

214-R-733 GEOSYNTHETICS

(Revised 09-16-21)

The Standard Specifications are revised as follows:

SECTION 214, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

**SECTION 214 – GEOSYNTHETICS**

**214.01 Description**

This work shall consist of furnishing and installing geosynthetics as shown on the plans or as directed by the Engineer and in accordance with 105.03.

**MATERIALS**

**214.02 Materials**

Materials shall be in accordance with the following:

Coarse Aggregate .....	904.03 *
Geocell Confinement System.....	918.04
Geogrid.....	918.05
Geotextile for Pavement and Subgrade.....	918.02

Notes: ~~Coarse Aggregate~~ \*Only No. 2, 5, 43, 53, 73, shall be used only. ~~ACBF Slag~~ shall not be ~~allowed~~ used.

**CONSTRUCTION REQUIREMENTS**

**214.03 Foundation Preparation**

The embankment foundation shall be cleared and grubbed in accordance with 201 and excavated using lightweight equipment to minimize disturbance of the embankment foundation surface soils. Construction activities using equipment which cause pumping and rutting of the embankment foundation soils shall be prevented where possible and shall otherwise be minimized. Fine grading may be waived where impractical. When very soft soil is encountered, the embankment foundation shall be cleared of all trash and rubbish materials without disturbing the vegetation cover or root mat. The embankment foundation shall be subject to approval prior to placement of geosynthetics. Proofrolling of the embankment foundation will not be required in accordance with 203.09 when geosynthetics are used in construction of embankment foundation treatment.

**(a) Geotextile as a Drainage Blanket**

Geotextile shall be stored in such a manner as to prevent exposure to direct sunlight and damage by other construction activities. Geotextile shall be placed taut and transversely after backfilling all wheel tracks. Geotextile shall be overlapped by 3 ft and sewn in accordance with the manufacturer’s guidelines.

Coarse aggregate No. 2 or No. 5 shall be placed as directed and encapsulated with geotextile. Coarse aggregate shall be placed by spreading dumped material over previously placed material with light equipment in such a manner as to prevent damage to the geotextile. Dumping of coarse aggregate will be allowed on *the* initial working platform. The overlap shall be staggered throughout the roadway profile. Coarse aggregate shall be

placed to the full required thickness and compacted before any loaded trucks are allowed on the blanket. The drainage blanket shall have positive drainage.

No vehicles or construction equipment ~~shall~~ *will* be allowed on the geotextile prior to placement of the coarse aggregate. Damaged geotextile shall be repaired or replaced as directed. Damaged geotextile may be patched by placing a piece of the same geotextile over the damaged area. The overlap shall be at least 3 ft wide. The remaining lifts of the embankment shall be in accordance with 203.23.

**(b) Geotextile Placement for Pavement, Subgrade, or Embankment**

The subgrade or embankment shall be proofrolled in accordance with 203.26 and any defect or rut shall be repaired as directed prior to the geotextile placement. Geotextile shall be placed taut, without wrinkles and stretched in tension. Coarse aggregate shall be placed with a minimum disturbance to grade. Any damage to geotextile shall be repaired in accordance with 214.03(a). The remaining grade shall be constructed in accordance with 207. *Geotextile for pavement, subgrade, or embankment shall be in accordance with 918.02(c).*

*When geotextile for moisture management is specified, the grade shall be prepared in such a way as to provide positive drainage. The surface shall be prepared in accordance with 201.03 and compacted in accordance with 203.23. All rocks shall be broken and compacted in accordance with 203.24. Geotextiles shall be placed taut, without wrinkles, in accordance with the manufacturer's guidelines, as shown on the plans, or as specified. Damaged geotextile shall be replaced. Geotextile for moisture management shall be in accordance with 918.02(d).*

Geotextile shall be covered within three calendar days of placement.

**(c) Geogrid Placement in ~~Embankment and Subgrade~~**

The geogrid shall be installed in accordance with the Engineer's designs or the manufacturer's recommendations. The geogrid shall be kept taut during placement of the initial lift of backfill. Installation shall require the use of stakes, staples, sandbags, pile of granular fill, or other approved means to hold the geogrid in place during fill placement operations. ~~Type IA~~ *g*Geogrid shall be used for embankment foundation treatment. ~~Type IB~~ *g*geogrid shall be used for subgrade treatment, ~~type IV~~. When placing ~~type IA~~ *g*geogrid ~~in the embankment foundation, any~~ rutting in the granular material shall not exceed 3 in. ~~in the embankment foundation~~. The Engineer may increase the lift thickness to obtain stability of the granular material.

~~If required by the Engineer, the geogrid material supplier shall provide a qualified manufacturer's representative on the contract site at the start of the work to assist the Contractor. The representative shall also be available during the construction when required by the Engineer or the Contractor.~~

~~When~~ ~~type IB~~ *g*geogrid is ~~used~~ *specified for subgrade*, proofrolling shall be performed in accordance with 203.26 prior to placing the ~~type IB~~ *g*geogrid. Deflection or rutting shall not exceed 1 in. Any defect shall be repaired as directed. The first 6 in. of coarse aggregate No. 53 shall be spread and compacted with a 10 t roller in static mode. ~~The~~ *s*Spreading and compaction of the aggregate shall be performed so that ~~adequate~~

~~interlocking~~ of the aggregate and geogrid is obtained ~~interlock~~. The second 6 in. of coarse aggregate No. 53 shall be constructed in accordance with 301.

