

PRODUCT SPECIFICATION (CSI FORMAT)
Stabilizer Grid System
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This specification utilizes the Construction Specifications Institute (CSI) Format, including MasterFormat (2004 Edition), SectionFormat, and PageFormat, contained in the CSI Manual of Practice. Optional text is indicated by brackets [], delete optional text in your final copy. Delete Specifier Notes which precede some sections. Each section must be carefully reviewed by the Engineer to meet the requirements of the project and local building code.

SECTION 02340
SOIL STABILIZATION SYSTEM

Specifier Notes: This section covers Cell-Tek Geosynthetics Stabilizer Grid (geocell) Cellular Confinement System. The system is comprised of three basic components: Stabilizer Grid (geocell), one or more infill materials, and a geotextile fabric.

PART 1 GENERAL

Specifier Notes: Revise any part of the sections below to suit project requirements.

1.01 SUMMARY

A. Cellular confinement system utilized for load support.

1.02 RELATED SECTIONS

- A. Section 02300 - Earthwork
- B. Section 02370 - Erosion and Sedimentation Control

1.03 REFERENCES

- A. AASHTO M 288 - Geotextile Specification for Highway Applications
- B. ASTM D 1505 - Density of Plastics by the Density-Gradient Technique
- C. ASTM D 1693 - Environmental Stress-Cracking of Ethylene Plastics
- D. ASTM D 5199 - Measuring Nominal Thickness of Geotextiles and Geomembranes
- E. ASTM E 41 - Terminology Relating to Conditioning

1.04 SYSTEM DESCRIPTION

- A. Cellular confinement system involves a three-dimensional geocell material into which specific infill materials are placed. It is composed of a set of virgin polyethylene strips which are ultrasonically welded together at certain intervals, creating seams aligned perpendicular to longitudinal axis of strips. When expanded, this structure creates a flexible, three-dimensional matrix of connecting cells.
- B. Complete load support system includes Stabilizer Grid sections, geotextiles, and cell infill materials.

1.05 SUBMITTALS

- A. Product Data: Submit product data provided by manufacturer.
- B. Technical Drawings: Submit manufacturer's technical drawings including section layout, direction of expansion, and any other relevant information.
- C. Samples: Submit representative samples provided by the manufacturer.

1. Geocell sections
 2. Geotextile swatch
 3. [Specimen of infill materials, if required]
- D. Material Certification: Submit certifications of the polyethylene used to make the geocell material.
1. Certification of percentage of HALS provided by manufacturer
 2. Certification of polyethylene density (ASTM 1505) and ESCR (ASTM D1693) provided by manufacturer

1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Quality management system certified to ISO 9001:2000.
- B. Installation: Choose an installer with a satisfactory record of performance on landscaping and/or paving projects of comparable size, complexity, and quality.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original packaging, with identification labels clearly intact.
- B. Storage:
1. Store materials per manufacturer's instructions.
 2. Store materials out of direct sunlight.
- C. Handling: Use care when unwrapping, handling, expanding, and infilling grid sections.
1. Be certain to overfill cells prior to any load bearing or vehicular traffic.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Cell-Tek Geosynthetics, LLC, 809 Barkwood Court, Suite M, Linthicum Heights, MD 21090
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2.02 Stabilizer Grid CELLULAR CONFINEMENT SYSTEM

Specifier Notes: All measurements are subject to manufacturing tolerances, unless otherwise specified.

- A. Base Materials:
1. Virgin, Colored, Polyethylene Stabilized with HALS:
 - a. Density, ASTM D 1505: 0.9574 g/cm³ (59.77 pounds per cubic foot)
 - b. Environmental Stress Crack Resistance (ESCR), ASTM D 1693: 6,000 hours.
 - c. Ultra-Violet Light Stabilization: Certified 1% HALS (Hindered Amine Light Stabilizer) content by weight, homogeneously distributed throughout material.
- B. Strip Properties:
1. Perforated and Textured Strip/Cell:
 - a. Strip Sheet Thickness, ASTM D 5199: 1.45 mm, minus 5 percent, plus 10 percent
 - b. Polyethylene Strips: Textured surface with a multitude of rhomboidal (diamond Shape) indentations
 - c. Polyethylene Strips: Perforated with horizontal rows of 9.5 mm (0.37 inch) diameter holes
 - d. Perforations Within Each Row: 20 mm (0.79 inch) on-center
 - e. Horizontal Rows: Staggered and separated 13 mm (0.51 inch) relative to hole centers
 - f. Edge of Strip to Nearest Edge of Perforation: 7.4 mm (0.29 inch) minimum
 - g. Centerline of Spot Weld to Nearest Edge of Perforation: 26.5 mm (1.04 inch) minimum
 2. Weld Spacing:
 - a. Weld Spacing for Cell Sections: 356 mm plus or minus 2.5 mm (14.0 inches plus or minus 0.10 inch)
- C. Cell Properties:
1. Individual Cells: Uniform in shape and size when expanded.

Specifier Notes: Specify required cell depth and delete others. Consult Cell-Tek Geosynthetics for suitable size. Specify either LSG-3™-Cell Size, LSG-4™-Cell Size, LSG-6™-Cell Size.

