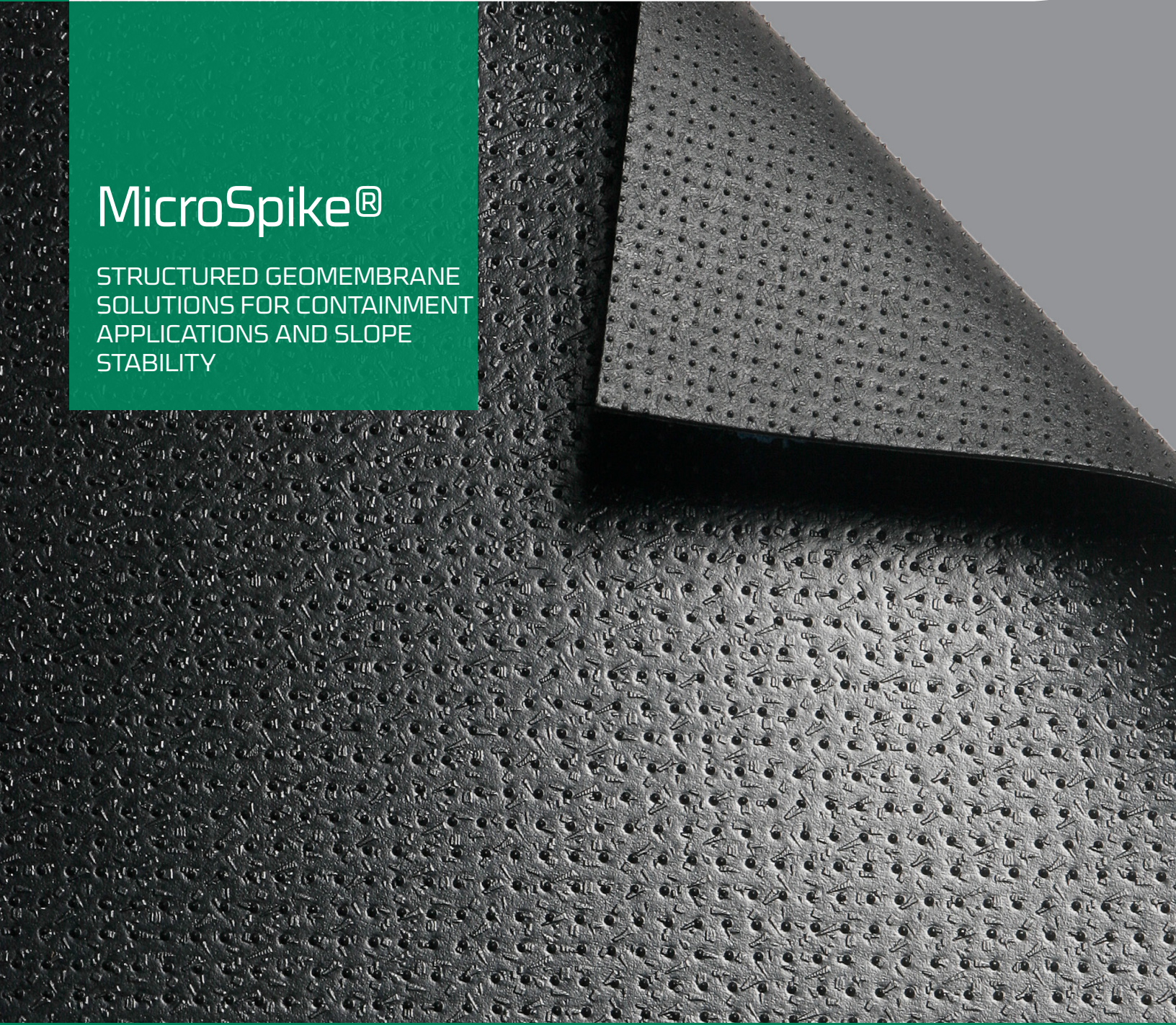


MicroSpike®

STRUCTURED GEOMEMBRANE
SOLUTIONS FOR CONTAINMENT
APPLICATIONS AND SLOPE
STABILITY





The Plastics Experts.

