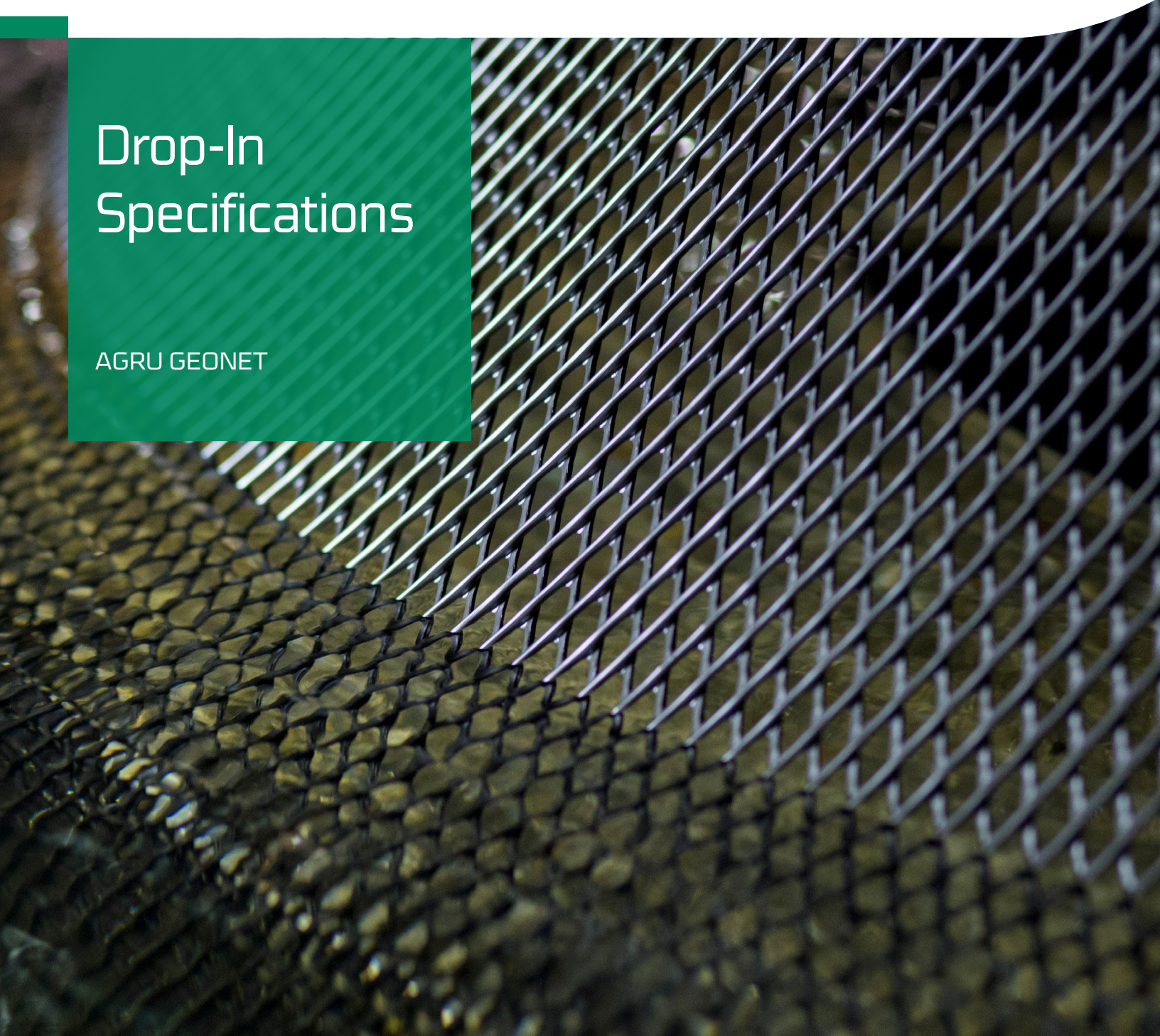




Drop-In Specifications

AGRU GEONET



The following drop-in specifications is a sample guideline to be customized by the engineer for preparing site specific specification. This information is provided for reference purposes only and is not intended as a warranty or guarantee. AGRU assumes no liability in connection with the use of this information. Please contact AGRU America for current specifications.

