

# Geocomposite Closure Solution

AN AGRU SPIN TO A  
TRADITIONAL SYSTEM







# The Plastics Experts.

AGRU America uses state-of-the-art equipment and the flat-die calendar process to manufacture structured geomembranes with a consistent core thickness and greater physical properties than those made with other processes, such as blown film extrusion. AGRU uses only the highest-grade HDPE and LLDPE resins available in North America.

The AGRU success story has been unfolding for seven decades. Founded in 1948 by Alois Gruber, who set the company on the course for plastic manufacturing, AGRU has become one of the world's most important single-source suppliers for piping systems, semi-finished products, concrete protection liners, and lining systems made from engineered plastics. We use only top-grade thermoplastic polymers as our raw materials. When it comes to application-technical consulting, we are your best partner in the field.



## Quality

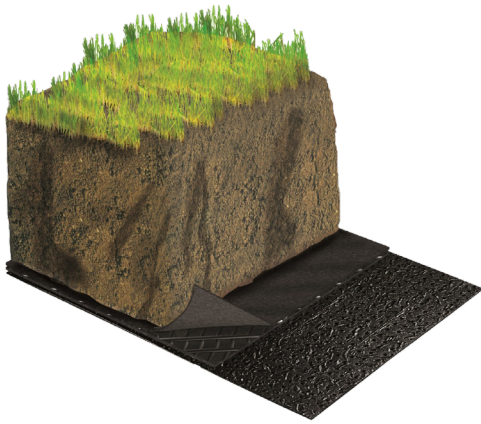
Customer satisfaction comes first at AGRU. For instance, technical consultations, training courses, and on-site assistance are among the services offered by AGRU to support customers. Additionally, AGRU procedures help ensure that products comply with international norms, as monitored and evaluated on an ongoing basis according to standards set by independent testing agencies. Our start-to-finish attention to quality ensures that our products meet and exceed the strictest technical specifications, providing safe operation within municipal solid waste, coal combustion residual (CCR), mining, oil & gas, water, and wastewater infrastructures.

# Geocomposite Closure System

A typical EPA Subtitle D-compliant closure and containment project requires a high-quality, low-permeability liner to prevent rainfall percolation from entering the waste containment area. Additionally, a drainage layer, soil cover, and vegetative layer are added for slope stability, additional fluid and gas control, and long-term protection against erosion. AGRU America's Geocomposite Closure Solution delivers on this traditional system with the added benefit of more than half a century of geosynthetic manufacturing expertise and quality control.

AGRU's Geocomposite Closure Solution (GCS) utilizes two categories of AGRU products for the protective layer and the drainage layer. The low-permeability protective layer utilizes AGRU MicroSpike or AGRU Smooth Liner geomembrane. This geomembrane layer is made of high-grade polyethylene that can be uniformly coextruded with a spikes, studs, or color layers to meet your exact project specifications.

This traditional closure system utilizes a cost-saving geocomposite drainage layer and offers among the highest and most consistent asperity height available on the market, providing consistent and dependable shear strengths.



## Summary

- A traditional closure solution that base drainage and environmental containment performance into a single system.
- Cost-efficient geocomposite material provides moderate drainage for minimal footprint.
- High factor of safety for steep-slope stability.
- Applications include closure projects, double-lined ponds/reservoirs/pits, and containment pads for landfills and coal combustion residuals.
- Installs up to two times faster compared with gravel-based drainage layers.

## Applications

### Containment

GCS is a cost-saving containment solution for double-lined ponds, reservoirs, pits, and containment cells because it can be configured based on the project specifications. The configuration will depend largely on the steepness of the slope of the containment area and normal load above the system. GCS configurations for ponds, reservoirs, containment cells and pits:

- Primary Geomembrane: Choose depending on the steepness of the slope.
  - Smooth Liner
  - MicroSpike Liner.
- Secondary Geomembrane with GCS:
  - Geocomposite over Smooth Liner -or-
  - Geocomposite over MicroSpike Liner.

### Closure

GCS is an effective closure solution for landfills as it can be configured based on the project specifications. The configuration will depend largely on the steepness of the slope of the closure area. The steepest slopes would benefit stability-wise utilizing AGRU's Super Gripnet Liner, or the Integrated Drainage System (IDS).

GCS configurations for landfill closures:

- Geocomposite Drainage layer
- Low-permeability layer
  - Smooth Liner -or-
  - MicroSpike Liner.





### The Polyethylene Advantage

All AGRU geomembrane products are available in two high-quality resin types: high-density polyethylene (HDPE) or linear low-density polyethylene (LLDPE). AGRU geomembranes meet and exceed all GRI GM 13 (HDPE) and GRI GM 17 (LLDPE) test values.

For assistance in choosing the GCS configuration that best aligns with your project, or to find out about our Integrated Drainage Solution or ClosureTurf system, reach out to an AGRU sales representative at 800-373-2478 or visit online at <http://agruamerica.com/contact>.

## Geocomposite Closure Solution Component Specifications

AGRU GCS is a customizable system with several component options for each layer depending on the specific requirements of the project. Below is a breakdown of all GCS components and their available specifications.

### AGRU Smooth Liner®

Smooth Liner is ideal for any application that requires a tough and flexible barrier, minimal interface friction performance, a broad range of chemical resistance and capable of delivering high performance over the project's lifetime.

#### Technical Specifications

- Available in thickness between 30 mm and 100 mm
- Available in white for improved thermal expansion and contraction performance
- Rolled on 23' wide plastic cores to ensure ease of installation, increased safety while unloading or staging eliminating the problem of collapsed cores.