AGRU America's structured geomembranes are manufactured on state-of-the-art manufacturing equipment using the flat die calender manufacturing process, a method that produces a more consistent core thickness and greater physical properties than other processes, such as the blown film extrusion process. AGRU uses only the highest-grade HDPE and LLDPE resins manufactured in North America.

The AGRU success story has been unfolding now for about seven decades. Founded in 1948 by Alois Gruber Sr., the company has grown to become one of the world's most important single-source suppliers for geosynthetic materials, piping systems, semi-finished products and concrete protection liners made from engineered plastics. Our ability to manufacture and supply everything from a single source is a unique differentiator. And, when it comes to application-technical consulting, we are your best partner.



Quality

At AGRU, customer satisfaction comes first. 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.

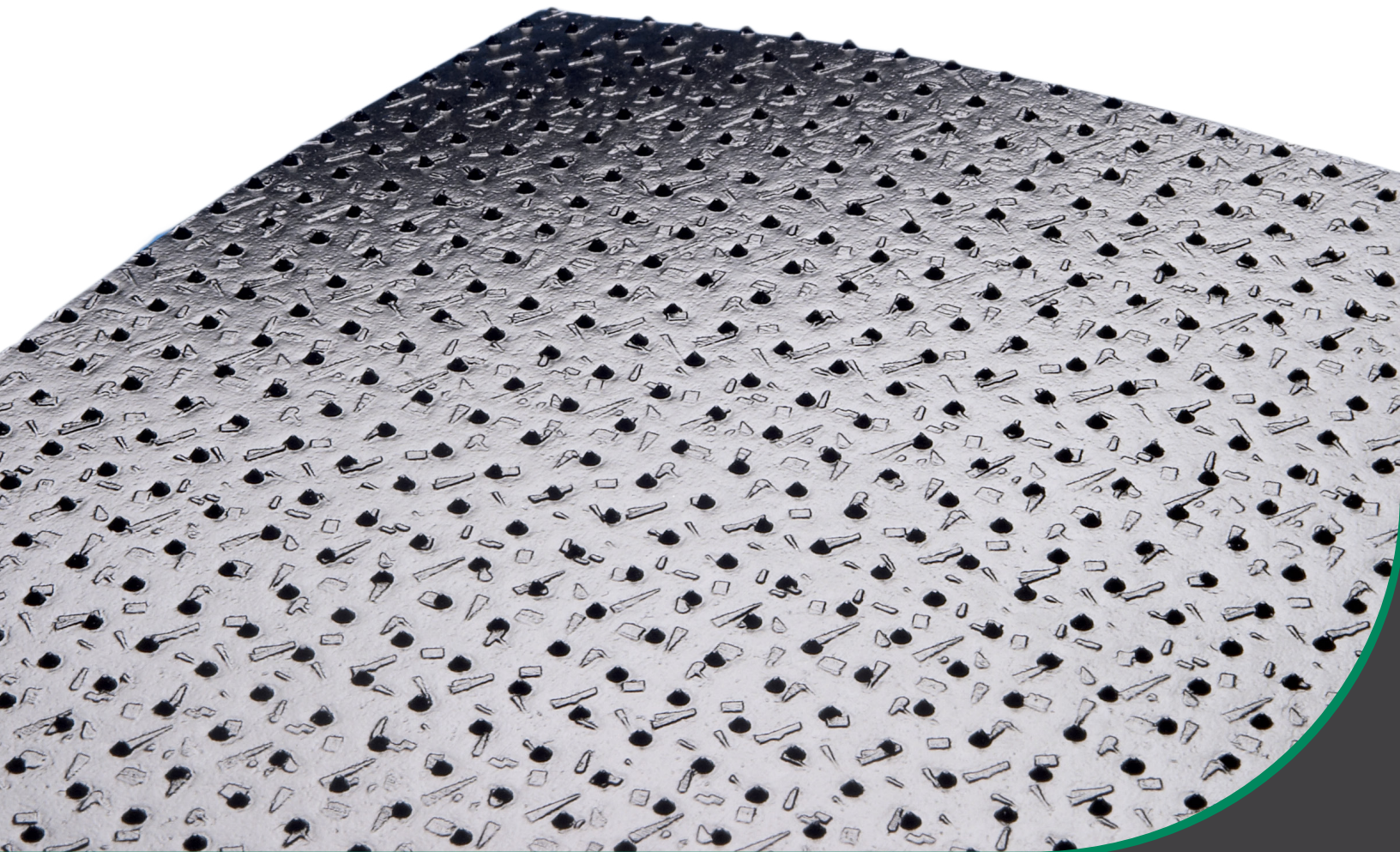
HDPE and LLDPE MicroSpike® Liner

AGRU America manufactures structured geomembranes, including MicroSpike®. MicroSpike is available as a high-density polyethylene (HDPE) or liner low-density polyethylene (LLDPE) geomembrane. Consistent texturing patterns and asperity height allows for more reliable and predictable interface shear strength.