*When geogrid is specified for subbase or base applications, geogrid shall be placed as shown on the plans and in accordance with the manufacturer's guidelines.*

*When specified, the geogrid material supplier shall provide a qualified manufacturer's representative on site at the start of the work to assist the Contractor. The representative shall also be available during the construction when requested by the Engineer or the Contractor.*

The geogrid shall be overlapped a minimum of 2 ft side to side and end to end for *subgrade, subbase, and base applications* ~~type IB~~. ~~The type IA g~~Geogrids shall be overlapped 3 ft in areas where foundation conditions cannot support foot traffic or where 2 ft is found to be inadequate during fill placement. Overlaps shall be oriented in the direction of fill placement, or shingled, to prevent advancing fill from lifting any geogrid roll edges. Overlaps shall be further secured to prevent separation during fill placement. Damaged geogrid shall be patched. Patching shall include placement of a minimum of 3 ft of overlapped geogrid beyond the damaged area. If the damaged portion extends for more than 50% of the roll in the width direction, the entire width shall be replaced.

Geogrid shall be covered with fill within three calendar days after placement. Only that amount of geogrid required for pending work shall be placed to minimize exposure of the geogrid.

#### **(d) Geocell Confinement System**

The Contractor shall construct the grade in accordance with 203. A layer of geotextile shall be placed in accordance with 214.03(b) and shall be anchored at the roadway edge when widening or when intersecting an existing roadway. The geocell confinement system, GCS, shall be placed and anchored as shown on the plans, or as directed. The Contractor shall ensure that the GCS is anchored vertically and the geocell shall be filled with a minimum of ~~34~~ in. of coarse aggregate No. 5, No. 8, or No. 43. If the Contractor chooses No. 5 or No. 8, geotextile in accordance with 918.02(a), Type 1B shall be placed on the GCS before placing No. 53 or No. 73. The GCS shall be oriented with the smaller cell dimension perpendicular to the roadway. The remaining GCS shall be filled with ~~No. 53 or No. 73~~ and at least 98 in. of No. 53 or No. 73. ~~shall be placed on the GCS.~~ The aggregate shall be back dumped and compacted with a light roller in accordance with 301. No trucks or construction vehicles ~~shall~~ will be allowed on the GCS. A light tracked bulldozer or other equipment may be used as directed. ~~A~~The 6 in. lift above GCS shall be compacted with low frequency and amplitude, with a minimum of six passes. The remaining aggregate shall be placed and compacted lightly at first, then with high amplitude. Efforts shall be made to ensure that the geotextile and GCS are in tension. ~~The Contractor may propose an alternate means of providing a typical section for the GCS, and shall submit the proposal to the Engineer for review and approval. The proposal shall be certified by a professional engineer licensed in the State of Indiana.~~

*The Contractor may propose an alternate means of providing a typical section for the GCS, and shall submit the proposal to the Engineer for review and approval. The proposal shall be certified by a professional engineer registered in the State of Indiana.*

GCS shall be constructed in accordance with 207 and 214.

**214.04 Fill Placement**

Construction vehicles ~~shall~~ will not be allowed on the ~~geogrid~~ geosynthetic. The placement of the fill shall proceed forward along the roadway centerline and outward to the embankment edges and compacted in accordance with 203.23. The Engineer may waive density requirements for the first lift of embankment foundation treatment if the fill is determined to be too weak to support compaction equipment.

**214.05 Method of Measurement**

Geotextile for pavement, ~~and~~ subgrade, embankment, and moisture management will be measured by the square yard, for the type specified. Geotextile for coarse aggregate and drainage blankets will be measured in accordance with 301 and 616, respectively. Geogrid will be measured by the square yard, for the type specified. The quantity will be computed based on the total area of geosynthetics shown on the plans. The aggregate used for the embankment foundation improvement will be measured in accordance with 301.09. The geogrid reinforced subgrade, GCS, and the excavation required to place the GCS will be measured in accordance with 207.05.

~~The GCS and the excavation required to place the GCS will not be measured.~~

**214.06 Basis of Payment**

The accepted quantity of geotextile will be paid for at the contract unit price per square yard per type of geotextile. *Geotextile for subgrade and geotextile for embankment will be paid for as geotextile for pavement, for the type specified, at the contract unit price per square yard.* The accepted quantities of geogrid will be paid for at the contract unit price per square yard per type of geogrid. The aggregates will be paid for in accordance with 301.10. The geogrid reinforced subgrade will be paid for in accordance with 207.06.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit Symbol</b>
Geotextile for Moisture Management, _____ type	.....SYS
Geotextile for Pavement, _____ type	.....SYS
<del>Geotextile for Subgrade, _____</del> type	<del>.....SYS</del>
Geogrid, _____ type	.....SYS

The cost of furnishing the materials, manufacturer’s representative, all labor and equipment required for furnishing and placing the geotextile or geogrid, all work necessary to establish grades, geogrid splices, overlaps, stakes or pins, supplemental product test data, and patching or replacement of damaged geotextile or geogrid shall be included in the cost of this work.

The geocell confinement system, anchors, restraint clips, pins, necessary incidentals required to provide a complete in place system, and the Type IB geotextile if required for the GCS, shall be included in the cost of subgrade treatment in accordance with 207.06.

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