### AGRU MicroSpike® Liner

MicroSpike Liner features consistent texture and friction angle values, making it the material of choice in containment applications where slope stability is essential. To create MicroSpike, AGRU uses the patented manufacturing process called flat die-cast extrusion. Flat die-cast extrusion provides uniform asperity height that is also higher than competitive products.

#### Technical Specifications

- MicroSpike made with LLDPE offers 400% Elongation at Break (HD 350%)
- Most consistent textured surface and core thickness available in industry
- Available in thickness between 30 mm and 100 mm
- Four customizable colors: black/white, green, or natural.

# Alternate Systems

## Integrated Drainage System

Integrated Drainage System (IDS) is a Subtitle D-compliant closure and containment system that incorporates an advanced drainage structure within the Super Gripnet and Drain Liner products. By combining geomembrane sheet and a drainage layer equivalent to geonet into one product, AGRU provides a powerful closure and containment solution that also delivers significant cost savings. IDS offers increased shear strength performance, reliable long-term drainage performance, a reduction in required geosynthetic material, and reduced installation time and cost. As of 2017, over 140 million square feet of IDS has been installed and in use for closure and containment applications.



## ClosureTurf®

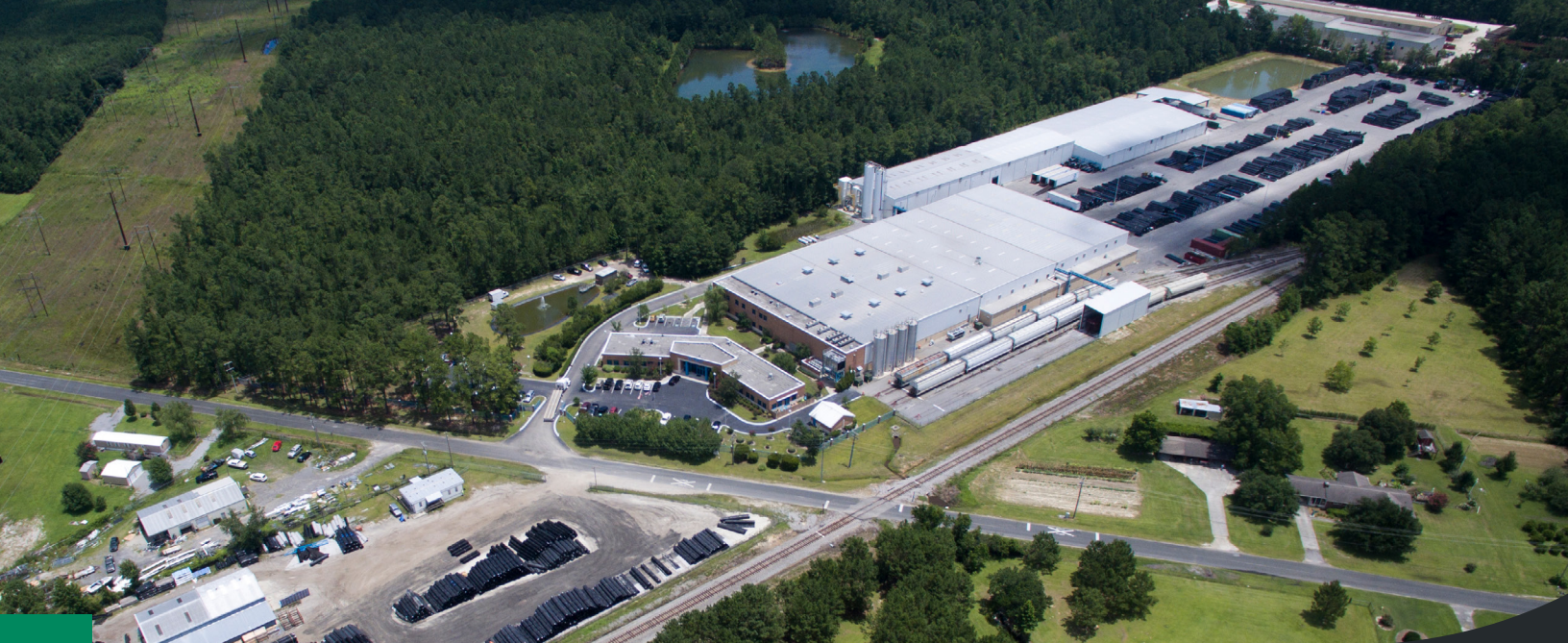
ClosureTurf® is a patented final cover system comprising AGRU's Super Gripnet® or MicroSpike® geomembrane overlain by an engineered synthetic turf and specified infill material. It is a proven hybrid composite closure system that outperforms earlier closure methodologies and is the only system that provides a predictable level of performance when subjected to severe weather conditions that occur in a post-closure timeframe. ClosureTurf is an EPA Subtitle-D and Federal CCR Rule-compliant final cover system that can be installed more than 50% faster than traditional closure systems, which utilize cover soil materials. ClosureTurf eliminates the need for large quantities of soil and related equipment usage, cost, borrow pit and hauling operations, thus dramatically improving site safety and decreasing its carbon footprint by almost 80%. ClosureTurf® reduces average maintenance costs by approximately 90% per acre per year. This final cover system also dramatically improves runoff water quality, making it an effective tool for best management practice in relation to Clean Water Act requirements.



CLOSURETURF® is a U.S. registered trademark which designates a product from Watershed Geosynthetics, LLC. This product is the subject of issued U.S. and foreign patents and/or pending U.S. and foreign patent applications.

  
**ClosureTurf®**  
A Watershed Geo Patented Product





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