This textured geomembrane is the material of choice in containment applications where slope stability is critical. To create MicroSpike, AGRU uses the manufacturing process called flat die-cast extrusion.

MicroSpike Summary

- Consistent texturing and interface shear strength
- Available in thickness between 30 mil and 100 mil
- Manufactured with HDPE or LLDPE
- Available colors: black/white, green, or natural
- Available as a single- or double-sided textured geomembrane





The MicroSpike® Advantage

MicroSpike HDPE and LLDPE geomembranes provide a number of advantages over competing products including blown film textured geomembranes.

Reliability

The reproducible interface shear strength in MicroSpike gives design engineers confidence that they have designed a system that will meet or exceed project design requirements with greater factors of safety and reliability.

Consistent Material

The structured “micro spikes” are completely integrated within the geomembrane.

Highest Tensile Values

MicroSpike LLDPE geomembrane has a 400% Elongation at Break (HD 350%), in an industry where the standard is only 250% (HD 100%)*. AGRU’s calendared structured manufacturing process produces a consistent core thickness, resulting in the highest tensile values available in the industry. *Industry standard based on tensile elongation values from GRI GM 13 and GM 17

High Interface Shear Strength

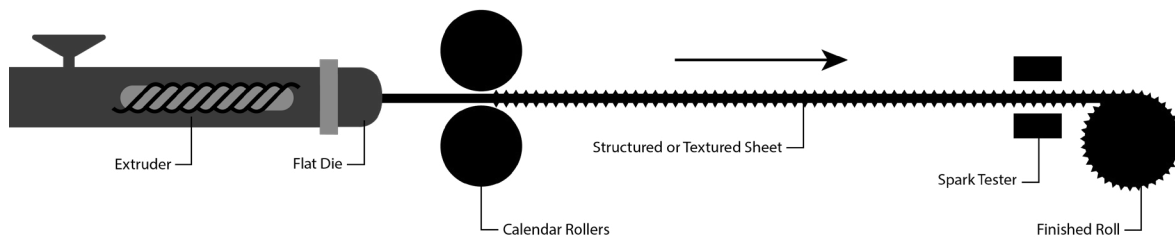
Exceptional shear resistance between soil and geotextile components allows flexibility and stability during protective cover material placement. The structured geomembrane’s asperity height is not only consistent, but also higher than competitive textured products.

Flat Die-Cast Extrusion Process

AGRU America's calendared liner manufacturing process produces the structured liner with a consistent core thickness and texturing. A consistent core thickness and texturing gives MicroSpike geomembranes reproducible friction angle values.

By extruding materials in-house, AGRU can manufacture one-layer products with unique surface structures such as spikes or drain studs. All AGRU geomembranes feature uniform structure and appearance throughout, and are preferred by installation contractors, owners and engineers for the ease-of-installation, durability, and high quality.