Part 1 GENERAL

1.1 SCOPE

1. This drop-in specification covers the technical requirements for the manufacturing and installation of the geonet drainage layer. All materials meet or exceed the requirements of this specification, and all work will be performed in accordance with the procedures provided in these project specifications.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM D 1238-13 Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
2. ASTM D 792-13 Standard Test Method for Density and Specific Gravity of Plastics by Displacement
3. ASTM D 4218-15 Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
4. ASTM D 4716-14 Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
5. ASTM D7179 Standard Test Method for Determining Geonet Breaking Force

1.3 DEFINITIONS

A. Construction Quality Assurance Consultant (CONSULTANT) - Party, independent from MANUFACTURER and INSTALLER that is responsible for observing and documenting activities related to quality assurance during the lining system construction.

B. ENGINEER - The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.

C. Geonet Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geonet rolls.

D. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY)- Party, independent from the MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the OWNER.

E. INSTALLER- Party responsible for field handling, transporting, storing and deploying the geonet.

F. Lot- A quantity of resin (usually the capacity of one rail car) used to manufacture polyethylene geonet rolls. The finished rolls will be identified by a roll number traceable to the resin lot.

1.4 QUALIFICATIONS

A. MANUFACTURER

1. Geonet shall be manufactured by the following:
 - a. AGRU America
 - b. Approved equal

2. MANUFACTURER shall have manufactured a minimum of 10,000,000 square feet of polyethylene geonet material during the last year.

B. INSTALLER

1. Installation shall be performed by one of the following installation companies (or approved equal):

a. AGRU America approved installer/dealer

2. INSTALLER shall have installed a minimum of [] square feet of geonet in the last [] years.

3. INSTALLER shall have worked in a similar capacity on at least [] projects similar in complexity to the project described in the contract documents, and with in at least [] square feet of geonet installation on each project.

4. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.

1.5 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

A. Labeling- Each roll of geonet delivered to the site shall be labeled by the MANUFACTURER. The label will identify:

1. Manufacturer's name
2. Product identification
3. Length
4. Width
5. Roll number

B. Delivery- Rolls of geonet will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.

C. Storage- The on-site storage location for the geonet, provided by the CONTRACTOR to protect the geonet from abrasions, excessive dirt and moisture shall have the following characteristics:

1. Level (no wooden pallets)
2. Smooth
3. Protected from theft and vandalism
4. Adjacent to the area being lined.

D. Handling

1. The CONTRACTOR and INSTALLER shall handle all geonet in such a manner as to ensure it is not damaged in any way.
2. The INSTALLER shall take any necessary precautions to prevent damage to underlying layers during placement of the geonet.

Part 2 PRODUCTS

2.1 GEONET PROPERTIES

A. A geonet shall be manufactured by extruding two crossing strands to form a bi-planar drainage net structure.

B. The geonet specified shall have properties that meet or exceed the values listed in the following tables below.

TABLE 1: GEONET PROPERTIES

Properties below are Minimum Average Roll Values unless otherwise specified:

Thickness – ASTM D5199	Density – ASTM D792, B	Tensile – ASTM D5035	Melt Flow – ASTM D1238*	Carbon Content ASTM D4218	Transmissivity ASTM D4761**
200 mils	0.940 g/cc	45 lb	<1.0 g/10 minutes	>2.0	2 x 10 ⁻³ m ² /s
250 mils	0.940 g/cc	55 lb	<1.0 g/10 minutes	>2.0	3 x 10 ⁻³ m ² /s
275 mils	0.940 g/cc	65 lb	<1.0 g/10 minutes	>2.0	6 x 10 ⁻³ m ² /s
300 mils	0.940 g/cc	75 lb	<1.0 g/10 minutes	>2.0	8 x 10 ⁻³ m ² /s

*Measured at 190°C, 2.16 kg

** Measured at 10,000 psf, gradient of 0.1, seat time of 15 minutes between stainless steel plates

C. Resin

1. Natural resin (without carbon black) shall meet the following additional minimum requirements:

TABLE 2: RAW MATERIAL PROPERTIES

Property	Test method	Frequencies	Value
Density (g/cc)	ASTM D 792, Method B	Once Per Lot	>0.94
Melt Flow Index (g/10 min)	ASTM D 1238	Once Per Lot	< 1.0

2.2 MANUFACTURING QUALITY CONTROL

A. The geonet and/or geocomposite shall be manufactured in accordance with the Manufacturer’s Quality Control Plan submitted to and approved by the ENGINEER.

