



TECHNICAL DATA SHEET (TDS)

HDPE GEOCELL

Cellular Confinement System for Soil Stabilization & Ground Reinforcement

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1. PRODUCT DESCRIPTION

HDPE Geocell is a three-dimensional cellular confinement system manufactured from high-quality High Density Polyethylene (HDPE) strips that are ultrasonically welded together to form a flexible honeycomb structure. When expanded on-site and filled with suitable aggregate, soil, concrete, or recycled materials, the system creates a stable composite layer that improves load distribution, reduces settlement, minimizes lateral movement, and enhances structural performance.

The system is designed for demanding civil engineering, transportation, mining, environmental, hydraulic, and landscaping applications where long-term soil stabilization and erosion protection are required.

2. FEATURES & BENEFITS

- High load-bearing capacity
- Excellent soil confinement
- Superior load distribution
- Outstanding erosion control
- High tensile strength
- Excellent seam weld strength
- UV stabilized
- Chemical resistant
- Corrosion resistant
- Flexible and lightweight
- Quick installation
- Reduces aggregate requirements
- Increases pavement life
- Environmentally friendly
- Long service life



- Low maintenance cost

3. TYPICAL APPLICATIONS

Transportation

- Highway subgrade stabilization
- Road base reinforcement
- Unpaved roads
- Temporary access roads
- Airport pavements
- Railway ballast stabilization
- Heavy haul roads

Civil Engineering

- Foundation stabilization
- Embankment reinforcement
- Working platforms
- Load transfer platforms
- Parking areas
- Industrial yards

Hydraulic Engineering

- Canal lining
- Drainage channels
- Riverbank protection
- Spillways
- Water reservoirs

Mining

- Haul roads
- Tailings dams
- Working platforms
- Equipment pads



Slope Protection

- Steep slopes
- Vegetated slopes
- Retaining walls
- Hillside stabilization

Environmental Engineering

- Landfills
- Erosion control
- Green infrastructure
- Landscape reinforcement

4. MATERIAL COMPOSITION

Component	Content
High Density Polyethylene (HDPE)	95–97%
Carbon Black	2–3%
UV Stabilizers	<1%
Antioxidants	<1%
Processing Additives	Trace

5. PRODUCT CONFIGURATIONS

Parameter	Available Options
Cell Height	50, 75, 100, 150, 200 mm
Strip Thickness	1.0, 1.2, 1.5, 1.7 mm
Surface Type	Smooth or Textured
Perforation	Perforated / Non-perforated
Color	Black
Panel Size	Custom available



6. TYPICAL TECHNICAL PROPERTIES

Property	Test Method	Typical Value
Polymer	ASTM D1505	HDPE
Density	ASTM D1505	$\geq 0.940 \text{ g/cm}^3$
Strip Thickness	ASTM D5199	1.0–1.7 mm
Carbon Black Content	ASTM D4218	2.0–3.0%
Carbon Black Dispersion	ASTM D5596	Category A1–A3
Tensile Strength	ASTM D638	$\geq 20 \text{ MPa}$
Yield Elongation	ASTM D638	$\geq 12\%$
Break Elongation	ASTM D638	$\geq 700\%$
Seam Peel Strength	Manufacturer Standard	$\geq 1,000 \text{ N}$
Seam Weld Strength	Manufacturer Standard	$\geq 1,400 \text{ N}$
Environmental Stress Crack Resistance	ASTM D5397	$\geq 500 \text{ hours}$
Oxidative Induction Time	ASTM D3895	$\geq 100 \text{ min}$
High Pressure OIT	ASTM D5885	$\geq 400 \text{ min}$

Typical values may vary depending on the selected model and thickness.

7. PHYSICAL PROPERTIES

Property	Value
Material	High Density Polyethylene
Appearance	Cellular honeycomb structure
Color	Black
Specific Gravity	$0.94\text{--}0.97 \text{ g/cm}^3$
Water Absorption	Negligible
Water Permeability	Impermeable strip material
UV Resistance	Excellent
Chemical Resistance	Excellent
Biological Resistance	Excellent



8. MECHANICAL PERFORMANCE

The cellular confinement system:

- Increases bearing capacity
- Minimizes rutting
- Reduces differential settlement
- Improves subgrade stability
- Restrains lateral aggregate movement
- Enhances fatigue resistance
- Improves pavement life
- Reduces maintenance requirements

The three-dimensional confinement mechanism significantly improves the structural performance of weak soils by distributing loads over a larger area.

9. CHEMICAL RESISTANCE

Excellent resistance against:

- Acids
- Alkalis
- Salts
- Industrial wastewater
- Fertilizers
- Sewage
- Petroleum-contaminated soils
- Ground chemicals
- Corrosion

HDPE is resistant to most chemicals encountered in civil engineering applications.



10. UV & WEATHER RESISTANCE

Manufactured using premium UV-stabilized HDPE incorporating carbon black for long-term outdoor durability.

Resistant to:

- Ultraviolet radiation
- Oxidation
- Freeze-thaw cycles
- Moisture
- Weathering
- Soil microorganisms

Properly installed HDPE geocells can provide decades of service in outdoor applications.

11. INSTALLATION

Installation generally consists of:

1. Prepare and level the subgrade.
2. Expand geocell panels to the required dimensions.
3. Anchor panels using stakes or anchors.
4. Connect adjacent panels where required.
5. Fill cells with specified infill material.
6. Compact the infill to the required density.
7. Apply surface treatment if required.

Installation should follow project specifications and accepted geosynthetic engineering practices.

12. STORAGE & HANDLING

- Store in original packaging.
- Keep on a clean, dry, level surface.
- Protect from mechanical damage.



- Avoid prolonged exposure before installation.
- Keep away from open flames and excessive heat.
- Lift with appropriate equipment.

13. QUALITY CONTROL

Each production batch is routinely tested for:

- Strip thickness
- Material density
- Tensile strength
- Carbon black content
- Carbon black dispersion
- Weld integrity
- Dimensional accuracy
- Visual inspection

14. COMPLIANCE & STANDARDS

Manufactured and tested in accordance with applicable international standards, including:

- ASTM D1505
- ASTM D638
- ASTM D5199
- ASTM D4218
- ASTM D5596
- ASTM D5397
- ASTM D3895
- ASTM D5885

Additional testing and certification are available upon project requirements.

15. ADVANTAGES

- Faster construction
- Reduced excavation depth
- Lower aggregate consumption
- Increased pavement service life



- Improved bearing capacity
- Reduced project cost
- Sustainable engineering solution
- Easy transportation and installation
- Adaptable to complex terrain

16. PACKAGING

The product is supplied folded in compact panels and packaged for safe transport.

Standard packaging includes:

- Protective wrapping
- Product identification label
- Batch number
- Manufacturing date
- Quality inspection label

Custom packaging is available upon request.

17. SERVICE LIFE

When installed in accordance with accepted engineering practices and protected by appropriate cover materials, HDPE Geocell systems are designed to provide a service life exceeding **50 years** in most civil engineering applications.

18. WARRANTY

Products are manufactured under strict quality management procedures and supplied in accordance with agreed specifications. Warranty terms are subject to the applicable sales contract and project-specific requirements.



19. DISCLAIMER

The information contained in this Technical Data Sheet is based on current manufacturing knowledge and industry practice. The values shown are typical and should not be interpreted as guaranteed minimum specifications unless specifically stated in a purchase agreement. Users are responsible for verifying the suitability of the product for their intended application. The manufacturer reserves the right to improve or modify product specifications without prior notice as part of its continuous product development program.