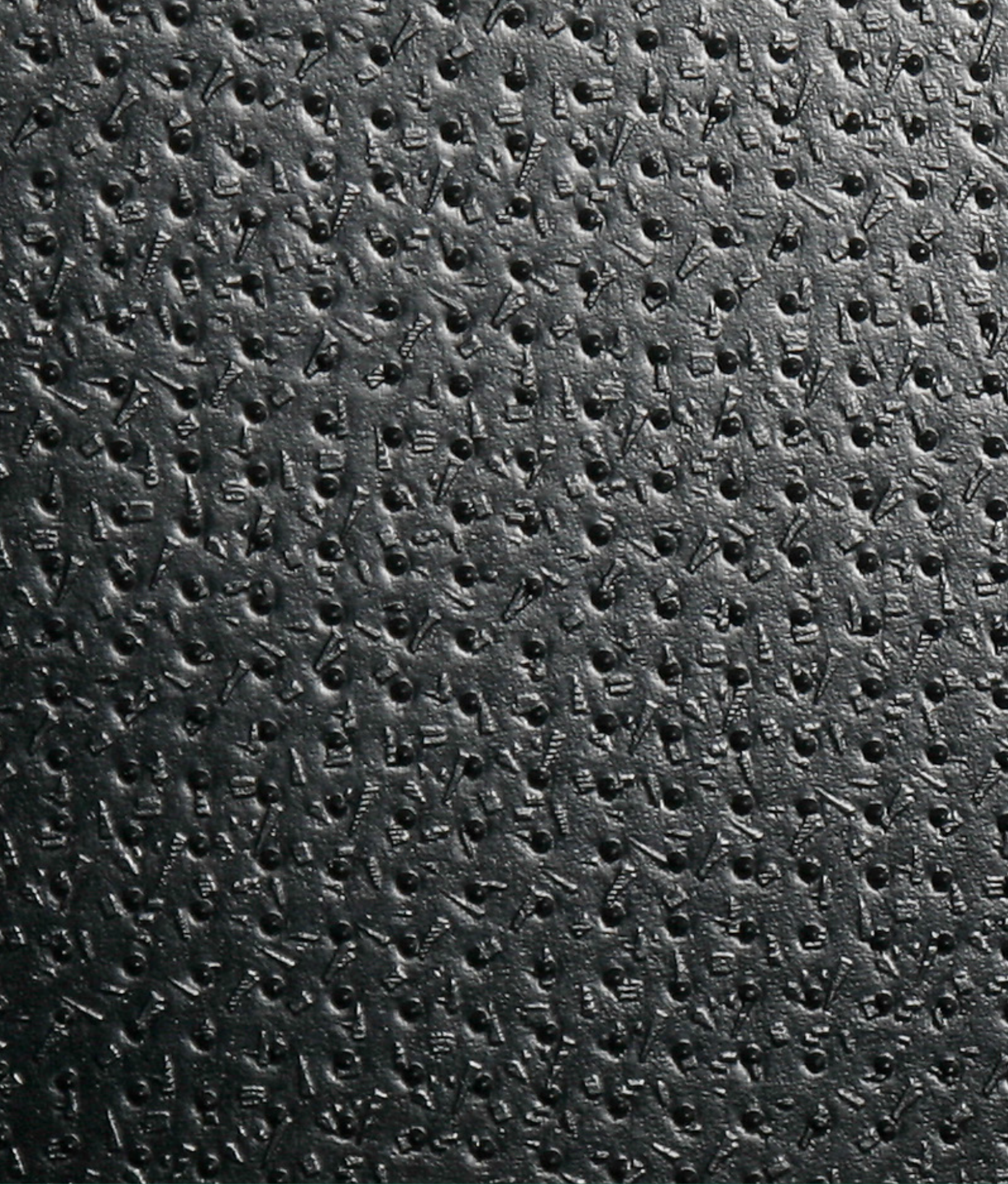
MicroSpike geomembranes are manufactured to meet or exceed current industry standards including GRI GM 13 (HDPE) and GRI GM 17 (LLDPE) test values, frequency of testing, and functional requirements. The MicroSpike textured geomembrane has smooth edges to allow for high-quality thermal fusion welding between adjacent sheets. All AGRU geomembrane material is rolled on solid plastic pipe cores to ensure ease of installation without damage to the rolled material.