B. The geonet shall be tested according to the test methods and frequencies listed below:

TABLE 3: GEONET COMPONENT TEST FREQUENCIES

Test Property	Test Method	Frequency
Thickness	ASTM D5199	50,000 SF
Tensile	ASTM D5035	50,000 SF
Melt Flow	ASTM D1238	Per lot
Density	ASTM D792, B	50,000 SF
Carbon Content	ASTM D4218	50,000 SF
Transmissivity	ASTM D4716	500,000 SF

Part 3 EXECUTION

3.1 FAMILIARIZATION

A. Inspection

1. Prior to implementing any of the work in the Section to be lined, the INSTALLER shall carefully inspect the installed work of all other Sections and verify that all work is complete to the point where the installation of the Section may properly commence without adverse impact.
2. If the INSTALLER has any concerns regarding the installed work of other sections, he shall notify the Project ENGINEER.

3.2 MATERIAL PLACEMENT

A. The geonet roll should be installed in the direction of the slope and in the intended direction of flow unless otherwise specified by the ENGINEER.

B. If the project contains long, steep slopes, special care should be taken so that only full-length rolls are used at the top of the slope.

C. In the presence of wind, all geonets shall be weighted down with sandbags or the equivalent. Such sandbags shall be used during placement and remain until replaced with cover material.

D. If the project includes an anchor trench at the top of the slopes, the geonet shall be properly anchored to resist sliding. Anchor trench compacting equipment shall not come into direct contact with the geonet.

E. In applying fill material, no equipment can drive directly across the geonet. The specified fill material shall be placed and spread utilizing vehicles with a low ground pressure.

F. The cover soil shall be placed in the geonet in a manner that prevents damage to the geonet. Placement of the cover soil shall proceed immediately following the placement and inspection of the geonet.

3.3 SEAMS AND OVERLAPS

A. Each component of the geonet will be secured to the like component at overlaps.

B. Geonet Components

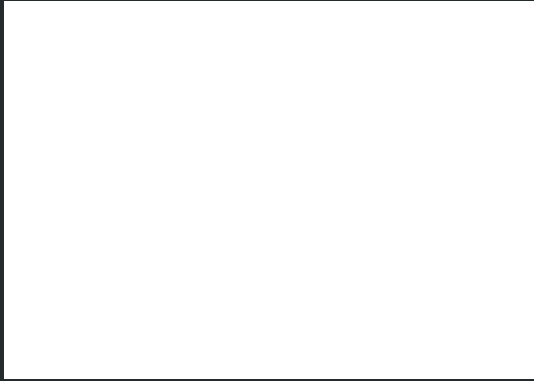
1. Adjacent edges along the length of the geonet roll shall be overlapped a minimum of 6" or as recommended by the engineer.
2. The overlapped edges shall be joined by tying the geonet structure with cable ties. These ties shall be spaced every 5 feet along the roll length.
3. Adjoining rolls across the roll width should be shingled down in the direction of the slope and joined together with cable ties spaced every foot along the roll width.

3.4 REPAIR

A. Prior to covering the deployed geonet, each roll shall be inspected for damage resulting from construction.

B. Any rips, tears or damaged areas on the deployed geonet shall be removed and patched. The patch shall be secured to the original geonet by tying every 6 inches with the approved tying devices. If the area to be repaired is more than 50 percent of the width of the panel, the damaged area shall be cut out and the two portions of the geonet shall be cut out and the two portions of the geonet shall be joined in accordance with Subsection 3.03.

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