 feet (3.0 m) from other end overlaps in adjacent rolls or consecutive layers.

Patch damaged geogrid. Place a patch that extends at least 3.0 feet (0.9 m) beyond the damaged area in all directions. If the damaged portion is larger than 50 percent of the roll width, cut across the entire width of the roll to remove the damaged portion and overlap the cut ends.

C. Granular Fill Placement. Place granular fill as specified in the Contract Documents and according to Item 204. Cover the geogrid with fill within three calendar days after placement. Place, spread, and compact the granular fill in a manner that prevents the development of wrinkles or movement of the geogrid. Keep the geogrid taut during the placement of the initial lift of granular fill. Hold the geogrid in place with pins, staples, sandbags, or piles of granular material to prevent movement during granular fill placement.

End dump granular fill on the geogrid. Do not operate construction equipment directly on the geogrid. Place the end dumped material along the roadway centerline and spread outward to the roadway edges. Unless stated otherwise, maintain a minimum lift thickness of 12 inches (300 mm) for the lift immediately above the geogrid. Do not turn equipment or brake suddenly on the first lift of fill over the geogrid. Replace or repair damaged geogrids at no cost to the Department.

If rut depths exceed 3 inches (75 mm) reduce the size, weight, or both of the construction equipment. The Engineer may increase the lift thickness to obtain stability at the top of the lift. The Engineer may waive density requirements for the first lift if the subgrade is too soft to support compaction equipment. Fill in any ruts that form during construction. Do not use a dozer blade to cut down the fill between ruts.

861.05 Method of Measurement. The Department will measure the quantity of Geogrid by the number of square yards (square meters) of subgrade covered by the geogrid. The Department will not include overlaps in the measurement for payment.

861.04 Basis of Payment. The Department will pay for excavation, granular material, and geotextile fabric under Item 204. The Department will pay for accepted quantities at the contract price as follows:

Item	Unit	Description
861	Square Yard (Square Meter)	Geogrid For Subgrade Stabilization

Designer Note: Use geogrid in the design according to Geotechnical Bulletin 1 (GB1). Geogrid used for subgrade stabilization is applicable for any of the following:

1. Average N_L of 0 to 5 (CBR < 3)
2. To avoid impact on utilities below the subgrade.
3. To avoid difficult maintenance of traffic situations when using other stabilization methods.

If required granular thickness is greater than 14 inches, put geogrid in the middle of the granular material and include a fabric at the bottom.