2. Individual Cell Dimensions: LSG-3™-Cell Detail

Nominal Dimensions \pm 10%

- a. Length 259 mm (10.2 inches)
- b. Width 224 mm (8.8 inches)
- c. Nominal Area plus or minus 1%: 290 cm² (44.9 square inches)
- d. Nominal Depth: 75 mm (3 inches)

4. Individual Cell Dimensions: LSG-4™-Cell Detail

Nominal Dimensions \pm 10%

- a. Length 259 mm (10.2 inches)
- b. Width 224 mm (8.8 inches)
- c. Nominal Area plus or minus 1%: 290 cm² (44.9 square inches)
- d. Nominal Depth: 100 mm (4 inches)

5. Individual Cell Dimensions: LSG-6™-Cell Detail

Nominal Dimensions \pm 10%

- a. Length 259 mm (10.2 inches)
- b. Width 224 mm (8.8 inches)
- c. Nominal Area plus or minus 1%: 290 cm² (44.9 square inches)
- d. Nominal Depth: 150 mm (6 inches)

D. Cell Seam Strength Tests:

1. Short-Term Seam Peel-Strength Test:

- a. Cell Seam Strength: Uniform over full depth of cell.
- b. Minimum Seam Peel Strength: 1065 N (239 lbf) for 75 mm (3 inch) depth, 1542 N (347 lbf) for 100 mm (4 inch) depth, 2170 N (488 lbf) for 150 mm (6 inch) depth

2. Long-Term Seam Peel-Strength Test:

- a. Conditions: Minimum 7 days in a temperature-controlled environmental chamber that undergoes fluctuation on a 1-hour cycle from room temperature (per ASTM E 41) to 54 degrees C (130 degrees F).
- b. Test Samples: Testing is conducted on the seam of 100 mm (4 inch) cell depth specimens.
- c. Test Method: Seam shall support a 72.5 kgs (160 pound) load for a minimum of 7 days.

E. Section Types and Sizes:

Specifier Notes: Consult Cell-Tek Geosynthetics for assistance in specifying appropriate cell depth for the specific application.

1. Cell Size: 75 mm (3") – LSG-3™

- a. Section Length: 6.86 m (22.5 feet)
- b. Section Width: 2.44 m (8 feet)
- c. Section Area: 16.74 square meters (180 square feet)

3. Cell Size: 100 mm (4") – LSG-4™

- a. Section Length: 6.86 m (22.5 feet)
- b. Section Width: 2.44 m (8 feet)
- c. Section Area: 16.74 square meters (180 square feet)

4. Cell Size: 150 mm (6") – LSG-6™

- a. Section Length: 6.86 m (22.5 feet)
- b. Section Width: 2.44 m (8 feet)
- c. Section Area: 16.74 square meters (180 square feet)

2.05 RELATED GEOSYNTHETIC COMPONENTS

Specifier Notes: Specify related geosynthetic components required for the application. Consult Cell-Tek Geosynthetics for assistance in determining requirements.

A. Geotextiles: AASHTO M 288

2.06 CELL INFILL MATERIALS

Specifier Notes: Specify cell infill materials based on properties and size of design loads. Consult Cell-Tek Geosynthetics for assistance.

A. Cell infill materials include one or a combination of the following:

1. Sand
2. Gravel and crushed rock or stone with a maximum particle size of 65 mm (2.5 inches) for load support applications
3. Concrete and soil-cement mixes
4. Clays, silts, and organic soils are not acceptable infill material for load support

2.07 SURFACE TREATMENTS

Specifier Notes: Specify surface treatments of infilled geocell system.

A. Surface treatment includes one or a combination of the following:

1. Vegetation
2. Degradable revegetative blankets
3. Turf reinforcement mats
4. Sprayed emulsions and binders
5. Asphalt
6. Concrete
7. Aggregates

PART 3 EXECUTION

3.01 EXAMINATION

- A. Evaluate site conditions. Notify the Engineer and refrain from excavation until site conditions have been corrected.
- B. Evaluate that the layout of the project is as indicated on the drawings. Notify the Engineer and do not proceed until the layout of the project matches the drawings.

Specifier Notes: Edit the installation requirements as required for the project. Consult Cell-Tek Geosynthetics for assistance in determining requirements.

3.02 INSTALLATION OF LOAD SUPPORT (STABILIZER GRID) SYSTEM

- A. Prepare subgrade and install according to manufacturer's instructions.
- B. Subgrade Preparation:
 1. Excavate and shape foundation soils to grades, elevations, and dimensions as indicated on the drawings.
 2. Confirm foundation soil meets specified compaction through proof rolling or other conventional method and is examined by the Engineer. If unacceptable foundation soils are encountered, excavate affected areas and replace these areas with suitable quality material as directed by the Engineer.
- C. Subbase and Base Installation:
 1. Place geotextile over subgrade according to geotextile manufacturer's recommendations. (NOTE: if installing grass on top, we recommend TRIAX Geogrid as the underlayment instead of a geotextile to promote root growth.)
 2. Use rebar spikes, expansion tools, or other suitable anchors, in selected outer cells to expand and maintain expansion of the Stabilizer Grid sections. Position grid sections as indicated on the drawings.
 3. Confirm each Stabilizer Grid section is expanded uniformly to 8' x 22.5' (2.44 m x 6.86m) and outer cells of each layer are correctly aligned. Interleaf or overlap edges of adjacent sections in each layer, joining the grid sections per manufacturer's installation instructions to create a continuous matrix of cells.
 4. Overfill cells with chosen infill per manufacturer's installation instructions and Engineer's

recommendation. Maximum particle size of granular infill material must not exceed 65 mm (2.5 inches). Level surface approximately 50 mm (2 inches) above cell walls. Cell walls must be sufficiently covered with infill to prevent any equipment or load bearing vehicular traffic from damaging the grid. (Note: if installing grass on top, the recommendation is an infill mix of 50% topsoil and 50% clean angular stone.)

5. Compact infill to a minimum of 95 percent SPDD. An additional layer of fill material over Stabilizer Grid cells may be required as a wear course depending on the application. Refer to manufacturer's installation instructions.
6. Contour compacted surface to specified elevation and grade as indicated on the drawings.