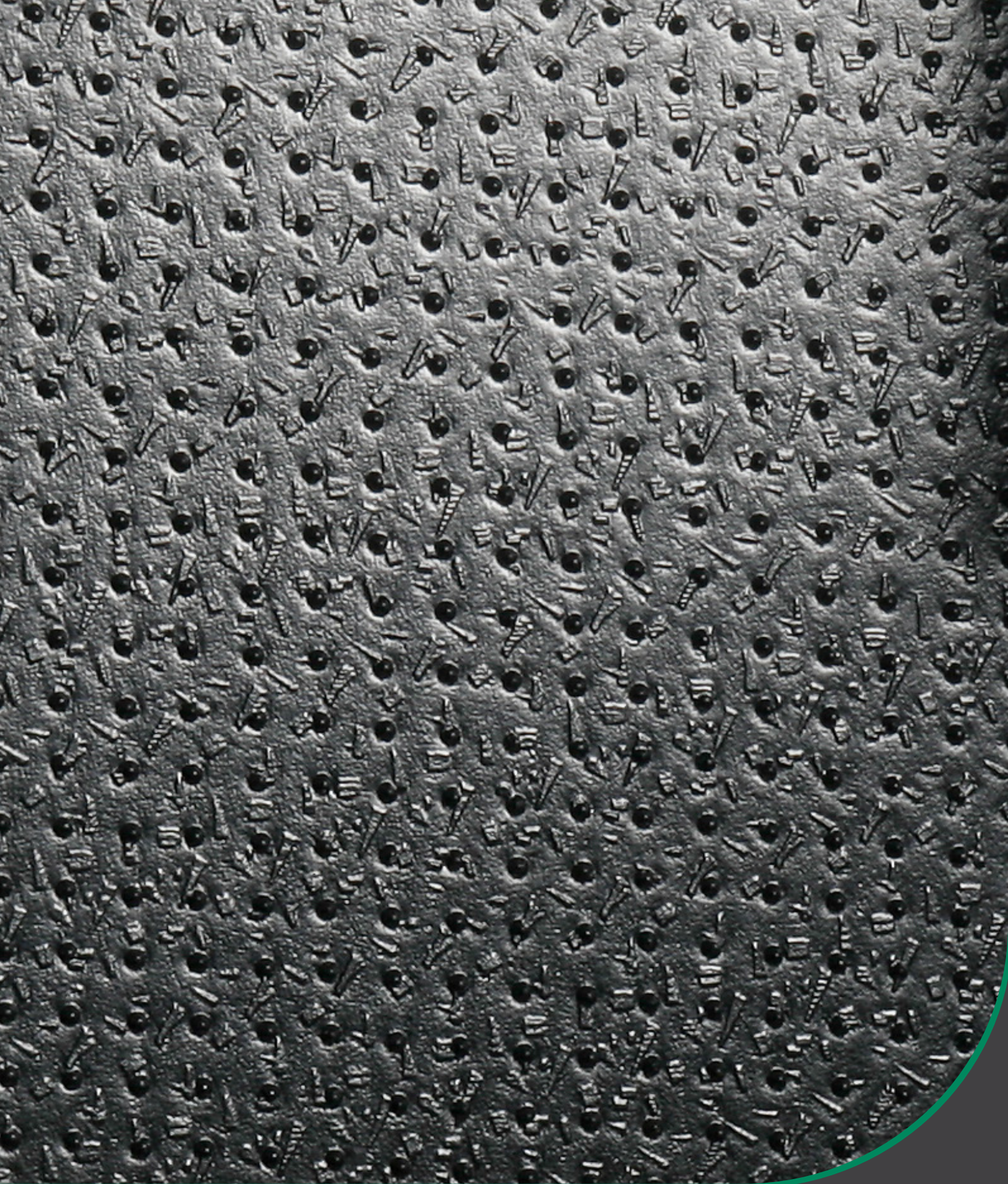


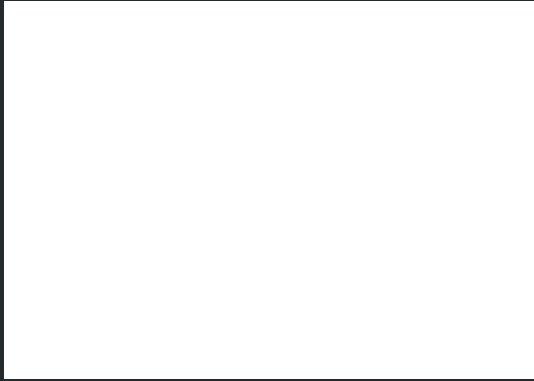
Comparative Properties for Design Considerations

Table 1. Blown film co-extruded textured surface vs. MicroSpike® structured texture surfaces

Design Consideration	Blown Film	MicroSpike® Structured
Consistent Core Thickness	No	Yes
Consistent Surface Texture	No	Yes
Consistent Asperity Height	No	Yes
Consistent Interface Friction	No	Yes







Subject to errors of typesetting, misprints and modifications.
Illustrations are generic and for reference only.

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