

Standard Guidelines for Product Review
Type 1 MSEW Geogrids;
Section 02320.00
December, 2016

DEPARTMENT OF
TRANSPORTATION

Construction Section
800 Airport Road SE
Salem, OR 97301-4798
503-986-3059

Type 1 MSEW Geogrids-02320.00

ODOT maintains a list of approved geogrid soil reinforcement products known as *Type 1 MSEW Geogrids*. *Type 1 MSEW Geogrids* are used in mechanically stabilized earth (MSE) retaining walls in accordance with the requirements of Chapter 15 (*Retaining Structures*) in the ODOT Geotechnical Design Manual (GDM).

Geogrid reinforcement shall consist of a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit adequate mechanical interlock with the surrounding backfill. Geogrid soil reinforcements shall be dimensionally stable and able to retain their geometry during transport and installation. Geogrid reinforcements shall consist of polypropylene (PP), polyethylene (PE or HDPE), or polyester (PET).

A Product Qualification Report from the National Transportation Product Evaluation Program (NTPEP) is required to have a geogrid soil reinforcement product considered for ODOT approval as *Type 1 MSEW Geogrid*. NTPEP testing is in accordance with the requirements of AASHTO Designation PP 66-10, *Standard Practice for Determination of Long-Term Strength of Geosynthetic Reinforcement*. Overview of the NTPEP program, contact information, submittal and application forms can be found on the following web page:

<http://www.ntpep.org>

Testing and evaluation of geogrid soil reinforcement products for ODOT approval as *Type 1 MSEW Geogrid* (in accordance with AASHTO Designation PP 66-10) shall include the following additional requirements:

- Geogrid testing and evaluation shall be conducted using MSE granular wall backfill (relatively well-graded mixture of gravel-size crushed rock and sand) meeting the requirements in SP0A596.11(b).
- Unless otherwise indicated, the effective ambient or baseline temperature shall be 68°F (20°C) for testing.
- Calculate T_{ai} for the geogrid reinforcement assuming a 75-year design life.
- Assume “nonaggressive environmental conditions” with respect to MSE reinforced backfill particle size and characteristics, chemical properties, MSE wall site temperature, and other criteria.

The following requirements apply to calculation of the strength reduction factor to account for installation damage to the geogrid (RF_{ID}) in AASHTO Designation PP 66-10, Annex A:

- Place the MSE granular wall backfill in horizontal layers not greater than 8 inches in thickness over the test geogrid.
- Compact the MSE granular wall backfill with a vibratory drum roller in accordance with 00330.21.

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- The MSE granular wall backfill shall be compacted to at least 100% of the relatively maximum density per AASHTO T 99 in accordance with 0A596.47(c).

The following requirements apply to calculation of the strength reduction factor to prevent long-term creep rupture of the geogrid (RF_{CR}) in AASHTO Designation PP 66-10, Annex B:

- Temperature accelerated creep data (ASTM D5262 and D6992) is required for the assumed 75-year geogrid design life.
- The accelerated creep testing temperature shall not exceed 158 to 167°F (70 to 75°C).
- Test results shall include average geogrid creep stiffness for 2% strain at 1,000hrs ($J_{2\%}$) and at the specified design life (typically 75 years).

Project Acceptance Requirements:

The actual minimum average and average roll values furnished by the manufacturer shall be based on representative test results from the manufacturing plant which produced the geogrid, and shall meet or exceed each specified property value. All geogrid delivered to the project construction site shall be clearly labeled as being part of the same production run certified as meeting all applicable requirements.

The contractor will be required to furnish a Level A - Manufacturer's Test Result Certificate for each geogrid product delivered to the project construction site, including the geogrid product information and test results indicated below.

(1) Level A - Manufacturer's Test Result Certificate - Furnish a test result certificate according to 00165.35 from the Geogrid Manufacturer. The certificate shall:

- Include the minimum average roll values and average roll values for each of the specified properties from the same production run as the delivered material.
- Include production run number, production plant name and location.

(2) Geogrid Product Information - For geogrid products used in permanent MSE retaining walls, the Contractor shall submit all of the following information to the Engineer for verification purposes:

- Manufacturer's name and current address.
- Full product name and information.
- ODOT QPL Product Category (*Type 1 MSEW Geogrids*) and ODOT Standard Specification Number (02320.10).
- MSE retaining wall location information referencing the drawing name, detail and structure number.
- Polymer type(s) for geogrid and coating, if present.
- Primary resin type, class, grade, and category for HDPE (ASTM D 1248) and PP (ASTM D 4101).

Manufacturer's Sampling/Testing - The Manufacturer's reported property values shall be based on the following sampling and testing requirements:

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- (1) **Sampling** - Sample geogrid product according to ASTM D 4354.
- (2) **Geogrid Testing** - Provide laboratory test results that demonstrate the ultimate tensile strength (average roll value) for the delivered geogrid product is greater than or equal to the ultimate tensile strength listed for the same geogrid approved as *Type 1 MSEW Geogrid* and listed on the ODOT QPL. The geogrid ultimate tensile strength shall be established based on ASTM D 6637 (*Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Test Method*) in accordance with AASHTO Designation PP 66-10.

To apply for inclusion on the QPL, submit the following:

- [Preliminary information for Product Evaluation Form](#).
- Copy of NTPEP Product Qualification Report showing compliance with the above requirements.
- Spec data sheet.
- 3 small samples of the geogrid (approximately 2' x 2').
- Detailed installation instructions.

Submit documentation and submittal forms to:

Oregon DOT Materials Lab
Products Evaluation Coordinator
800 Airport Road SE
Salem OR 97301-4798